WANTS YOU TO JOIN AS A NEW MEMBER OR AS A RENEWED MEMBER

Please consider joining the Charleston Chapter of Sigma Xi. Sigma Xi, The Scientific Research Society, is the international society of science and engineering. In addition to all of the national and international efforts of the Society, your membership will afford you immediate local benefits. The Charleston Chapter is one of the few that is not affiliated with a single University, with members from the Medical University of South Carolina, The College of Charleston, The Citadel, Trident Tech, Bayer Corporation, NOAA, and SCDNR. Membership in the Charleston Chapter brings you into immediate contact with scientists from all disciplines and in all work environments in our area.

Please consider nominating yourself for membership or renewing your membership and then enjoy the benefits:

• **Subscription to the American Scientist.** The American Scientist, published bimonthly since 1913, contains articles to inform scientists and engineers about developments outside of their own fields.

• **Grants-in-Aid of Research.** Small grants to encourage the professional development of new scientists.

• **Support of Charleston Area Schools.** Our Chapter members serve as consultants for local teachers, give classroom presentations to encourage student interest in science, judge science fair projects, host classes for field trips to professional sites, and much more.

• **Support of Charleston Area Undergraduate and Graduate Research.** Our Chapter sponsors awards for Outstanding Research Presentations by students at MUSC’s Student Research Day, CofC’s Marine Biology Colloquium, The Citadel’s Undergraduate Research Conference and the Annual Meeting of the South Carolina Academy of Sciences.

• **Local Professional Talks.** Throughout the year our Chapter sponsors research seminars and field activities featuring our own members and the broad range of scientific disciplines in which they are engaged.

• **National Speakers.** At least once a year, we bring in a Sigma Xi National speaker. In recent years, the visit of our National speaker has been the highlight of “Darwin Week” – a week-long seminar series in February to celebrate Darwin’s birthday.

• **Annual Banquet.** Once a year, each spring, we recognize the outstanding accomplishments of scientists and teachers in our Chapter and we have a keynote address of particular scientific or policy interest to the members of our Chapter.

• **Chapter Listserver.** Our chapter sponsors Chs-Sci-Net, the best way to stay informed about all manner of science activities in the Lowcountry and throughout South Carolina.

To join, complete the nomination form available at: [http://www.sigmaxi.org/member/join/nom.html](http://www.sigmaxi.org/member/join/nom.html). We can provide nomination signatures if you do not know other Sigma Xi members.

New member dues: $90 (students $25) + one time $20 initiation fee (chapter dues waived). Transitional dues for recent graduates (e.g. postdocs): $45.00 + $20 initiation fee.
The Corn Lab develops and uses next-generation genome editing and regulation technologies to enable fundamental biological discoveries and develop potential therapies for human genetic diseases. The lab focuses on the mechanisms by which cells repair their DNA and use ubiquitin signaling to propagate cellular signals. Through technology development, mechanistic cellular biochemistry, and translational projects, they are working to unravel complex cellular phenotypes to further biological understanding and improve human health.
ACKNOWLEDGEMENTS

The Perry V. Halushka Research Day Endowment
In 2006, in recognition of the many years of service given by their father, Dr. Perry V. Halushka, to the Medical University, Francine Halushka Katz, Marc Halushka, M.D., Ph.D., and Suzanne Friedman and their families have established, through the MUSC Foundation, The Dr. Perry V. Halushka Research Day Endowment. This endowment will help to support the activities of Student Research Day in perpetuity. Specifically, the endowment will enable the University to:

- Provide monetary awards for outstanding research presentations
- Attract world-class scientists as guest keynote speakers
- Provide funds to support the annual MUSC Research Day event

MUSC Sponsors:

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The MUSC Graduate Alumni Association
The Graduate Student Association
The MUSC Library

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The MUSC Research Day Committee

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Kate Williams College of Graduate Studies, Student Representative
Caroline Fugle College of Graduate Studies, Student Representative
Diana Fulmer College of Graduate Studies, Student Representative
Bradley Krisanits College of Graduate Studies, Student Representative
INFORMATION FOR PARTICIPANTS

Poster Presentation Sessions:

Poster sessions will be held in the Harper Student Center Gym. You are encouraged to view the posters currently on display on the walls of the Basic Science Building and at other locations around campus for examples of poster layout, design and size. For assistance with poster design and content, contact the MUSC Center for Academic Excellence. Most poster support boards are approximately 3’ 6” tall by 5’ 6” wide. Poster support boards will be available by 7:30 am on Friday, November 13th, with numbers corresponding to the abstract numbers in this program. Posters should be in place by 8:30 am and should remain in place until 11:30 noon. The times indicated for your session in the program are the times we expect that the judges will be in attendance. Do not remove your poster before 11:30 noon. If you have a scheduling conflict and can only be present to win door prizes, as part of the prizes that are in addition to the regular session prizes be a 1st place prize of $500 and a 2nd place prize of $200. The Awards Ceremony will

Awards Ceremony:

A MUSC catered lunch for presenters and other student attendees in the Harper Center Gym at 11:00 am.


donuts and soft drinks will be available from 9:30 am – 11:30 pm in the Harper Center Gym. There will be a MUSC-catered lunch for presenters and other student attendees in the Harper Center Gym at 11:00 am.


Oral Presentation Sessions:

Most of the oral sessions will be in the Colbert Education Center and Library in several rooms on the first floor. Sessions will take place in the 1st floor lecture rooms: please check the program for specific room assignments. Computer projection using a PC platform will be available. You can either save your presentation on a CD, to your homeroom or on a memory stick. Ensure that your presentation loads and runs correctly before you save it. Download your presentation to the desktop of the computer in the room where you will be presenting; do this BEFORE the start time of your session on Friday, November 4th. Oral presentation time slots are 15 minutes. An oral presentation should last 10 minutes with the remaining time for questions. The 15-minute time slot will be strictly adhered to by the session judges – you will receive a warning at minus 3 minutes. Remember that question handling is one of the criteria being evaluated and if you leave no time for questions, you will lose points.

Judging:

Teams of 3 judges will evaluate presentations in each of the sessions. Judges will be wearing red nametags. Presentations will be scored on a scale of 1 to 10 in ten categories covering the areas a) scientific approach to the subject of the research, b) clarity and quality of delivery, and c) handling of questions. The scores for the ten categories (max 100 points) from each judge in that session will be used to compute a ranked score. 1st and 2nd place prizes will be awarded to the presentations with the highest and next highest mean ranked scores respectively. We have tried to assign judges so as to avoid possible conflicts of interest. If, however, there is a conflict, then the judge affected will not score that presentation. Scores and evaluation sheets will be emailed to presenters by responding to the message from Dr. Kubalak indicating the score sheets have been compiled. Please note, there will also be a team of judges selecting presentations for prizes in the following categories: Sigma Xi, Interprofessional Research, Ralph H Johnson VA Research, Health Disparities, Innovation, and Ethics Award - these judges will be operating as separate teams, and if your presentation qualifies for one of these categories you will be visited by these additional judges.

Breaks:

Coffee, doughnuts and soft drinks will be available from 9:30 am – 11:30 pm in the Harper Center Gym. There will be a MUSC-catered lunch for presenters and other student attendees in the Harper Center Gym at 11:00 am.

Awards Ceremony:

The Awards Ceremony will begin at 4:00 pm in the Drug Discover Auditorium (Rm 110). In each session there will be a 1st place prize of $500 and a 2nd place prize of $200. The special awards listed above have their own cash prizes that are in addition to the regular session prizes.

Door prizes, as part of the Thursday Vendor Show will also be awarded – for further information and for your door prize ticket, see the individual exhibitors tables at the Vendor Show. Several door prize drawings will occur throughout the Vendor Show and you must be present to win.
# Poster and Oral Presentation Program

Friday November 4, 2016

## Poster Presentations

**Harper Wellness Center Gym**

8:30 am - 11:30 noon

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Abstracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Undergraduate – I</td>
<td>#001-012</td>
</tr>
<tr>
<td>2</td>
<td>Clinical / Professional / Masters – I</td>
<td>#013-032</td>
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<tr>
<td>3</td>
<td>Clinical / Professional / Masters – II</td>
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<tr>
<td>4</td>
<td>Clinical / Professional / Masters – III</td>
<td>#064-094</td>
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<td>5</td>
<td>Clinical / Professional / Masters – IV</td>
<td>#095-124</td>
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<tr>
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<td>PhD – I Years 1-2</td>
<td>#125-140</td>
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<td>PhD – II Years 3+</td>
<td>#141-156</td>
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<td>PhD – III Years 3+</td>
<td>#157-171</td>
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<tr>
<td>9</td>
<td>Postdoc / Resident / Fellow / Staff Scientist – I</td>
<td>#172-192</td>
</tr>
<tr>
<td>10</td>
<td>Research Specialist / Technician – I</td>
<td>#193-203</td>
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</table>

## Oral Presentations

**Colbert Education Center and Library**

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Room</th>
<th>Time</th>
<th>Abstracts</th>
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<td>Undergraduate – II</td>
<td>EL 113</td>
<td>12:00-2:15</td>
<td>#204-211</td>
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<td>EL 115</td>
<td>12:00-3:00</td>
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<td>Clinical / Professional / Masters – VI</td>
<td>EL 121</td>
<td>12:00-3:00</td>
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<td>Clinical / Professional / Masters – VII</td>
<td>EL 116</td>
<td>1:15-3:15</td>
<td>#234-240</td>
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<td>PhD – IV Years 1-2</td>
<td>EL 118</td>
<td>1:15-3:15</td>
<td>#241-247</td>
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<tr>
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<td>PhD – V Years 3+</td>
<td>EL 102</td>
<td>12:00-3:15</td>
<td>#248-259</td>
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<tr>
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<td>PhD – VI Years 3+</td>
<td>EL 103</td>
<td>12:00-3:15</td>
<td>#260-271</td>
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<td>BE 112</td>
<td>12:30-3:00</td>
<td>#272-280</td>
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<td>EL 114</td>
<td>12:00-3:00</td>
<td>#281-291</td>
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<td>DD 111</td>
<td>12:45-2:30</td>
<td>#292-297</td>
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</table>

**EL** = Colbert Education Library; **BE** = Bioengineering Building; **DD** = Drug Discovery Building
LOCATION OF ORAL PRESENTATIONS

JAMES W. COLBERT EDUCATION CENTER & LIBRARY

FIRST FLOOR PLAN

HORSESHOE SIDE OF BUILDING
Session 1: Undergraduate I

001 A Role of the S2-S3 Cytoplasmic Loop of the Ryanodine Receptor Calcium Channel for Ca\(^{2+}\) Dependent Regulation: Implications of Muscular Disease-Associated Mutations, Jordan S Carter\(^1\), Angela C Gomez\(^2\), Timothy W Holford\(^3\), Naohiro Yamaguchi\(^4\); \(^1\)Biology, CofC, \(^2\)Regenerative Medicine and Cell Biology, MUSC.

002 Effects of TIMP-1 on Myocardial Collagen Content in Pressure Overload Cardiac Hypertrophy, Mark P Karavan\(^1\), Catalin F Baicu\(^2\), An O Van Laer\(^2\), Azim Hossain\(^2\), Amy D Bradshaw\(^2\), Michael R Zile\(^2\); \(^1\)USC, \(^2\)Division of Cardiology, MUSC and Ralph H. Johnson VA Medical Center.

003 The Role of ADAMTS5 Protease on Outflow Tract Intercalated Cushion Formation, Lea G Russell, Josh Mifflin, Kitty Rice, Loren Dupuis, Christi Kern; Regenerative Medicine and Cell Biology, MUSC.

004 The Effects of Proteoglycan Cleavage on Wnt/\(\beta\)-catenin Signaling During Myocardialization, Marcus T Ellison, Loren Dupuis, Kitty Rice, Josh Mifflin, Christine Kern; Regenerative Medicine and Cell Biology, MUSC.

005 The Relationship Between Cardiometabolic Risk Factors and African-American Breast Cancer Survivors, Kai Cobb\(^1\), Gayenell Magwood\(^2\); \(^1\)Claflin University, \(^2\)College of Nursing, MUSC.

006 Factors Associated with Prenatal Diagnosis of Critical Congenital Heart Disease in South Carolina, Abby T Spencer, Shahryar Chowdhury, Francis Woodard, Carolyn Taylor, Sinai Zyblewski; Pediatrics, MUSC.

007 Relationship Between Marijuana Use Frequency and Self-Reported Marijuana-Related Problems in Adolescents, Lauren N Mitchell\(^1\), Lindsay R Meredith\(^2\), Lindsay M Squeglia\(^2\), Kevin M Gray\(^2\); \(^1\)University of South Carolina, \(^2\)Psychiatry, MUSC.

008 The Effect of School Attachment on School Defiance, Michelle N Myers\(^1\), Phillippe B Cunningham\(^2\), Stephen D Short\(^1\), Colleen A Halliday-Boykins\(^3\); \(^1\)Psychology, CofC, \(^2\)Psychiatry, MUSC.

009 Two-week Repetitive Transcranial Magnetic Stimulation of the Dorsal Lateral Prefrontal Cortex Does Not Affect Cortical Excitability in Chronic Smokers, Rina Bonalontal\(^1\), Xingbao Li\(^2\), Scott Henderson, Karen Hartwell, Kathleen Brady, Mark George; \(^1\)Psychiatry and Behavioral Sciences, MUSC, \(^2\)University of South Carolina.

010 Comparison of Serum Vanin-1 Concentrations in Diving Marine Mammals and Terrestrial Mammals Using Mass Spectrometry, Baylye K Boxall\(^1\), Michael G Janech\(^2\); \(^1\)Marine Biology, CofC, \(^2\)Nephrology, MUSC.

011 The Effect of Oxygen Levels on Human Alveolar Epithelial Cells and Its Implications on Human Health At Altitudes, Amanjot S Paintlia\(^1\), John E Baatz\(^2\); \(^1\)CofC, \(^2\)Pediatrics, MUSC.

012 Peer Approaches to Lupus Self-management (PALS): A Novel Lupus Peer Mentorship Intervention, Trevor Faith, Edith Williams, Leonard Egede, James Oates, Delia Voronca, Mulugeta Gebregziabher; CofC.

Session 2: Clinical-Professional-Masters I Social/Behavioral Sciences

013 Piece It Together: Comprehensive Wellness Program for Transitional Age, Alexandra E Serpe\(^1\), Carrie Papa\(^2\), Keely Flynn\(^3\), Janis Newton\(^3\), Lee Blackmon\(^1\), Eve Spratt\(^2\); \(^1\)COM, MUSC, \(^2\)Developmental Pediatrics, MUSC, \(^3\)Wellness Center, MUSC.
014 Exploring Factors That Influence Non-participation and Non-Adoption of Weight Management Behaviors and Participation Within a VA MOVE! Weight Management Program, Marina Miller, Michelle Nichols; College of Nursing, MUSC.

015 Varied Vs. Specific Task Practice and Influence on Confidence in Clients Post-Stroke, Ashlyn Baxley1, Katherine Greenslit1, Ebony Pollock1, Kelly Anderson2, Michelle Woodbury3; 1Occupational Therapy, MUSC, 2Health and Rehabilitation Science, MUSC, 3Health Sciences and Research, MUSC.

016 Interprofessional Impact of Ergonomics Education on Dental Students, Lauren K Schneider1, Kierstin L Bockelman1, Katelyn E Ruggiero1, Jompob Vuthiganon2, Peter J Bowman1; 1Occupational Therapy, MUSC, 2Dental Medicine, MUSC.

017 Can We Identify Delays Early? Validation of the Specific Test of Early Infant Motor Performance (STEP), Anne Lyle Illges1, Laura Wilson1, Marie Brainard1, Katharina Faerber1, Jana Kitch1, Heather Richardson1, Patty Coker-Bolt1, Dorothea Jenkins1; 1Occupational Therapy, MUSC, 2Health Sciences and Research, MUSC.

018 A Comparison of Patterns of Real World Paretic Arm Use Among People With and Without Unilateral Neglect After Stroke, Kellyn RP Colclough1, Elizabeth M Borden1, Taylor M Williams1, Woodbury L Michelle2, Grattan S Emily2; 1Occupational Therapy, MUSC, 2Health and Rehabilitation Science, MUSC.

019 Similarity Between Sitting Balance Control Performed in a 3-D Virtual Reality Environment and Those in the Physical Environment, Joshua A White1, Sarah J McEarl1, Scott Hutchison2; 1Occupational Therapy, MUSC, 2Health and Rehabilitation Science, MUSC.

020 Efficacy of Trunk Constraint Training for the Re-learning of Elbow Extension in a Virtual Environment, Georgia Berbert1, Alexa Neiling1, Olivia Bentley1, Michelle Woodbury2, Christian Finetto2; 1Occupational Therapy, MUSC, 2Health Sciences and Research, MUSC.

021 Interdisciplinary Development and Application of a New Mobile App: An Innovative Flipped Lab Approach, Elizabeth Hensley1, Natalie Ajamian1, Peter Bowman1, Gretchen Seif2, Jonathan Coultas3, Sachin Patel4, Amanda Giles1; 1Occupational therapy, MUSC, 2Physical therapy, MUSC, 3Library Science and Informatics, MUSC, 4TACHL, MUSC.

022 Implementing the Days for Girls Menstrual Hygiene and Reproductive Health Education Program in Haiti, Annika Z Jansson1, Sherridan M Bigg2, Elizabeth N Hammond, Harmony Hudson, Patty C Coker-Bolt, Janet O'Flynn, Marie D Laurent, Leslee Jaeger; 1Health Professions, MUSC, 2Occupational Therapy, MUSC.

023 Comparison of Electronic Visits Versus Office Visits for Common Acute Conditions, Patrick C Morency1, Marty Player2, Edward O'Brian3, Jessica Bright4, Vanessa Diaz5; 1COM, MUSC, 2Family Medicine, MUSC, 3Emergency Medicine, MUSC.

024 RadioActivity: A Radiology Resident Wellness Pilot Study, Lawrence Wood1, Madeline Lewis2, Seth Stalcup2; 1COM, MUSC, 2Radiology, MUSC.

025 Tobacco Use Prevalence and Outcomes Among Perinatal Patients Assessed Through an Opt-out Counseling and Phone-based Follow-up System, Cole J Buchanan1, Georges El Nahas2, Constance Guille2, Cameron Wheeler1, Kathleen Michael Cummings3, Erin McClure5; 1COM, MUSC, 2Psychiatry, MUSC, 3Psychiatry, MUSC.

026 The Effectiveness of 1Hz RTMS to the Pre-supplementary Motor Area (pre-SMA) in the Treatment of Essential Tremor, Christopher W Austelle1, Bashar W Badran1, Chloe E Glusman1, Shonna Jenkins2, William H Devries1, Tiffani Thomas3, Mark S George1, Gonzalo J Revuelta2; 1Brain Stimulation Lab, MUSC, 2Neurology, MUSC, 3Medicine, MUSC.
027 Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE) Causes Higher Activation in Anterior Cingulate, Parietal, Precuneus Regions During Exposure to a Traumatic Memo, Mary A Fox¹, Sudie E Back², Shayla Lester³, Jane E Joseph¹; ¹Neuroscience, MUSC, ²Psychiatry, MUSC, ³Center for Drug & Alcohol Programs, MUSC.

028 Improving Environmental Cleaning in a Hospital Setting Using Audits and Feedback with Fluorescent Targeting, Adrienne L Lorek, Kelly J Hunt; Public Health, MUSC.

029 Prevalence of Bystander CPR and AED Knowledge in Charleston County, Lisa M Petruncio¹, David M French²; ¹COM, MUSC, ²Emergency Medicine, MUSC.

030 Strengthening Maternal Health Services in Nairobi, Kenya Through a Quality Improvement Focused Public-Private Partnership, Kevin C Keith¹, Eric Wachira², Cathy E Green²; ¹COM, MUSC, ²Jacaranda Health.

031 Relationship Between the Affordable Care Act and Insurance, Access, and Cost on the Quality of Care in Patients with Diabetes, Arjun Varadarajan¹, Kinfe G Bishu², Rebekah J Walker², Joni S Williams², Leonard E Egede²; ¹COM, MUSC, ²Health Disparities, MUSC.

032 The Influence of Success Rate on Motor Learning During Stroke Rehabilitation, Kelly R Anderson¹, Christian Finetto², Michelle Woodbury²; ¹Health and Rehabilitation Science, MUSC, ²Health Science and Research, MUSC.

Session 3: Clinical-Professional-Masters II Basic/Clinical Sciences

033 Role MiR-217 in the Context of the UPR Pathway During ER Stress, Alexander Oles, Yiwen Bu, Alan Diehl; Biochemistry, MUSC.

034 Identification of Penicillin-binding Protein 3 (PBP3) Inhibitors As Agents Against Pseudomonas Aeruginosa, Jaime Randise, Jonathan M Turner, Wei Chen, Christopher Davies; Biochemistry & Molecular Biology, MUSC.

035 Development of a Peptide-Derived Orally-Active Kappa Opioid Agonist for Peripheral Pain: Preclinical Results in Rats, Tyler C Beck¹, Carmela M Reichel², Shannon M Ghee², Kristi L Helke³, Patrick M Woster³¹, Isuru R Kumarasinghe³¹, Thomas A Dix⁴; ¹COM, MUSC, ²Neurosciences, MUSC, ³Comparative Medicine, MUSC, ⁴Drug Discovery and Biomedical Sciences, MUSC.

036 Donor Nebulization of Alpha-1-antitrypsin Improves Post Lung Transplant Outcomes, Grace L Bazzle¹, Kunal Patel², Qi Cheng², Peng Zhu², Satish Nadig², Carl Atkinson¹; ¹Microbiology and Immunology, MUSC, ²Surgery, MUSC.

037 Non-Optic Vision: Beyond Synesthesia?, Matthew H Roberts¹, Joel I Shenker², Tom Jhou¹, Jane Joseph¹, Thomas Naselaris¹; ¹Neuroscience, MUSC, ²Neurology, University of Missouri.

038 Deletion of Specific Type-1 Transforming Growth Factor-Beta Receptor Attenuates Thoracic Aortic Aneurysm Development, Hannah Hollon¹, Robert Stroug², Sarah Lieser³, Adam Franklin³, Elizabeth Nadeau³, Rupak Mukherjee³, John Ikonomidis³, Jones Jeffrey³; ¹COM, MUSC, ²Cardiothoracic Surgery, MUSC, ³Cardiothoracic Surgery, MUSC .

039 Retinol Formation in Isolated Human Cone Photoreceptors, Cole M Milliken, Chunhe Chen, Yiannis Koutalos; Ophthalmology, MUSC.
040 Characterizing the Novel Interaction Between ErbB3 and Reep5, Laurel Black1, Jody Longo2, Steve Carroll; 1College of Graduate Studies, MUSC, 2Pathology, MUSC.

041 The Targeted Cellular Uptake of a Dual Peptide-siRNA Complex Into Oral Cancer Cells is Mediated By Direct Interaction with the EGF Receptor, Haiwen Zhang1, Andrew Jakymiw2; 1Dental Medicine, MUSC, 2Oral Health Sciences, MUSC.

042 Targeting the SCAP/SREBP Pathway May Be a Potential Therapy for Pancreatic Ductal Adenocarcinoma (PDAC), Keeland M Williams1, Meredith R McGuire2, Wei Shao2, Peter J Espenshade2; 1COM, MUSC, 2Cell Biology, John Hopkins.

043 L-Glutamine is Required, But Not Sufficient, to Stimulate Alpha Cell Proliferation, Aysha Mushtaq1, Danielle E Dean2, Ella Baum2, Radhika Armandala2, Alison Von Deylen2, Wenbiao Chen2, Alvin C Powers2; 1Medicine, MUSC, 2Diabetes, Endocrinology, and Metabolism, Vanderbilt University Medical Center.

044 Characterizing the Role of Dicer1e in MiRNA Pathways and Oral Cancer Pathogenesis, Tessa Streeter1, Andrew Jakymiw2; 1Dental Medicine, MUSC, 2Oral Health Sciences, MUSC.

045 SPARC Influence on Collagen Fiber Morphology in a Murine Model of Periodontal Disease, Inesha V Baker, Amy Bradshaw, Emilie Rosset; Dental Medicine, MUSC.

046 A Quality Assessment of ’Get-With-The-Guidelines’ Data for the Study of Disparities in Stroke Recovery, Ashley R Gathers1, Daniel T Lackland2; 1COM, MUSC, 2Neurology, MUSC.

047 Racial and Ethnic Differences in Out-of-Pocket Expenses Among Adults with Diabetes, Makiera L Simmons1, Kinfe Bushu1, Joni S Williams2, Rebekah J Walker3, Leonard E Egede3; 1COM, MUSC, 2General Internal Medicine and Geriatrics, MUSC, 3Ralph H. Johnson Veterans Affairs Medical Center.

048 Lower Activation Signal Strength Supports Wnt/Beta-catenin Signaling and Enhances the Antitumor Activity of Th17 and CD8+ T Cells, Lillian R Neal1, Logan W Huff1, Michelle H Nelson1, Megan M Wyatt1, Stefanie R Bailey1, Jacob S Bowers1, Juan C Varela2, Chrystal M Paulos1; 1Microbiology and Immunology, MUSC, 2Hematology/Oncology, MUSC.

049 Donor Lung Pretreatment with a Synthetic Connexin 43 Mimetic Peptide Ameliorates Lung Transplant Ischemia Reperfusion Injury, Lindsay R Rucker1, Qi Cheng1, Kunal Patel2, Peng Zhu1, Patterson Allen1, Chenta Vasu1, Satish Nadig3, Carl Atkinson1; 1Microbiology and Immunology, MUSC, 2Surgery, MUSC.

050 Infusion of Fewer T Cells Streamlines Potent Antitumor Response in Adoptive Immunotherapy, Hannah M Knochellmann1, Michelle H Nelson2, Jacob S Bowers3, Daniel J Neitzke, Megan E Meek, Chrystal M Paulos; 1Microbiology and Immunology, MUSC, 2Surgery, MUSC, 3Dermatology and Dermatologic Surgery, MUSC.

051 The Tinman At the Heart of Pre-Eclampsia: Placental Regulation of Angiogenic Signaling By a Cardiac Transcription Factor, Kymbreana Coley, Kyu-Ho Lee; Regenerative Medicine and Cell Biology, MUSC.

052 Controlled Release of Connexin Mimetic Peptide From Reaction Electrospun Collagen Fibers, Alexandra T Cocca1, Heather Bainbridge2, Veronica Rodriguez2, Steven Fann2, Michael J Yost2; 1COM, MUSC, 2Surgery, MUSC.

053 Micro CT Analysis of Optimal Treatment of Malignant Long Bone Fractures, S Tucker Kornegay, William R Barfield, Alex Chiaramonti, Zilan Lin, E Lex Hanna, Yongren Wu, Vincent D Pellegrini; Orthopedics, MUSC.

054 Development and Characterization of an Amphipathic Unidirectional Fluid Removal Wound Dressing, Grant N Kahley1, Michael J Yost2; 1COM, MUSC, 2General Surgery, MUSC.
055 Relaxation Therapy for the Management of Pain in the Emergency Department (RPED), Courtney M Poston1, Steven Saef2, McRae Hamer2; 1COM, MUSC, 2Emergency Medicine, MUSC.

056 Safety and Efficacy of Novel Facemask for Positive Pressure Ventilation, Samuel T Keane1, William R Hand2, Tod A Brown2, Michel J Sabbagh2, Tamas Szabo2, Kathryn H Bridges2, Robert D Warters2; 1COM, MUSC, 2Anesthesia, MUSC.

057 Assessment of Traumatic Brain Injury in Infants with Diffusion Kurtosis Imaging, Michael O Tyler1, Emily Lowther2, Macy Adams3, Rachel Deardorf3, Jens Jensen3, Donna Roberts3; 1COM, MUSC, 2SC Governors School for Science and Mathematics, 3Radiology, MUSC.

058 Patient-Related Risk Factors for Periprosthetic Ankle Joint Infection: An Analysis of 6,977 Total Ankle Arthroplasties, Alyssa Althoff1, Brian Werner2; 1Orthopedics, MUSC, 2University of Virginia.

059 Coronary CT Angiography-derived Morphological Markers for the Prediction of Stent Fracture and Major Adverse Cardiac Events, Matthew W Bickford1, Junjie Yang2, Christian Tesche2, Mortiz Albrecht2, Joseph Schoepf2; 1COM, MUSC, 2Radiology, MUSC.

060 Assessment of Risk Factors for Increased Resource Utilization in Kidney Transplantation, Steven C Vranian1, Kelly L Covert2, Caitlin R Mardis3, John W McGillicuddy1, Ken D Chavin1, Derek Dubay1, Dave Taber1; 1Transplant Surgery, MUSC, 2Pharmacy Practice, Bill Gatton College of Pharmacy, 3Transplant Service Line, MUSC, 4Transplant Surgery, MUSC.

061 Out with The Old and in with The Great: Alcohol Septal Ablation Outcomes on Race, Gender and Age, Akayla Ford1, Billy Mullinax2, Amy Wahlquist, Jeremy Rier, Barbara Griffin, Shawn Shaji, Christopher Nielson, Valerian Fernandes, Sheldon Litwin; 1Cardiology, MUSC, 2Ralph H. Johnson VA Medical Center.

062 Safety of Reduction Mammoplasty in the Adolescent Population, Marion W Tapp1, Robinder Singh2, Fernando A Herrera2; 1COM, MUSC, 2Plastic and Reconstructive Surgery, MUSC.

063 Neuroimaging of Cerebrovascular Inflammation Following Endovascular Thrombectomy in Acute Ischemic Stroke, Yangchun Li1, Arindam Rano Chatterjee2; 1COM, MUSC, 2Radiology, MUSC.

Session 4: Clinical-Professional-Masters III Basic/Clinical Sciences

064 Measuring the Impact of Genomic Testing on Treatment Decision in Newly Diagnosed Prostate Cancer Patients, Rohail Rashid Kazi1, Stephen Savage2, Sandip Prasad2, Susan Caulder3, Claire Pittman3; 1COM, MUSC, 2Urology, MUSC, 3Ralph H. Johnson VAMC.

065 Mesenchymal Stem Cell Cotransplantation in Total Pancreatectomy with Islet Autotransplantation, Taylor L Turnbull1, Hongjun Wang2, David B Adams2, Katherine A Morgan2; 1COM, MUSC, 2Surgery, MUSC.

066 Regulated Breathing for Pain Management in the Emergency Department: Association of Response with Patient Demographics, Heyward B Mack1, Steven Saef2, McRae Hamer2; 1COM, MUSC, 2Emergency Medicine, MUSC.

067 Transient Swelling of the Jugular Venous Plexus Following Decompressive Craniectomy and Cranioplasty, Edward W Duffy, Michael Antonucci; Radiology, MUSC.

068 Overall Cost-Effectiveness of Acute Chest Pain CT in Comparison with Standard Treatment, Jonathan T Pannell, Christian Tesche, J L Wichmann, S Baumann, Carlo De Cecco, Joeseph Schoepf; Radiology, MUSC.
Clinical Features and Neurological Complications of Children Hospitalized with Chikungunya Virus in Honduras, Nancy L Hagood¹, Kenton R Holden², Andrea Summer³, José A Samra⁴; ¹COM, MUSC, ²Neurology, MUSC, ³Pediatrics, MUSC, ⁴Pediatrics, Hospital Escuela Universitario.

Safety of Trans-Jugular Liver Biopsy in Patients with Suspected Cirrhosis, Henry J Burchett¹, Mona Haj², Don Rockey³; ¹COM, MUSC, ²Gastroenterology, MUSC, ³Medicine, MUSC.

Diagnostic Accuracy and Radiation Dose Reduction in High-Pitch Acquisition CT Coronary Artery Calcium Scoring with Tin Filtration, Chelsea D Eason, Christian Tesche, Schoepf Joseph; Radiology and Radiological Science, MUSC.

Presentation of a Calcifying Aponeurotic Fibroma in the Distal Forearm of a Pediatric Patient, Lauren E Hemmingsen, Meryl Eklund; Radiology, MUSC.

Regulated Breathing for Pain Management in the Emergency Department: Impact on Patients with Visceral Vs. Somatic Pain, Bastien H Bacro-Duverger¹, McRae Hamer², Meggan Deveaux¹, Heyward Mack¹, Courtney Poston¹, Steven Saef²; ¹COM, MUSC, ²Emergency Medicine, MUSC.

Non-binary Myocardial Infarct Quantification Technique Accounting for Partial Volume Averaging Predicts Segmental Left Ventricular Myocardial Contraction, Rayphael S Hardy³, Moritz Albrecht², Balazs Ruzsics², Pal Suranyi², Rob J van der Geest², Gabriel A Elgavish², Akos Varga-Szemes², Joseph U Schoepf²; ¹COM, MUSC, ²Radiology, MUSC.

Predictive Value of Coronary CT Angiography Derived Plaque Quantification In Patients With Acute Coronary Syndrome, Darby Shuler, Christian Tesche, Damiano Caruso, Carlo N De Cecco, Jess Rames, Moritz Albrecht, Taylor M Duguay, Joseph Schoepf; Radiology, MUSC.

Regulated Breathing for Pain Management in the Emergency Department: Impact on Patients Based on Duration of Pain, Meggan M DeVeaux¹, Bastien Bacro-Duverger¹, Heyward Mack¹, Courtney Poston¹, McRae Hamer², Steven Saef²; ¹COM, MUSC, ²Emergency, MUSC.

Diagnostic Utility of the Upper Gastrointestinal Series, Meredith Pritchett¹, Anil Rao², Cephus Simmons²; ¹COM, MUSC, ²Radiology, MUSC.

Medical History and Past Interventions in Youth At Risk for Autism Spectrum Disorder, Emily B Crosby¹, Catherine C Bradley², Amy E Wahlquist³, Jane Charles², Andrea D Boan⁴, Laura A Carpenter²; ¹COM, MUSC, ²Pediatrics, MUSC, ³Public Health Sciences, MUSC, ⁴Neurology, MUSC.

Abdominal Wall Reconstruction Using Component Separation, a Retrospective Review of a Single Institution, Stewart A Bryant¹, Michaela Close¹, Brian Hill², Rohan Kambeyanda², Fernando Herrera²; ¹Medicine, MUSC, ²Plastic Surgery, MUSC.

Incidence of Sialoadenitis in Patients Undergoing Radioactive I131 Therapy: How Treating Physician and Dose Affect Outcomes and Chances of Salivary Gland Symptoms, Tristan R Young¹, Leonie Gordon², Marques Bradshaw²; ¹COM, MUSC, ²Radiology, MUSC.

Women in Pediatric Radiology: Does a Gender Disparity Exist?, Holly Alford¹, Anil Rao²; ¹COM, MUSC, ²Pediatric Radiology, MUSC.

Economic Impact of Community Sports Coverage By Outreach Athletic Trainers on a Health System: Implications for Program Growth and Sustainability, Jeannie F Buckner¹, Kirstie Hewson², Michael Barr³, Thomas Crawford ⁴, Shane Woolf⁴, Harris Slone⁴; ¹COM, MUSC, ²CHP, MUSC, ³Sports Medicine, MUSC, ⁴Orthopaedics, MUSC.
083 A Clinical and Radiographic Presentation of Lemierre’s Syndrome (postanginal Sepsis) in a Pediatric Patient, Colin M Johnson¹, Caroline M Swift², Meryle J Eklund³; ¹COM, MUSC, ²Radiology, MUSC, ³Pediatric Radiology, MUSC.

084 Brain Imaging in a Pediatric Patient With Alexander Disease, Lauren Jutras¹, Meryle Eklund²; ¹COM, MUSC, ²Radiology, MUSC.

085 Machine Learning Algorithm Versus Computational Fluid Dynamics Modeling for Coronary CT Angiography Derived Fractional Flow Reserve, Han Lin, Joseph Schoepf, Christian Tesche; Radiology, MUSC.

086 Hemiepiphyseodesis for Tibia Vara with Percutaneous Transphyseal Screws, Mark A Pacult, Robert F Murphy, William R Barfield, James F Mooney III; Orthopedics, MUSC.

087 A Retrospective Review of Ventral Hernia Repairs with Component Separation, Michaela F Close¹, Stewart Bryant¹, Bryan Hill², Rohan Kambeyanda², Fernando Herrera²; ¹COM, MUSC, ²Plastic Surgery, MUSC.

088 Correlating MR Neurography with Intraoperative Findings in Patients with Ulnar Neuropathy, Philip M Coffey¹, Eric Bass², Komal Sharma¹, Abhay Varma¹, Maria V Spaminato²; ¹COM, MUSC, ²Neuroradiology, MUSC, ³Radiation Oncology, MUSC, ⁴Neurosurgery, MUSC.

089 Early Teenage Type 1 Diabetic Females Report Parental Stress, Abby T Lewis¹, Kimberly Lewis², Remberto Paulo², Michele Hutchison², Deborah Bowlby²; ¹COM, MUSC, ²Pediatric Endocrinology, MUSC.

090 Rural-Urban Differences in Quality of Care Indicators Among Adults with Diabetes, Darian Vernon¹, Kinfe Bishu², Joni Williams², Rebekah Walker², Leonard Egede²; ¹Medicine, MUSC, ²Ralph H. Johnson VA Medical Center.

091 Development of Cost Effective Universal Surveillance Program For Carbapenem-Resistant Enterobacteriaceae, Albalawi Fadyah¹, Michael G Schmidt¹, Lisa Steed²; ¹Microbiology and Immunology, MUSC, ²Pathology & Laboratory Medicine, MUSC.

092 Effects of Glycation on the Promotion of Prostate Cancer, Dion A Foster; COM, MUSC.

093 Assessing Feasibility: Pastoral Care in the Management of Hypertension, Toni M Stevenson, Daniel Lackland; COM, MUSC.

094 The Effect of Chemogenetic Activation of the Prelimbic Cortex on Relapse to Cocaine Seeking in Rats, Calvin J Hu¹, Ben M Siemsen², Giuseppe Giannotti², Jacqueline F McGinty²; ¹COM, MUSC, ²Department of Neuroscience, MUSC.

Session 5: Clinical-Professional-Masters IV  Basic/Clinical Sciences

095 Effects of Oxytocin Following Traumatic Stress on Methamphetamine Seeking in Female Rats, Catherine M Svetcharnik¹, Casey E O'Neili², Jacqueline F McGinty²; ¹COM, MUSC, ²Neuroscience, MUSC.

096 Individual Variability in Brain Response to Drug Cues Predicts RTMS Treatment Efficacy, Norvel W Brown, Tonisha E Keaney-Ramos, Logan T Dowdle, Oliver Mithoefer, William Devries, Mark S George, Colleen A Hanlon; Psychiatry and Behavioral Sciences, MUSC.
The Ethnography of Novel Drugs of Abuse At Two Outdoor Music Festivals in Colorado, Alexis L Smith¹, Jacob Fox², Andrew Monte³; ¹COM, MUSC, ²School of Medicine, University of Colorado, ³Emergency Medicine, University of Colorado.

Complement Peptide C3a Induces Non-lytic ATP Efflux, Plasma Membrane Depolarization, and Candida Glabrata Cell Death, Jessica Dinh¹, Silvia Vaena², Caroline Westwater³; ¹Microbiology and Immunology, MUSC, ²Oral Health Sciences, MUSC.

Analyzing the Impact of Elective SCCP 757 on Students’ Preparedness for Advanced Pharmacy Practice Experience (APPE), Micaela Furest-Cataldo, Taylor Peters, Stephanie Kirk, James Sterrett; South Carolina College of Pharmacy, MUSC.

AboutFace: Pilot Study of a Digital Storytelling Resource Used to Reduce Stigma and Increase Treatment-Seeking Behavior Among Veterans, Danna L Cook¹, Jessica L Hamblen², Brian E Bunnell¹, Tatiana M Davidson¹, Kenneth J Ruggiero¹; ¹Nursing, MUSC, ²National Center for PTSD.

Fournier’s Gangrene: Preoperative Predictors of Reconstruction, Morbidity And Survival, Bill Rawls, Nima Baradaran, Lindsay Cox, Eric Rovner; Urology, MUSC.

Quality of Diabetic Care Among Recent Immigrants to the United States, Romik Srivastava, Kinfe Bishu, Rabekah Walker, Joni Williams, Leonard Egede; Center for Health Disparities, MUSC.

Induction of Primary Tumor in Nude Mice Via Injection of Modified DsRed-expressing Cal27 Cells, Jeffrey P Langdon, Andrew Jakymiw, Haiwen Zhang; Center for Oral Health Research, MUSC.

The Role of Scleraxis in Fibroblasts, Charles A Johnson¹, Andrea Nillas², Titus A Reaves²; ¹COM, MUSC, ²Regenerative Medicine and Cell Biology, MUSC.

The Effect of Ceramide Analogs on Human Head and Neck Squamous Cell Carcinomas, Sumin Han¹, Besim Ogretmen²; ¹Dentistry, MUSC, ²Cancer, MUSC.

Novel Anti-Inflammatory Nanoparticle Scaffolds for Periodontal Treatment, Paul J Han¹, Michael S Valerio¹, Joy Kerkpaptrick¹, Ian Hale², Frank Alexis³, Keith L Kirkwood¹; ¹Oral Health Sciences, MUSC, ²Bioengineering, Clemson.

Uninsured Patients: A Distinct Subpopulation of Breast Cancer Patients, David Morrow¹, Shai White-Gilbertson², Heather Collins³, Madeleine Lewis⁴; ¹COM, MUSC, ²Cancer Registry, MUSC, ³Center for Biomedical Imaging, MUSC, ⁴Radiology, MUSC.

Incidence and Impact of Adverse Drug Events Contributing to Hospital Readmissions in Adult Kidney Transplant Recipients, Michelle Arms¹, John W Mc Gillicuddy², Satish N Nadig², David J Taber⁵; ¹COM, MUSC, ²Transplant Surgery, MUSC.

Effect of Matching or Overconstraining Knee Laxity During Anterior Cruciate Ligament Reconstruction on Knee Osteoarthritis and Clinical Outcomes: A Randomized Controlled Trial With 84-Month Follow-up, Matthew R Akelman¹, Paul D Fadale², Michael J Hulstyn², Robert M Shalvoy², Arlene Garcia², Gary J Badger², Jeffrey Duryea³, Fleming C Braden²; ¹COM, MUSC, ²Orthopaedics, Brown University, ³Radiology, Harvard University.

Testing the Antimicrobial Effects of Copper Nanoparticles on Enterococcus Faecalis in an Endodontic Treatment Model, Andrew C Lane¹, Monica Estes¹, Hubert H Attaway², Sarah E Fairey², Michael G Schmidt²; ¹Dental Medicine, MUSC, ²Mirkobiology and Immunology, MUSC.

Characterizing the Existence of Hematopoietic Stem Cell-derived Osteoblasts in Murine Calvaria, Arjun R Majumdar, Meenal Mehrotra, Uday Baliga, Inhong Kang; Pathology, MUSC.
112 Consumption of Contaminated Fish in the Great Lakes Region and Breast Cancer Risk: New York State Anglers Cohort Study (NYSACS), Ariel R Christensen\textsuperscript{1}, Matthew Bonner\textsuperscript{2}, Jeff Korte\textsuperscript{1}, Sophia Sourlis\textsuperscript{1}, Matthew Bozigar\textsuperscript{1}, John Vena\textsuperscript{1}, \textsuperscript{1}Public Health Sciences, MUSC, \textsuperscript{2}Epidemiology and Environmental Health, University of Buffalo.

113 Long-Term Outcomes Of Hypertrophic Cardiomyopathy Patients Following Alcohol Septal Ablation Exhibit No Improvement In BMI Despite Improved Heart Function And Returning To General Population Mortality, Billy J Mullinax\textsuperscript{1}, Akayla Ford\textsuperscript{1}, Amy Wahlquist \textsuperscript{2}, Valerian Fernandes\textsuperscript{3}, \textsuperscript{1}COM, MUSC, \textsuperscript{2}Biostatistics and Epidemiology, MUSC, \textsuperscript{3}Cardiology, Ralph H. Johnson VA Medical Center.

114 Gap and Tight Junction Stabilization in Cardiac Transplantation, Ryan Finnegan\textsuperscript{1}, Peng Zhu\textsuperscript{1}, Satish Nadig\textsuperscript{2}, Carl Atkinson\textsuperscript{2}; \textsuperscript{1}Microbiology and Immunology, MUSC, \textsuperscript{2}Surgery, MUSC.

115 Optimal Dosing of Acetazolamide for Pediatric Patients with Metabolic Alkalosis in the PICU, Taylor Peters, A Jill Thompson; Pharmacy, MUSC.

116 Comparison of Retinal Pigment Epithelium Components By Location of 10 Human Cadaver Eyes Using Thin-line Chromatography Analysis, David Wade Redick; COM, MUSC.

117 Pre and Post Transplant Marijuana Usage Related to Transplant Outcomes, Darrell G Holmes\textsuperscript{1}, Toni Richardi\textsuperscript{2}, Wendy Balliet\textsuperscript{2}, Kenneth Chavin\textsuperscript{3}, Prabhakar Baliga\textsuperscript{4}, \textsuperscript{1}COM, MUSC, \textsuperscript{2}Psychiatry and Behavioral Sciences, MUSC, \textsuperscript{3}Surgery, MUSC, \textsuperscript{4}Surgery, MUSC.

118 Comparison of Fixation Types in a Radiated Model of Long Bone Fracture Using Histomorphometry, Kendall Barton\textsuperscript{1}, Yongren Wu\textsuperscript{1}, William Barfield\textsuperscript{1}, Zilan Lin\textsuperscript{1}, Alex Chiaramonti\textsuperscript{1}, Tucker Kornegay\textsuperscript{1}, Johannes Aartun\textsuperscript{2}, Vincent D Pellegrini\textsuperscript{1}; \textsuperscript{1}Orthopaedics, MUSC, \textsuperscript{2}L-COHR, MUSC.

119 Malignancy Prevalence Among Patients with Autoimmune Overlap Syndromes, Maham Awan\textsuperscript{1}, Jim C Oates\textsuperscript{2}, Gary S Gilkeson\textsuperscript{2}, Diane L Kamen\textsuperscript{3}; \textsuperscript{1}Medicine, MUSC, \textsuperscript{2}Rheumatology, MUSC, \textsuperscript{3}Rheumatology, MUSC.

120 LCL-461 is a Lipid Based Therapeutic Drug That Overcomes Drug Resistance in Acute Myeloid Leukemia, Mohammed Dany\textsuperscript{1}, Besim Ogretmen\textsuperscript{2}; \textsuperscript{1}Biochemistry and Molecular Biology, MUSC, \textsuperscript{2}Biochemistry, MUSC.

121 Polyethylene Insert Subluxation in Rotating Platform Total Knee Arthroplasty: The Role of Flexion/Extension Gap Laxity, Nicole E Durig\textsuperscript{1}, Yongren Wu\textsuperscript{2}, Alex Chiaramonti\textsuperscript{2}, Vincent D Pellegrini\textsuperscript{2}; \textsuperscript{1}Orthopaedic Surgery, MUSC COM, \textsuperscript{2}Orthopaedic Surgery, MUSC.

122 A Comparison Between High Resolution Manometry Studies Obtained in Academic Vs. Community Based Healthcare Setting, Abid T Javed\textsuperscript{1}, Kevin Batte\textsuperscript{2}, Mustafa Abdul-Hussein\textsuperscript{3}, Don O Castell\textsuperscript{3}; \textsuperscript{1}COM, MUSC, \textsuperscript{2}Medicine, MUSC, \textsuperscript{3}Gastroenterology, MUSC.

123 Comparative Pharmacodynamics of Imipenem and Imipenem-Relebactam Against Wild-type and Resistant Populations of P. Aeruginosa and Non-Proteae Enterobacteriaceae, Joshua M Knight, Roger L White; College of Pharmacy, MUSC.

124 Evolving Trends in Racial Disparities for Perioperative Outcomes with the Kidney Allocation System, Daisy Sanchez\textsuperscript{1}, Derek Dubay\textsuperscript{2}, Baliga Prabhakar\textsuperscript{2}, David J Taber\textsuperscript{2}; \textsuperscript{1}COM, MUSC, \textsuperscript{2}Transplant, MUSC.
125 Determination of Venom Components From Conus Purpurascens Through Proteotranscriptomic Approaches, Meghan K Grandal¹, Clay Davis², Ben Neely², Evan Clark³, Frank Mar¹; ¹Drug Discovery and Biomedical Sciences, MUSC, ²NIST, Hollings Marine Lab, ³Biomedical Sciences, FAU.

126 Two-Dimensional Mapping of the Breast Cancer N-Glycome By MALDI-IMS, Danielle A Scott, Peggi Angel, Elizabeth Yeh, Richard R Drake; Cell and Molecular Pharmacology, MUSC.

128 Identification of DZIP1 Mutations in Patients with Mitral Valve Prolapse, Diana B Fulmer¹, Katelynn A Toomer¹, Lilong Guo¹, Amanda J Johnson¹, Linda K Williams¹, Joshua H Lipschutz², Russell A Norris¹; ¹Regenerative Medicine and Cell Biology, MUSC, ²Renal Medicine, MUSC.

129 Studying the Link Between Pannexin-1 and NOX2-mediated ROS in Response to Danger Signal ATP Stimulation in Primary Gingival Epithelial Cells, Jaden S Lee, JoAnn S Roberts, Nityananda Chowdhury, Zachary Messick, Özlem Yilmaz; Oral Health Sciences, MUSC.

130 A Light-Sheet Microscopy Based Three-Dimensional FRAP System, Chen Xun, Chen Peng, Hepfner Richards, Li Yang, Yao Hai, Ye Tong; Bioengineering, Clemson-MUSC.

131 Differential Relationships Between Diabetes Knowledge Scales and Diabetes Outcomes, Aprill Z Dawson, Rebekah J Walker, Leonard E Egede; Medicine, MUSC.

132 Glutaminase Inhibitor CB-839 Enhances Proteasome Inhibitor Sensitivity in Multiple Myeloma Cells, Ravyn M Thompson, Leticia Reyes, Brittany Smith, Nathan G Dolloff; Cell and Molecular Pharmacology and Experimental Therapeutics, MUSC.

133 The Role of ADAMTS5-mediated Cleavage in the Development of the Mandibular Condyle in the Temporomandibular Joint, Alexandra W Rogers, Loren E Dupuis, Kittrell Rice, Christine B Kern; Regenerative Medicine and Cell Biology, MUSC.

134 Use of KDM4B Inhibitors to Target Periodontal Disease Progression, Joy Kirkpatrick¹, Keith Kirkwood², Patrick Woster¹; ¹Drug Discovery and Biomedical Sciences, MUSC, ²Oral Health Sciences, MUSC.

135 Modulation of Signaling and Metabolic Preference of NK Cells By Different Forms of NKG2D Ligands and Its Implications, Payal Dhar, Fahmin Bashir, Jinyu Zhang, Jennifer D Wu; Microbiology and Immunology, MUSC.

136 Development of Novel Penicillin-binding Protein 2 (PBP2) Inhibitors As Drug Candidates for Penicillin- and Cephalosporin-resistant Neisseria Gonorrhoeae, Jonathan M Turner¹, Patrick M Woster², Christopher Davies¹; ¹Biochemistry & Molecular Biology, MUSC, ²Drug Discovery & Biomedical Sciences, MUSC.

137 BDNF As a Biomarker for Alzheimer’s Disease, Krishna L Bharani¹, Laura Columbo¹, Aurelie Ledreux¹, Granholm Ann-Charlotte²; ¹Neuroscience, MUSC, ²Denver University.

138 Rapid Anastomosis and Endothelial Reorganization Around Cellular Implants, Sanket Pattnaik, Heather Bainbridge, J Matthew Rhett, Stephen A Fann, Michael J Yost; General Surgery Research, MUSC.

139 Rapamycin Reverses Metabolic Alterations Induced By Static Cold Preservation in Models of Cardiac Transplantation, Danh T Tran¹, Catherine Dong², Ali Alawieh¹, Gyda Beeson³, Carl Atkinson¹, Satish N Nadig⁴; ¹Microbiology & Immunology, MUSC, ²COM, MUSC, ³Drug Discovery & Biomedical Sciences, MUSC, ⁴Surgery, MUSC.
Structural Analysis of Mutated Penicillin-binding Protein 2 From a Cephalosporin-resistant Strain of Neisseria Gonorrhoeae, Brandon Young, Christopher Davies; Biochemistry and Molecular Biology, MUSC.

Session 7: PhD II: Years 3+

Levels of Engagement in a Parenting Program: How Parenting Stress Impacts Intent to Enroll, Enrollment, and Attendance, Chelsey M Hartley, Angela D Moreland Johnson; Psychiatry and Behavioral Sciences, MUSC.

HSP90 Beta Controls the Conversion of Endoderm to a Hepatic Fate By Regulating HNF4A Protein Levels, Ran Jing, Stephen Duncan; Regenerative Medicine and Cell Biology, MUSC.

Genetic Analysis of the L2 and A30.5 Proteins: Key Regulators of Poxvirus Membrane Biogenesis, Justin Radomski, Paula Traktman; Biochemistry and Molecular Biology, MUSC.

The Effects of POWER Training on Gait and Muscle Function in Individuals Poststroke, Jennifer L Hunnicutt, Stacey E Aaron, Aaron E Embry, Chris M Gregory; Health Sciences and Research, MUSC.

The Role of P97 in DNA Inter-strand Crosslink Repair, Halley B Rycenga, Jordan Gruber, George Fullbright, David T Long; Biochemistry, MUSC.

Evaluating Stopping Boundaries for Bayesian Multi-Arm Multi-Stage Design with Binary Endpoints, Zhenning Yu, Caitlyn Ellerbe, Viswanathan Ramakrishnan; Biostatistics, MUSC.

Genome-scale Genetic Knockout Screen Identifies Modifiers of EGFR Dependence in Non-small Cell Lung Cancer Cells, Jon DiMaina, Chris Duckworth, Hiu Wing Cheung; Pathology and Laboratory Medicine, MUSC.

In Vivo Fluorescence Imaging Predicts Drug Uptake for Temperature Sensitive Liposomal Doxorubicin, Anjan Motamarry, Christian Rossmann, Dieter Haemmerich; Pediatrics, MUSC.

The Role of Transcription Factors in Sinoatrial Node Differentiation, Yunkai Dai1, Kemar Brown2, Rich Robinson3, Ann Foley1; 1Bioengineering, Clemson, 2Mount Sinai College of Medicine, 3Columbia University.

HIV Testing Attitudes and Behaviors At a Sports-based HIV Prevention Program in Mukuru Kwa Ruben, Nairobi, Kenya, Caroline J Vrana1, Danielle R Stevens1, Enouce Ndeche2, Jeffrey Korte1; 1Public Health Sciences, MUSC, 2Vijana Amani Pamoja.

Diabetes and African American Women’s Health in South Carolina From 2009-2012, Elizabeth A Brown1, Amy Wahlquist2, Dana Burschell3, Carolyn Jenkins3; 1Health Professions, MUSC, 2Public Health Sciences, MUSC, 3College of Nursing, MUSC.

Treating Post-Stroke Depression: Aerobic Exercise and Combined Aerobic Exercise and Transcranial Magnetic Stimulation, Catherine J VanDerwerker1, Ryan Ross1, Aaron Embry1, Stacey Aaron1, Brian Cence1, Mark George2, Chris Gregory1; 1Health Sciences and Research, MUSC, 2Psychiatry and Behavioral Sciences, MUSC.

Left DLPFC TMS Modulates Striatal BOLD Signal in an Amplitude-dependent Manner: a Sham Controlled Interleaved TMS/BOLD Imaging Study, Logan T Dowdle1, Truman R Brown2, Mark S George1, Colleen A Hanlon1; 1Psychiatry and Behavioral Sciences, MUSC, 2Radiology, MUSC.

Motor Cortical Stimulation Following Experimental TBI and Stroke Improves Motor Recovery, Serena-Kaye Kinley-Cooper, DeAnna Adkins; Neurosciences, MUSC.
155 Decoding Visual Attentional and Perceptual Processes in the Hippocampus Using Electrocorticography, Zahraa Sabra1, Jesse Breedlove1, Leo Bonilha2, Thomas Naselaris1; 1Neurosciences, MUSC, 2Neurology, MUSC.

156 Functional Connectivity of the STN and PPN in Patients with Freezing of Gait, Daniel H Lench1, Revuelta J Gonzalo2, Hanlon A Hanlon1; 1Psychiatry and Behavioral Science, MUSC, 2Neurology, MUSC.

**Session 8: PhD III: Years 3+**

157 High-Fat Diet Induced Non-Alcoholic Steatohepatitis Impairs Liver Regeneration Post Partial Hepatectomy, SM Touhidul Islam, Gabriel R Chedister, Julie H Lench, Arun P Palanisamy, Caroline Westwater, Michael Schmidt, Kenneth D Chavin; Microbiology and Immunology, MUSC.

158 In Utero Exposure to Tobacco Smoke, Subsequent Cardiometabolic Risks and Metabolic Syndrome Among U.S. Adolescents, Danielle Stevens1, Caroline West2, Angela Malek1, Kelly Hunt1; 1Public Health Sciences, MUSC, 2Medicine, MUSC.

159 Vagus Nerve Stimulation Decreases Inflammation and Increases BDNF in a Model of Parkinson’s Disease, Ariana Q Farrand1, Rebecca A Gregory2, Kristi L Helke2, Vanessa K Hinson3, Heather A Boger1; 1Neurosciences, MUSC, 2Comparative Medicine, MUSC, 3Neurology, MUSC.

160 Interleukin-like EMT Inducer ILEI Controls Metastatic Progression Through LIF-R/GP130 Receptor Signaling, Alec Woosley, Annamarie Dalton, Philip Howe; Biochemistry and Molecular Biology, MUSC.

161 Identifying the Role of VRK-1 in the DNA Damage Pathway, Maya F El-Sabban, Aye Mon, Paula Traktman; Biochemistry and Molecular Biology, MUSC.

162 The Role of DZIP1 and Primary Cilia in Valve Development and Disease, Katelynn A Toomer, Diana Fulmer, Lilong Guo, Amanda Johnson, Kathrine Williams, Chip Norris; Regenerative Medicine and Cell Biology, MUSC.

163 Molecular and Structural Maturation of the Nodes of Ranvier in Mouse Auditory Nerve Correlates with Hearing Onset, Clarisse H Panganiban1, Yazhi Xing1, Nancy Smythe1, LaShardai Brown1, Jeremy Barth2, Hainan Lang1; 1Pathology, MUSC, 2Regenerative Medicine and Cell Biology, MUSC.

164 Investigation of Cdc34 Molecular Interaction with Ubiquitin Conjugation Enzyme Partners, Katelyn Williams, Zongyang Lyu, Shaun Olsen; Biochemistry and Molecular Biology, MUSC.

165 Oncogene Targets on the 8p11-p12 Amplicon in Breast Cancer, Alexandria C Rutkovsky, Stephen P Ethier; Pathology, MUSC.

166 Histone Deacetylase Inhibition Targets Wisp-1, a Novel Cardiac Angiogenesis Regulator, Within Post-MI Myocardium, Lillianne H Wright1, Daniel Herr1, Symone Brown2, Harinath Kasiganesan1, Donald Menick1; 1Cardiology, MUSC, 2SURP, MUSC.

167 Quantifying Ethnic and Geographic Variations in Multimorbidity: Epidemiologic Evidence From Three Large Cohorts, Ralph Ward1, Mulugeta Gebregziabher1, Clara Dismuke2, Rebekah Walker2, David Taber3, Leonard Egede2; 1DPHS, MUSC, 2Charleston Health Equity and Rural Outreach Innovation Center (HEROIC), Ralph H. Johnson VAMC, 3Transplant Surgery, MUSC.
168 Benefits of Acute Aerobic Exercise on Neuroplastic Potential in Depression, Ryan E Ross¹, Mark S George², Michael E Saladin¹, Chris M Gregory¹; ¹Health Sciences and Research, MUSC, ²Psychiatry and Behavioral Sciences, MUSC.

169 Probing the Contractility of Capillary Pericytes in Vivo with Optogenetics, David A Hartmann, Roger Ian Grant, Andy Y Shih; Neurosciences, MUSC.

170 Macrophage-mediated Elimination of Excessive Glial Cells Contributes to Auditory Nerve Refinement in the Postnatal Mouse Cochlea, LaShardai N Brown¹, Yazhi Xing¹, Jeremy L Barth², Clarisse H Panganiban¹, Nancy M Smythe¹, Mary C Bridges³, Hainan Lang¹; ¹Pathology, MUSC, ²Regenerative Medicine and Cell Biology, MUSC, ³Graduate Studies, MUSC.

171 In-Silico Design and Synthesis of Novel, Potent, Amine Oxidase Family Inhibitors (LSD1 and SMOX) As Efficacious Agents in Pancreatic Cancer, Steven L Holshouser, Patrick Woster; MUSC.

Session 8: Postdoc / Resident / Fellow / Staff Scientist I

172 The Role of Pericytes in HIV-Associated Emphysema, Sarah E Stephenson, Carole L Wilson, Lindsey M Felton, Lynn M Schnapp; Medicine, MUSC.

173 Chronic Cocaine Self-Administration Impairs the Ability of Dopamine to Enhance Neuronal Excitability By Inhibition of Kv7/KCNQ Channels, Priyodarshan Goswamee, Jeffrey Parrilla-Carrero, William Buchta, Peter W Kalivas, Arthur C Riegel; Neurosciences, MUSC.

174 Measurement of Self-Reported Alcohol Use: Are Two Well-Validated Instruments Comparable?, Kristen B Johnson¹, Therese Killeen², Bernadette P Marriott³; ¹Gastroenterology, MUSC, ²Psychiatry and Behavioral Sciences, MUSC, ³Gastroenterology, MUSC.

175 Inhibition of Histone H3 Lysine 9 Dimethylation Protects From Noise-induced Hearing Loss, Xiong Hao, Long Haishan, Zhu Yuanping, Hill Kayla, Sha Su-hua; Pathology and Laboratory Medicine.

176 Sporadic Fundic Gland Polyps and Level of Gastric Acid Suppression, Mohamed H Khalaf, Andrew S Brock, Donald O Castell; Gastroenterology, MUSC.

177 Structural Studies of Penicillin Binding Protein 2 (PBP2) Form Neisseria Gonorrhoeae, Avinash Singh¹, Ailsa J Powell¹, Joshua Tomberg², Robert A Nicholas², Christopher Davies¹; ¹Biochemistry and Molecular Biology, MUSC, ²Pharmacology, University of North Carolina.

178 The Effects of Lung Cancer Screening Decision Intervention on Patient Knowledge, Intentions to Screen and Decisional Satisfaction, Emerald Banas, Chanita Hughes Halbert, Lin Dai, Nichole Tanner; Pulmonary/Critical Care, MUSC.

179 Independent Correlates of Chronic Kidney Disease Awareness Among Adults with Type 2 Diabetes, Ndidiemaka O Obadan¹, Rebekah Walker², Leonard Egede²; ¹Nephrology, MUSC, ²General Internal Medicine, RHJ VAMC.

180 Medial Prefrontal Cortex Theta Burst Stimulation Dampens the Striatal Response to Cocaine Cues in Individuals with High Baseline Striatal Drug Cue Reactivity, Tonisha Kearney-Ramos¹, Logan Dowdle¹, Oliver Mithoefer², William Devries², Mark George², Colleen Hanlon¹; ¹Neurosciences & Psychiatry, MUSC, ²Psychiatry, MUSC.
181 Circuit-Specific Neuroadaptations in Glutamate Inhibition in VTA Dopaminergic Neuron After the Predator Odor Stress, Jeffrey Parrilla-Carrero, Priyodarshan Goswamee, Greer McKendrick, Meredith Anderson, Arthur Riegel; Neurosciences, MUSC.

182 Kinetics of the Drug Release of Thermo-Sensitive Liposomes As Drug Delivery System in Cancer Chemotherapy, Davud Asemani, Anjan Motamarry, Dieter Haemmerich; Pediatrics, MUSC.

183 Transplanted Bone Marrow Hematopoietic Stem Cell-derived Cells Home to the Bones and Impart Clinical Benefits in a Mouse Model of Osteogenesis Imperfecta, InHong Kang, Uday Baliga, Meenal Mehrotra; Pathology and Laboratory Medicine, MUSC.

184 Mitochondrial Calcium Uniporter Knockout Protects From Noise-Induced Cochlear Synaptopathy, Yuanping Zhu, Zhiqi Liu, Su-hua Sha; Pathology, MUSC.

185 Identification of Genes Driving Malignant Peripheral Nerve Sheath Tumor Cell Proliferation and Survival Using Lentiviral ShRNA Screens, Amanda M Prechtl¹, Zachary Kratche¹, Stephen Guest¹, Elizabeth Garrett-Mayer², Steven Carroll³; ¹Pathology, MUSC, ²Public Health, MUSC.

186 Analysis of the Genomic Response to Auditory Nerve Injury in an Adult Mouse Model, Ryan Boerner¹, Hainan Lang², Judy R Dubno³, Mary C Bridges², Yazhi Xing², Jeremy Barth³; ¹Otolaryngology, MUSC, ²Pathology and Laboratory Medicine, MUSC, ³Regenerative Medicine and Cell Biology, MUSC.

187 Effects of IL-6 and Estradiol on Dermal Fibrosis in Systemic Sclerosis, DeAnna Baker Frost, Carol Feghali-Bostwick; Rheumatology, MUSC.

188 C3a Receptor Agonist Evoked Spike-like Calcium Amplitude and Mitochondrial Dysfunction in Oxidatively-stressed RPE Cells, Masaaki Ishii, Barbel Rohrer; Ophthalmology, MUSC.

189 Utilization of Bioengineered Immunotherapeutic Nanoparticles in Solid Organ Transplantation, Kunal J Patel¹, Peng Zhu¹, Ann-Marie Broome², Suraj Dixit³, Carl Atkinson³, Nadig N Satish¹; ¹Surgery, MUSC, ²Biomedical Imaging, MUSC, ³Microbiology and Immunology, MUSC.

190 Iliac Artery Aneurysm Producing Direct Inguinal Hernia As Presenting Sign for Hemoperitoneum, Ashley W Cross, Ellen Riemer; Pathology, MUSC.

191 Increased Cytokine Expression of Mesangial Cells Through Altered Glycosphingolipid Catabolism in Lupus Nephritis, Kamala Sundararaj, Peggi Angel, Richard Drake, Tamara Nowling; Medicine, MUSC.

192 CD26high T Cells Are a Unique CD4+ T Cell Subset with Superior Antitumor Activity, Michelle Nelson, Stefanie Bailey, Jacob Bowers, Kinga Majchrzak, Megan Wyatt, Logan Huff, Chrystal Paulos; Microbiology and Immunology, MUSC.

Session 10: Research Specialist / Technician I

193 Enhancing the Oncolytic Potential of Myxoma Virus in Combination with Interleukin-17, Eric Bartee; Microbiology and Immunology, MUSC.

194 Posttraumatic Stress Disorder and Amygdala Reactivity to Fearful Faces, Margaret A Warner, Megan Moran Santa Maria; Psychiatry, MUSC.
195 Three-Dimensional Reconstructions of Extracellular Matrix Remodeling and Lineage-Traced Cells Give Insight Into Early Outflow Tract Development, Joshua J Mifflin1, Nic E Alcala2, Loren E Dupuis3, Marcus T Ellison1, Kittrell Rice1, Christi B Kern1; 1Regenerative Medicine and Cell Biology, MUSC, 2CofC.

196 FZD5 and SFRP2 Interaction Activates NFATc3 Signaling and Angiogenesis in Endothelial Cells, Ingrid V Bonilla1, Yuri K Peterson2, Patrick Nasarre1, Jennifer Samples3, Eleanor Hilliard1, Thomas A Morinelli4, Betsy Hill4, Nancy K DeMore3; 1Surgery, MUSC, 2Drug Discovery and Biomedical Sciences, MUSC, 3Surgery, UNC Chapel Hill, 4Bioinformatics, UNC Chapel Hill.

197 The Role of IFN-γ During Combinational Therapy with IL-15/IL-15Rα Complexes and Anti-PD-1 MAb in a Preclinical Tumor Model, Luis E Cardenas, Marzena Swiderska-syn, Samantha Suriano, Kristina Andrijauskaite, John Wrangle, Mark Rubinstein; Surgery, MUSC.

198 Nanoscale Bead-Based Antigen-Specific Enrichment and In Vitro Stimulation Results in Rapid CD8+ T Cell Expansion, Carl S Haupt1, Lillian Neal2, Jonathan Schneck3, Chrystal Paulos1, Juan Varela1, 1Medicine, MUSC, 2Microbiology and Immunology, MUSC, 3Pathology, Johns Hopkins University, 4Medicine, HCC, MUSC.

199 Characterization of Circuit-specific Responses of Mesolimbic Dopamine Neuron Projections to Stress, Greer E McKendrick, Meredith E Andersen, Jeffrey Parrilla-Carrero, Priyodarshan Goswamee, Arthur Riegel; Neurosciences, MUSC.

200 Chronic Exposure to Cocaine and Heroin Does Not Alter Goal-directed Food Seeking, Korey Smith, Jacqueline M Barker, Jamie Peters; Neurosciences, MUSC.

201 Effect of Passive Movement and Functional Electrical Stimulation Within Brain Computer Interface Neuromodulation Targeting Tibialis Anterior, Anna Charlotte Lundgaard1, Michael Voigt1, Ning Jiang2, Kim Dremstrup1, Aiko K Thompson3, Dario Farina4, Natalie Mrachacz-Kersting1; 1Center for Sensory-Motor Interaction, Aalborg University, 2Systems Design Engineering, University of Waterloo, 3College of Health Professions, MUSC, 4Neurorehabilitation Engineering, Georg-August University.

202 Whole Blood Gene Expression Profiles Differ Between Patients Who Achieve a Sustained Virologic Response Versus Relapse After Antiviral Treatment of Chronic Hepatitis C Virus Infection, Cody M Orr, Eric Meissner; Infectious Diseases, MUSC.

203 Estrogen Signaling is Necessary for the Exercise-mediated Increase in Motoneuron Participation in Axon Regeneration After Peripheral Nerve Injury in Mice, Melina Acosta1, Patricia Copley2, Jamie Harrell3, Jennifer Wilhelm2; 1Neuroscience, MUSC, 2Psychology, CofC, 3Medicine, CofC.
ORAL PRESENTATIONS

Colbert Education Center and Library & Drug Discovery Bldg

Session 11: Undergraduate II  12:00 – 2:15 pm  EL 113

12:00 - 12:15

204 NEDD9 Mutations Alter Rab Protein Expression Levels in Cancer Cells, Daniel G Patterson1, Steven A Rosenzweig2, Stephane Grauzam2, Jessica Tiedeken2; 1USC Columbia, 2Cell and Molecular Pharmacology, MUSC.

12:15 - 12:30

205 A Translational Strategy to Improve Chronic Recovery After Stroke Using Injury-site Targeted Inhibition of Complement Activation, Elizabeth Farri Langley1, Ali Alawieh2, Melissa Scheiber1, Steve Tomlinson2; 1Biology, CofC, 2Microbiology and Immunology, MUSC.

12:30 - 12:45

206 Novel Injury-site Targeting Strategies for Modulating Innate and Adaptive Immunity At the Site of Transplant Rejection, David G Weatherford1, Xiaofeng Yang2, Melissa Scheiber1, Stephen Tomlinson2; 1Biology, CofC, 2Microbiology and Immunology, MUSC.

12:45 - 1:00

207 Modulation of the Antitumor Immune Response By Complement Anaphylatoxins, Ashton E Getchell1, Colleen E Quaas2, Andrea Whitfield4, Andrew Ellis4, Mario Fugal4, Kenneth Vanek4, Melissa Scheiber2, Stephen Tomlinson2; 1Biology, CofC, 2Microbiology and Immunology, MUSC, 4Pediatrics, MUSC, 4Radiation Oncology, MUSC.

1:00 – 1:15  Break

1:15 - 1:30

208 Individual Variability in Brain Response to Drug Cues Predicts RTMS Treatment Efficacy, Shaoni Dasgupta1, Norvel W Brown2, Tonisha E Kearney-Ramos3, Logan T Dowdle2, Oliver Milhoefer2, William Devries2, Mark S Geoge2, Colleen A Hanlon2; 1Academic Magnet High School, 2Psychiatry and Behavioral Sciences, MUSC.

1:30 - 1:45

209 The Effects of VDBP Genotypes on Circulating 25(OH)D, Serum VDBP Levels and Vitamin D Supplementation Responses, Sean K Brady1, Danforth Newton3, Judith Shary2, John Baatz2, Nina Forestieri2, Renee Washington2, Carol Wagner2; 1Health Science, Clemson, 2Neonatology, MUSC.

1:45 - 2:00

210 The Effect of ADAMTS5 Mediated Proteoglycan Cleavage on Temporomandibular Joint Development, Emmaline Schafer1, Christine Kerr2, Alexandra Rogers2; 1Clemson University, 2Regenerative Medicine and Cell Biology, MUSC.

2:00 - 2:15

211 Modulation of the Endocannabinoid System Within the Nucleus Accumbens Shell Elicits Anxyolitic-like Effects in Rats, Thibaut R Pardo-Garcia1, Nadira R Yusif2, Guillermo A Yudowski3, Carmen S Maldonado-Vlaar4; 1Neuroscience, MUSC, 2Neuroscience, Brown University, 3Anatomy & Neurobiology, University of Puerto Rico School of Medicine, 4Biology, University of Puerto Rico Rio Piedras campus.
Session 12: Clinical / Professional / Masters V  12:00 – 3:00 pm  EL 115

12:00 - 12:15

**212 Enhanced Membrane Type-1 Matrix Metalloproteinase Endosomal Recycling in Fibroblasts During Thoracic Aortic Aneurysm Development**, Elizabeth K Nadeau¹, Adam W Akerman¹, Robert E Stroud¹, Rupak Mukherjee², John S Ikonomidis¹, Jeffrey A Jones²; ¹Surgery, MUSC, ²Ralph H. Johnson VA.

12:15 - 12:30

**213 The Molecular Implications of Lifestyle Associated Metabolites (AGEs) to Prostate Cancer Disparity**, Narges Anbardar¹, Dazzell Smith¹, Dion Foster¹, Lourdes M Nogueira¹, Laura Spruill¹, Marbella E Ford², Victoria J Findlay¹, David P Turner¹; ¹Pathology and Laboratory Medicine, MUSC, ²Public Health Science, MUSC.

12:30 - 12:45

**214 Demographic Factors Associated with Age of Primary Repair of Cleft Palate in the United States**, Carly M Atwood¹, Darrell Wright¹, Shaun A Nguyen¹, Krishna G Patel¹, Ronald J Teufel², David R White¹; ¹ENT, MUSC, ²Pediatrics, MUSC.

12:45 - 1:00

**215 Cell Cycle Regulation of an Nkx2-5 Target Gene**, Balakrishnan Pillai¹, Kim Sutton², John Brooker², Kyu-Ho Lee²; ¹COM, MUSC, ²Pediatrics, MUSC.

1:00 - 1:15

**216 Extracapsular Dissection Vs. Superficial Parotidectomy of Benign Parotid Lesions: Surgical Outcomes and Cost-Effective Analysis**, Masanari G Kato, Evren Erkul, Shaun A Nguyen, Marion B Gillespie; Otolaryngology-Head and Neck Surgery, MUSC.

1:15 - 1:30

**217 Focal Adhesion Formation and Actin Polymerization Are Reduced in Aortic Smooth Muscle Cells with Aging**, Andrew R Leggett¹, Elizabeth K Nadeau², Jason B Wheeler², Adam W Akerman², Robert E Stroud², John S Ikonomidis³, Jeffrey A Jones³; ¹Medicine, MUSC, ²Cardiothoracic Surgery, MUSC.

1:30 – 1:45  Break

1:45 - 2:00

**218 The Role of Cilia in Valve Development and Mitral Valve Prolapse**, Neal K Peterson¹, Katelynn Toomer², Russell Norris²; ¹MUSC, ²Cell Biol. and Reg. Med..

2:00 - 2:15

**219 The Impact of Sugar Derived Metabolites (AGEs) on Pubertal Mammary Gland Development**, Bradley A Krisanits¹, Lourdes M Nogueira¹, Kenyatta L Walker², Victoria J Findlay¹, David P Turner³; ¹Pathology and Laboratory Medicine, MUSC, ²South Carolina State University, ³Pathology and Laboratory Medicine. MUSC.
2:15 - 2:30

220 GPA-EDA: An Interactive and Dynamic Visualization Toolkit for the Exploratory Analysis of Genetic Studies, Emma C Kortemeier¹, Kelly Hunt², Paula Ramos³, Hang Kim⁴, Dongjun Chung¹; ¹Biostatistics, MUSC, ²Epidemiology, MUSC, ³Rheumatology, MUSC, ⁴Statistics, UC.

2:30 - 2:45

221 The Relationship Between Physical Activity and Vitamin D Levels in Postpartum Women, Jordan Hall, Nina Forestieri, Judith Shary, Myla Ebeling, Carol L Wagner; Neonatology, MUSC.

2:45 - 3:00

222 Complement Factor C3a Induces Mitochondrial Dysfunction in Candida Glabrata, William E Linder, Silvia Vaena, Caroline Westwater; Oral Health Sciences, MUSC.

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Session 13: Clinical / Professional / Masters VI 12:00 – 3:00 pm EL 121

12:00 - 12:15

223 Immune Responses to Pneumococcal Vaccines in an HIV+ Aging Population, Megan AH Willner¹, Megan Bickford², Myra Happe³, Maj Westerink⁴; ¹COM, MUSC, ²CGS, MUSC, ³Infectious Disease, MUSC.

12:15 - 12:30

224 Targeted Complement Inhibition Reduces Chronic Neuroinflammation and Improves Outcomes After Murine Traumatic Brain Injury, Shannon Weber¹, Ali Alawieh¹, Farris Langley², Steve Tomlinson³; ¹COM, MUSC, ²CofC, ³Microbiology and Immunology, MUSC.

12:30 - 12:45

225 Impact of Vitamin D Deficiency on Sinonasal Inflammation and Tissue Remodeling in a Murine Model of Atopic Chronic Sinusitis, Elliott D Mappus¹, Carl Atkinson², Jennifer K Mulligan¹; ¹Otolaryngology, MUSC, ²Microbiology and Immunology, MUSC.

12:45 - 1:00

226 Effects of Apolipoprotein E on Left Ventricular Geometry and Function, Andrew P Hill¹, Hesham El-Shewy², Sarah Garrett³, Miram Jaffa², Jeffre A Jones³, Jaffa A Ayad¹; ¹Cardiothoracic Surgery, MUSC, ²Endocrinology, MUSC.

1:00 - 1:15

227 Perioperative Psoas:Lumbar Vertebral Index As a Predictor of Mid-Term Outcomes From Lower Extremity Revascularization, Emily S Nyers¹, Thomas E Brothers²; ¹COM, MUSC, ²Surgery, MUSC.

1:15 - 1:30

228 Prevention of Pediatric Hospital Acquired Harms, Sarah G Keaveny¹, Elizabeth H Mack²; ¹COM, MUSC, ²Pediatrics, MUSC.

1:30 – 1:45 Break
1:45 - 2:00

229 Fast Brain MRI Sequence for All Pediatric Indications: Outcomes and Limitations, Avni Patel, Maria Vittoria Spampinato, Gustavo Cervantes, Milad Yazdani, Ramin Eskandari; COM, MUSC.

2:00 - 2:15

230 Mechanical Tension Induces Exosome Secretion of MiR-133a in Thoracic Aortic Fibroblasts, Walker M Blanding¹, Adam W Akerman², Robert E Stroud³, John S Ikonomidis³, Jeffrey A Jones³; ¹COM, MUSC, ²CGS, MUSC, ³Surgery, MUSC.

2:15 - 2:30

231 Clinical Implications of Pre-operative Cochlear Implant Evaluations in Noise, Emily A Franko-Tobin¹, Kathryn A Kreicher², Meredith Holcomb², Elizabeth Camposeo², Ted A Meyer²; ¹COM, MUSC, ²Otolaryngology, MUSC.

2:30 - 2:45

232 Optimal Risk-Adjusted Length of Stay Following Primary Total Joint Arthroplasty in South Carolina to Reduce Readmission Rate, Patricia A Kirkland¹, Nathan R Royal², William R Barfield³, Harry A Demos⁴, Vincent D Pellegrini, Jr.³, Jacob M Drew⁴; ¹COM, MUSC, ²General Surgery, Medical College of Georgia, ³Orthopaedics, MUSC, ⁴Orthopaedics, MUSC.

2:45 - 3:00

233 Impact of Diagnosis Age on Quality of Life Among Patients with Systemic Lupus Erythematosus, Christina L Kearse¹, Jim C Oates², Gary S Gilkeson³, Diane L Kamen²; ¹COM, MUSC, ²Medicine, MUSC.

Session 14: Clinical / Professional / Masters VII 1:15 – 3:15 pm EL 116

1:15 - 1:30

234 Identification of Swallowing Tasks From MBSS That Optimize the Detection of Physiologic Impairment, R Jordan Hazelwood¹, Kent E Armeson², Elizabeth G Hill², Heather Shaw Bonilha¹, Bonnie J Martin-Harris³; ¹Health Sciences & Research, CHP, MUSC, ²Public Health Sciences, COM, MUSC, ³Communication Sciences & Disorders, Northwestern University.

1:30 - 1:45

235 Validation of the Specific Test of Early Infant Motor Performance (STEP) with Neuroimaging, Laurel Gower¹, Patty Coker-Bolt², Viswanathan Ramakrishnan³, Hunter Moss⁴, Truman Brown⁴, Dorothea Jenkins⁵; ¹COM, MUSC, ²Occupational Therapy, MUSC, ³Public Health Sciences, MUSC, ⁴Radiology, MUSC, ⁵Pediatrics, MUSC.

1:45 - 2:00

236 Optimal Radiographic Views for Predicting Intra-articular Screw Penetration After Proximal Humeral Locking Plate Implantation, Thomas Kelly¹, William R Barfield², Langdon A Hartsock², Russell Chapin³, Kristoff Reid⁴, Zilan Lin², Lucy Dimarco², Shane K Woolf³; ¹COM, MUSC, ²Department of Orthopaedics, MUSC, ³Department of Radiology, MUSC.

2:00 - 2:15

237 Epidemiology Of Neck Or Arm Symptoms And Pathology Among Patients Referred For Subspecialty Evaluation With Initial Complaint Of Shoulder Pain, Kristina Drake, Matthew Nodelman, Zilan Lin, William Barfield, Shane Woolf; Orthopaedics, MUSC.

2:15 – 2:30 Break
Prevalence of Hearing Loss in Teachers of Singing and Voice Students
Mitchell J Isaac, Deanna Mc规模最大orum, Shaun Nguyen, Lucinda Halstead; COM, MUSC, Music, CofC, Otolaryngology, MUSC.

Outcomes in Presumed GERD Patients with Negative Reflux Studies and Negative Manometry
Logan Roof, Mohamed Khalaf, Donald Castelli; COM, MUSC, Gastroenterology, MUSC.

Selective Inhibition of Endochondral Fracture Healing By External Beam Irradiation: Delayed Acquisition of Biomechanical Strength in a Rat Femur Fracture Model
Zilan X Lin, Yongren Wu, E Lex Hanna, Robert Holmes, Raymond Boaz, Daniel G McDonald, William R Barfield, Vincent D Pellegrini; Orthopaedics, MUSC, Public Health Science, MUSC, Radiation Oncology, MUSC.

The Impact of Reported Depression on Disability Following Stroke
Scott D Hutchison, Michelle L Woodbury, Annie Simpson; Health Science & Research, MUSC, Healthcare Leadership and Management, MUSC.

Geographic Variation in Pediatric Emergency Department Visits for Asthma in South Carolina From 1999-2015
Matthew Bozigar, John Pearce, Erik Svendsen; Public Health Sciences, MUSC.

Age-related Changes in B Cells Impact Immune Responses to Pneumococcal Vaccination in Aging HIV+ Individuals
Myra Happe, Jennifer Ohtola, Megan Bickford, Julie Westerink; Microbiology and Immunology, MUSC, Medicine, UTMC, Medicine, MUSC.

Examining the Relationship Between Semantic Performance and Inferior Longitudinal Fasciculus Integrity in Chronic Post-stroke Aphasia Using Advanced Diffusion MRI Techniques
Emilie McKinnon, Russell Glenn, Jens Jensen, Joseph Helpern, Julius Fridriksson, Leonardo Bonilha; Neurology, MUSC, Neuroscience, MUSC, Radiology, MUSC, Communication Sciences, USC.

Chronic Post-stroke Aphasia Severity is Determined By Fragmentation of Residual White Matter Networks
Barbara K Marebwa, Julius Fridriksson, Grigori Yourganov, Lynda Feenaughty, Chris Rorden, Leonardo Bonilha; Neurology, MUSC, Communication Sciences and Disorders, USC, Psychology, USC.

Laser Scanning Stereomicroscopy for Fast Volume Imaging with Two-photon Excitation and Scanned Bessel Beams
Yang Li, Chen Xun, Yang Yanlong, Tong Ye; Clemson-MUSC Bioengineering Program, State Key Laboratory of Transient Optics and Photonics, Chinese Academy of Sciences.
3:00 - 3:15

247 Impact of Selective Serotonin Reuptake Inhibitors (SSRIs) on Bone Health in the Veteran Population: 10 Year Clinical Outcomes, Daniel L Brinton, Cory E Fominaya, Amanda C LaRue, Annie N Simpson; Health Sciences & Research, MUSC, Ralph H. Johnson VA Medical Center, Healthcare Leadership & Management, MUSC.

Session 16: PhD V: Years 3+ 12:00 – 3:15 pm EL 102

12:00 - 12:15

248 Porphyromonas Gingivalis Modulates Antibacterial NADPH Oxidase 2, NOX2, in Primary Gingival Epithelial Cells, JoAnn S Roberts, Kalina Atanasova, Ozlem Yilmaz; Oral Health Sciences, MUSC, Periodontology, UF.

12:15 - 12:30

249 Sphingosine Kinase 1 in Mature Adipocytes Contributes to Adipogenesis Through Regulation of Glucocorticoid Signaling, Johana M Lambert, Andrea K Anderson, Ashley Cowart; Biochemistry, MUSC.

12:30 - 12:45

250 The Protein Kinase HUNK: A Novel Regulator in EGFR+ TNBC Growth and Metastasis, Carly B Williams, Melissa Abt, Elizabeth Yeh; Cell and Molecular Pharmacology & Experimental Therapeutics, MUSC.

12:45 - 1:00

251 Investigating the Requirement of Hunk Kinase Activity on Autophagy Regulation, Joelle N Zambrano, Elizabeth S Yeh; Pharmacology, MUSC.

1:00 - 1:15

252 Kallistatin Reduces Vascular Senescence and Aging By Preventing MicroRNA-34a-Modulated ENOS and SIRT1 Expression, Youming Guo, Pengfei Li, Chao Lee, Chao Julie; Biochemistry and Molecular Biology, MUSC.

1:15 - 1:30

253 Pharmacological Exposures Effect Cranial Suture Stem Cells, Emily L Durham, R Nicole Howie, Amanda LaRue, James Cray; Oral Health Sciences, MUSC, Oral Health Sciences, MUSC, Pathology, MUSC.

1:30 – 1:45 Break

1:45 - 2:00

254 Defining the Role of AGEs in Race Specific Tumor Immune Response in Prostate Cancer, Danzell Smith, Dion Foster, Victoria Findlay, Lourdes Nogueira, Laura Spruill, Marvella Ford, David Turner; Pathology, MUSC, Public Health Science, MUSC.

2:00 - 2:15

255 Adipocyte Sphingosine Kinase 1 (SK1) Modulates the Adipose Circadian Clock to Affect the Overall Metabolic Phenotype, Andrea K Anderson, Johana M Lambert, Ashley Cowart; Biochemistry and Molecular Biology, MUSC.
Elevated Serum Liver-type Fatty Acid Binding Protein Levels Are Associated with Poorer Survival in Acetaminophen-induced Acute Liver Failure, Jaime L Speiser, Constantine J Karvellas, Christopher F Rose, Valerie Durkalski; Public Health Sciences, MUSC, Hepatology and Critical Care Medicine, University of Alberta, Hepato-neuro Laboratory, University of Montreal.

Breaking the Spiral of Neurodegeneration After Stroke Using Transient and Local Inhibition of Complement Activation, Ali Alawieh, F E Langley, S Tomlinson; Microbiology and Immunology, MUSC, Biology, CofC.

E-meditation: A Double-blind Study Exploring the Use of Transcranial Direct Current Stimulation (tDCS) to Potentially Enhance Mindfulness Meditation, Bashar Badran, Chris W Austelle, Nicole R Smith, Chloe E Glusman, Brett Froeliger, Eric L Garland, Mark S George, Baron E Short; Brain Stimulation Lab, MUSC.

Recovery of MtDNA Stability Through New Mitochondrial Compounds, Tucker J Williamson, Jennifer J Rahn, James Chou, Sherine SL Chan; Drug Discovery and Biomedical Science, MUSC, Biology, College of William & Mary.

Session 17: PhD VI: Years 3+  12:00 – 3:15 pm  EL 103

Novel Application of a Weighted Zero-Inflated Negative Binomial Model in Modeling Count Data From a Complex Survey, Lin Dai, Mulugeta Gebregziabher; Public Health Sciences, MUSC.

Interpretation of Imaging Mass Spectrometry Data Using a Two-Part Zero-Inflated Process Convolution Model, Cameron S Miller, Benjamin Neely, Richard Drake, Elizabeth Hill; Public Health Sciences, MUSC, Chemical Sciences Division, National Institute of Standards and Technology, Cell and Molecular Pharmacology, MUSC.

Utilization of Response Adaptive Randomization in a Clinical Trial with Time Trend Confounding, Yunyun Jiang, Wenle Zhao, Durkalski L Valerie; Public Health Science, MUSC.

Cancer Promotion and Immune Tolerance Via Cancer Cell - Intrinsic Surface Expression of GARP, Alessandra Metelli, Bill Wu, Caroline W Fugle, Saleh Rachidi, Shaoli Sun, Jennifer Wu, Bei Liu, Zihai Li; Microbiology and Immunology, MUSC, Pathology and Laboratory Medicine, MUSC.

BRAF/MAPK Signaling Regulates ILEI, Which Contributes to the Low-MITF/invasive Melanoma Phenotype, Ken Noguchi, Annamarie Dalton, Buckley Mccall, Philip H Howe; Biochemistry and Molecular Biology, MUSC.
265 FTY720 Induces Necroptosis in Lung Cancer By Inducing Ceramide Signaling At the Plasma Membrane, Rose Nganga¹, Besim Ogretmen²; ¹Biochemistry and Molecular Biology, MUSC, ²Hollings Cancer Center, MUSC.

1:30 – 1:45 Break

1:45 – 2:00

266 Thoracic Aortic Wall Tension Regulates MicroRNA-133a Abundance, Adam W Akerman¹, Elizabeth K Nadeau¹, Robert E Stroud¹, Rupak Mukherjee², John S Ikonomidis¹, Jeffery A Jones²; ¹Surgery, MUSC, ²Ralph H. Johnson VAMC.

2:00 – 2:15

267 Hematopoietic Stem Cell-Derived Bone Marrow Cells Form Osteogenic Colonies, Ryan R Kelly¹, Amanda C LaRue²; ¹Pathology, MUSC, ²Research Services, Ralph H. Johnson VAMC.

2:15 – 2:30

268 SPARC Regulates Collagen Fibers and Monocyte Activity in Periodontal Disease By Controlling Transglutaminase-mediated Cross-links, Emilie Ann Rosset¹, Jessica Trombetta-eSilva², Amy D Bradshaw³; ¹Dental Medicine, MUSC, ²Periodontics, Baylor, ³Medicine, MUSC.

2:30 – 2:45

269 Multiple Statistical Approaches to Answer a Question Involving the Modified Rankin Scale: Which Approach is Best?, Colleen E Bauza, Renee Martin, Marvella E Ford, Sharon D Yeatts; Public Health Sciences, MUSC.

2:45 – 3:00

270 The Role of the TGFbeta-GARP Axis in B Cell Function and Tolerance, Caroline W Fugle, Bill Wu, Bei Liu, Zihai Li; Microbiology & Immunology, MUSC.

3:00 – 3:15

271 CD26high T Cells Eradicate Large, Established Tumors in Multiple Cancer Models, Stefanie R Bailey, Michelle H Nelson, Jacob S Bowers, Megan M Wyatt, Lillian R Neal, Kinga Majchrzak, Chrystal M Paulos; Microbiology & Immunology, MUSC.

Session 18: PhD VII: Years 3+ 12:30 – 3:00 pm BE 112

12:30 – 12:45

272 Cooperative Therapeutic Anti-tumor Effect of IL-15 Agonist ALT-803 and Co-targeting Soluble NKG2D Ligand SMIC, Fahmin Basher¹, Emily Jeng², Hing Wong², Jennifer D Wu¹; ¹Microbiology and Immunology, MUSC, ²Altor Biosciences, Miramar, FL.

12:45 – 1:00

273 Addressing Geographic Confounding Through Spatial Propensity Scores: A Study of Racial Disparities in Diabetes, Melanie L Davis¹, Leonard Egede², Kelly Hunt¹, Brian Neelon¹; ¹Public Health Sciences, MUSC, ²HEROIC COIN, Ralph H. Johnson VAMC.
1:00 - 1:15

**274** WHSC1L1 and 8p11 Amplicon-mediated Estrogen-independent Activation of ER-alpha in Luminal B Breast Cancers, Jamie N Mills, Britanny Ivey, Steve Ethier; Pathology, MUSC.

1:15 - 1:30

**275** Class I Histone Deacetylases Localize to Cardiac Myocyte Mitochondria and Contribute to Ischemia Reperfusion Injury, Daniel J Herr, Sverre E Aune, Xinh Xinh Nguyen, Jennifer R Bethard, Lauren E Ball, Donald R Menick; Medicine, MUSC, Pharmacology, MUSC, Ralph H. Johnson VAMC.

1:30 – 1:45 Break

1:45 - 2:00

**276** A Shift in Thoracic Aortic Smooth Muscle Cell Phenotype and Gene Expression Contributes to Aortic Structural and Mechanical Changes with Aging, Jason B Wheeler, Robert E Stroud, Rupak Mukherjee, John S Ikonomidis, Jeffrey A Jones; MCBP, MUSC, Surgery, MUSC.

2:00 - 2:15

**277** Th17 Cells Are Refractory to Senescence Retaining Robust Antitumor Activity After Long-term Ex Vivo Expansion, Jacob S Bowers, Michelle H Nelson, Kinga Majchrzak, Stefanie R Bailey, Baerbel Rohrer, Carl Atkinson, Luca Gattinoni, Chrystal M Paulos; Microbiology and Immunology, MUSC, Ophthalmology, MUSC, Experimental Transplantation and Immunology, NCI.

2:15 - 2:30

**278** Speech Recognition Based on Short Glimpses: Effects of Age and Cognitive Abilities, William J Bologna, Kenneth I Vaden, Jayne B Ahlstrom, Judy R Dubno; Otolaryngology, MUSC.

2:30 - 2:45

**279** The Effects of Adolescent Intermittent Ethanol Exposure on Discrimination and Reversal Learning with Probabilistic Reinforcement in Adulthood, Corrin Garr, Justin T Gass, Stan B Floresco, Judson Chandler; Neuroscience, MUSC, Psychology, University of British Columbia.

2:45 - 3:00

**280** Development of Allosteric Hydrazide-Containing Class I Histone Deacetylase Inhibitors for Use in Acute Myeloid Leukemia, Jesse McClure, Cheng Zhang, Elizabeth Inks, Yuri Peterson, Jiaying Li, C James Chou; Drug Discovery, MUSC, CofC.

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**Session 19: Postdoc / Resident / Fellow / Staff Scientist II**

12:00 – 3:00 pm EL 114

12:00 - 12:15

**281** N-acetyl Cysteine Interferes with the Trinder Reaction Based Assays and Beyond, Yun Wang, Susan Clapps, Beverly Horne, Yusheng Zhu; Pathology and Laboratory Medicine, MUSC.

12:15 - 12:30

**282** MEF2C Regulates Cortical Excitatory and Inhibitory Synapses and Behaviors Relevant to Neurodevelopmental Disorders, Adam J Harrington, Aram Raissi, Carly Hale, Kacey Rajkovich, Stefano Berto, Genevieve Konopka, Kimberly Huber, Christopher W Cowan; Neurosciences, MUSC, Psychiatry, HMS, Neuroscience, UTSW.
12:30 - 12:45

283 Hand Functional Recovery Using Sensory Stimulation in Chronic Stroke Patients, Ryan J Downey¹, Blair HS Dellenbach², Leonardo Bonilha³, Michelle L Woodbury², Na Jin Seo¹; ¹Health Professions, MUSC, ²Health Sciences and Research, MUSC, ³Neurology, MUSC.

12:45 - 1:00

284 Survival Studies in Cecal Ligation and Puncture-induced Murine Sepsis: role of MiRNAs, Joy J Buie¹, Andrew Goodwin², James Cook, John Vournakis³, Marina Demcheva³, Perry V Halushka⁴, Hongkuan Fan¹; ¹Pathology and Laboratory Medicine, MUSC, ²Pulmonary, Critical Care, Allergy and Sleep Medicine, MUSC, ³Marine Polymer Technologies, ⁴Pharmacology, MUSC.

1:00 - 1:15

285 Sertraline Impairs Bone Remodeling in Murine, Critical-sized, Calvarial Defects, Rebecca N Howie¹, Emily L Durham¹, Gracie Bennfors¹, Samuel Herberg², William D Hill³, James J Cray¹; ¹Oral Health Sciences, MUSC, ²School of Engineering, Case Western, ³Cell Biology and Anatomy, AU.

1:15 - 1:30

286 Hippocampal GABAergic Neurons Are Susceptible to Amyloid Beta Toxicity in Vitro and Are Decreased in Number At the Early Stage of Alzheimer’s Disease in APPSwID Mouse Model, Seungho Choi, Je-Seong Won, Inderjit Singh; Pediatrics, MUSC.

1:30 – 1:45 Break

1:45 - 2:00

287 Cognitive Persistence Predicts Speech Recognition in Noise in Older Adults, Susan E Teubner-Rhodes, Kenny I Vaden, Lois Matthews, Judy R Dubno, Mark A Eckert; Otolaryngology - Head & Neck Surgery, MUSC.

2:00 - 2:15

288 Sphingosine Kinase-2/Sphingosine 1-Phosphate Signaling Regulates P16INK4A Mediated Accelerated Aging in Normal Somatic Tissues and TCF21 Mediated Tumor Suppression in Lung Cancer, Shanmugam Panneer Selvam¹, Marion Cooley⁴, Kristi Helke⁵, Elizabeth Garrett-Mayer⁶, Charles Smith⁵, Besim Ogretmen¹; ¹Biochemistry and Molecular Biology, MUSC, ²Regenerative Medicine and Cell Biology, MUSC, ³Comparative Medicine-Lab Animal Resources, MUSC, ⁴Public Health Sciences, MUSC, ⁵Apogee Biotechnology Corporation, Pennsylvania.

2:15 - 2:30

289 Kallistatin Via Its Structural Elements Induces Cancer Cell Autophagy and Apoptosis, Pengfei Li, Youmin Guo, Lee Chao, Julie Chao; Biochemistry, MUSC.

2:30 - 2:45

290 Moesin Regulates Optimal TGF-β Signaling and ITreg Cell Differentiation and Attenuation Improves Adoptive T Cell Therapy, Ephraim A Ansa-Addo¹, Serhan Karvar², Philip H Howe³, Zihai Li¹; ¹Microbiology and Immunology, MUSC, ²Gastroenterology and Hepatology, MUSC, ³Biochemistry and Molecular Biology, MUSC.

2:45 - 3:00

291 The Fli-1 Transcription Factor Impacts Inflammatory Disease Through the Regulation of Inflammatory Cytokines and Chemokines, Mara L Lennard Richard¹, Shuzo Satō¹, Xian K Zhang²; ¹Rheumatology, MUSC, ²Rheumatology, MUSC and Ralph H Johnson VA Medical Center.
12:45 - 1:00

292 MicroRNA 204 Expression Disrupts Normal Lactation in the Mouse Mammary Gland, Lourdes Nogueira¹, Jerrica Walden², David P Turner¹, Victoria J Findlay¹; ¹Pathology, MUSC, ²USC.

1:00 - 1:15

293 Hematopoietic Stem Cell-derived Osteoblasts Enhance Tumorigenicity in the Osteosarcoma Microenvironment, Uday K Baliga¹, Inhong Kang¹, Ying Xion¹, Shilpak Chatterjee², Meenal Mehrotra³; ¹Pathology, MUSC, ²Surgerical Oncology, MUSC.

1:15 - 1:30

294 Parenting Stress Among Substance-using Parents Involved in Treatment: Results From Qualitative Interviews, Sara Delmas, Angela Moreland; Psychiatry, MUSC.

1:30 – 1:45  Break

1:45 - 2:00

295 The Association Between Olfaction and Depression: A Systematic Review, John S Muus, Christopher D'Esposito, Preeti Kohli, Zachary M Soler, Rodney J Schlosser, Shaun A Nguyen; Otolaryngology, MUSC.

2:00 - 2:15

296 The Cerebrovascular Mural Cell Continuum: A Structural and Biochemical Characterization of Smooth Muscle Cells, Pericytes, and Intermediary Hybrids, Roger I Grant, David H Hartmann, Robert G Underly, Ashley N Watson, Andy Y Shih; Neurosciences, MUSC.

2:15 - 2:30

297 Pediatric and Adult Recommendations Vary For Sibling Testing in Cystic Fibrosis, Kimberly L Brown, Patrick A Flume; Pulmonary, MUSC.
Ryanodine receptors (RyRs) are intracellular Ca\(^{2+}\) channels that release Ca\(^{2+}\) from the sarcoplasmic reticulum into the cytoplasm during muscle action potentials. The channel functions are regulated by Ca\(^{2+}\), activated by micromolar Ca\(^{2+}\) and inactivated by millimolar (1-10 mM) Ca\(^{2+}\). Multiple mutations associated with malignant hyperthermia (MH) in skeletal RyR (RyR1), and with catecholaminergic polymorphic ventricular tachycardia (CPVT) in cardiac RyR (RyR2), have been identified in human patients. Recent high-resolution structural studies with RyR1 suggested a potential role of a cytoplasmic loop linking the second (S2) and the third (S3) transmembrane helices (S2-S3 loop), for Ca\(^{2+}\)-dependent regulation of RyRs. To probe the role of the S2-S3 loop on RyR channel activities, we constructed recombinant mutant RyRs carrying disease-associated mutations in their S2-S3 loop and characterized their Ca\(^{2+}\)-dependent channel activities by [3H]ryanodine binding method. Four MH-associated RyR1 mutations (F4732D, G4733E, R4736W, and R4736Q), significantly reduced Ca\(^{2+}\) inactivation, whereas Ca\(^{2+}\) activation of these mutants was essentially the same as wild type RyR1. The results indicate that the S2-S3 loop of RyR1 plays an important role in Ca\(^{2+}\)-dependent inactivation. Given this information, we also constructed and characterized a CPVT-associated G4663S-RyR2 mutation, on the corresponding site as the G4733E mutation in RyR1. Preliminary data suggest that G4663S-RyR2 modestly enhances Ca\(^{2+}\) inactivation. In CPVT, release of catecholamine results in RyR2 phosphorylation at S2808 and S2814 by PKA and other protein kinases. Therefore, we constructed an additional RyR2 mutant, S2808D/S2814D (double SD), that mimics the conformation of two phosphorylated serine residues. We will address how the CPVT mutation (G4663S) affects the RyR2 channel function with normal and phosphorylated (double SD) status. A patient affected by the G4663S mutation also carried another missense RyR2 mutation (H4763P) from another parent; thus, we will also characterize the effect of H4763P mutation with a combination of G4663S and/or double SD mutations.

**002 Effects of TIMP-1 on Myocardial Collagen Content in Pressure Overload Cardiac Hypertrophy.** Mark P Karavan, Catalin F Baicu, An O Van Laer, Azim Hossain, Amy D Bradshaw, Michael R Zile; ¹USC, ²Division of Cardiology, MUSC and Ralph H. Johnson VA Medical Center.

Background. Heart failure (HF) affects 5.8 million people in the United States. About half of these patients die within 5 years of diagnosis, while cost of health care services are estimated at $30.7 billion each year. HF is a complex clinical syndrome with symptoms that indicate impairment of the heart function. In particular, patients with heart failure preserved ejection fraction (HFP EF) have an abnormal left ventricular (LV) diastolic function. In these patients, LV pressure overload (PO), which occurs secondary to aortic valve stenosis and/or systemic hypertension, causes cardiomyocyte hypertrophy, extracellular matrix collagen accumulation, increased myocardial stiffness, and LV diastolic dysfunction. Objective. Matrix metalloproteinases (MMPs) are the principle enzymes that degrade collagen and are essential for normal cardiac tissue remodeling. An endogenous inhibitor of MMPs are the glycoproteins known as tissue inhibitor of metalloproteinases (TIMPs). In this study, we investigated the potential role of TIMP-1 in myocardial collagen homeostasis and stiffness in PO hypertrophy. Hypothesis. We tested the hypothesis that TIMP-1 plays a mechanistic role in changes in collagen content, myocardial stiffness and development of PO induced hypertrophy. Methods and Results. Using transverse aortic constriction (TAC), LV PO was induced in C57BL/6 wild type (WT) and TIMP-1KO mice for 4 weeks. Baseline and final indices of cardiac function were determined by echocardiography. Histology measurements of collagen volume fraction (CVF) and papillary muscle stiffness were performed at 4 weeks following TAC. Following LV PO, CVF was increased by 281% in WT and only by 175% in TIMPKO vs corresponding baselines (p<0.05). Moreover, stiffness was increased by 61% in WT, but did not significantly change in TIMP1KO (p<0.05). Conclusions. Loss of TIMP-1 did not affect the extent of PO hypertrophy, but inhibited the PO-induced increases in collagen content and myocardial stiffness. Decreasing TIMP-1 may provide protective effects in ECM remodeling during PO. NIH R01HL123478

**003 The Role of ADAMTS5 Protease on Outflow Tract Intercalated Cushion Formation.** Lea G Russell, Josh Mifflin, Kitty Rice, Loren Dupuis, Christi Kern;
004 The Effects of Proteoglycan Cleavage on Wnt/β-catenin Signaling During Myocardialization, Marcus T Ellison, Loren Dupuis, Kitty Rice, Josh Mifflin, Christine Kern; Regenerative Medicine and Cell Biology, MUSC.

Abstract not available.

005 The Relationship Between Cardiometabolic Risk Factors and African-American Breast Cancer Survivors, Kai Cobb1, Gayenell Magwood2; 1Cluff University, 2College of Nursing, MUSC.

Cardiometabolic risk factors are the factors that increase your risk or likelihood of developing a disease such as diabetes, stroke, and heart disease. Some factors that can increase your cardiometabolic risks are smoking, physical inactivity, obesity, hypertension, age and race. Studies have been done on cardiometabolic risk factors however; chronic illnesses such as breast cancer have not been studied as a factor. The objective of this study is to identify the direct relationship between breast cancer, cardiometabolic risks, and physical activity. A literature search was conducted to gather information about cardiometabolic risks and its correlation with breast cancer through the use of PubMed, Ebscohost, and Scopus. Twenty studies were included in the review with a variety of frameworks, study designs, settings/samples, major variables studied, measurement, and data analysis/findings. A direct relationship between breast cancer and cardiometabolic risks were shown through the review done. Breast cancer survivors show an increase in weight gain post treatment resulting in survivors being obese/overweight. Although progress was made in weight loss interventions studied, black women are still shown to have higher cardiometabolic risks. Further studies need to be done to have a better understanding of the cardiometabolic risks associated with breast cancer survival in African-American Women. NIH R25CA193088, R34DK097724

006 Factors Associated with Prenatal Diagnosis of Critical Congenital Heart Disease in South Carolina, Abby T Spencer, Shahryar Chowdhury, Francis Woodard, Carolyn Taylor, Sinai Zyblewski; Pediatrics, MUSC.

INTRODUCTION: Congenital heart disease (CHD) is a leading cause of infant mortality. Prenatal diagnosis allows for a planned delivery, parental counseling and possibly reduced infant morbidity and mortality. Literature suggests regional differences in prenatal diagnosis rates in the United States. In 2013 new national guidelines were published for fetal cardiac screening in obstetric ultrasound. The primary objective of this study was to determine factors associated with prenatal diagnosis of critical CHD in South Carolina. METHODS: A retrospective study of 55 infants admitted to MUSC between 5/2015-6/2016 with critical CHD was performed. Demographic and medical information including infant diagnosis, infant mortality, maternal race and insurance type was obtained from MUSC patient charts. RESULTS: 69% of infants with critical CHD were prenatally diagnosed in years 2015-2016 compared to 53% in 2009-2013 (p=0.03). Single ventricle CHD patients were more likely to receive a prenatal diagnosis than those with 2-ventricle CHD. (p<0.01). There was a trend towards earlier time to first cardiac intervention in those infants with a prenatal diagnosis (8.2 ± 4.0 vs 11.0 ± 6.5 days; p=0.08). There was no difference in infant mortality, maternal insurance type or maternal race in prenatally diagnosed infants. CONCLUSION: This data suggests prenatal diagnosis of critical CHD is improving in South Carolina. In this recent group of patients there was no mortality difference between patients who received prenatal diagnosis and those who did not. Furthermore, maternal insurance and race factors were not found to be statistically different between those prenatally vs non-prenatally diagnosed with critical CHD. Future studies are needed to determine factors associated with lack of prenatal diagnosis of CHD in South Carolina.

007 Relationship Between Marijuana Use Frequency and Self-Reported Marijuana-Related Problems in Adolescents, Lauren N Mitchell1, Lindsay R Meredith2, Lindsay M Squegla2, Kevin M Gray2; 1University of South Carolina, 2Psychiatry, MUSC.

Marijuana is the most used illicit drug among adolescents, with 21% of high school seniors and college students having used in the past month. Both acute and long term marijuana use has been shown to decrease cognitive functioning such as attention, memory and processing speed. Minimal work has focused on the relationship between quantity and frequency of marijuana use and self-reported marijuana-related problems. The objectives of this study were to: (1) evaluate the relationship between the quantity and frequency of marijuana use and scores on
the Marijuana Problem Scale (MPS) in adolescents, and (2) compare non-treatment-seeking to treatment-seeking marijuana users in their quantity and frequency of use and MPS scores. Data on MPS scores and recent marijuana quantity and frequency via the Timeline Follow-back were obtained from two different studies involving heavy adolescent marijuana users: a non-treatment seeking sample (N=41) and a treatment-seeking sample (N=116). There was no significant between-group difference found in number of marijuana use days (p= .94). Bivariate correlation analyses revealed no significant relationship between average hits per day and MPS scores in either the non-treatment seeking group, r^2 (41)=.182, p=.255, or the treatment seeking group, r^2 (111)=.101, p=.293. However, there was a significant difference between the MPS scores of the two groups (p=<.001), with more perceived problems reported in the treatment-seeking group. There was also a significant relationship between the number of years using marijuana and the MPS scores, r^2= .376, p<.001. Marijuana users may not necessarily report more problems if they are using more frequently, and more reported marijuana-related problems may not indicate more frequent use. Marijuana-related problems appear to vary based on other factors, including overall duration of use. NIH R25DA020537, K12DA031794, R01DA026777

008 The Effect of School Attachment on School Defiance, Michelle N Myers1, Phillipe B Cunningham2, Stephen D Short1, Colleen A Halliday-Boykins1, 1Psychology, CofC, 2Psychiatry, MUSC.

Abstract not available.

009 Two-week Repetitive Transcranial Magnetic Stimulation of the Dorsal Lateral Prefrontal Cortex Does Not Affect Cortical Excitability in Chronic Smokers, Rina Bonalontal1, Xingbao Li2, Scott Henderson, Karen Hartwell, Kathleen Brady, Mark George; 1Psychiatry and Behavioral Sciences, MUSC, 2University of South Carolina.

Background: Nicotine is one of the main components of cigarettes and affects the central nervous system mainly via nicotinic acetylcholine receptors. It has further effects on neuromodulation by regulating the release of p.e. dopamine, serotonin, glutamate, and adrenaline. In general, the results show enhanced corticospinal excitability but reduced intracortical facilitation in smokers under nicotine deprivation, as compared to non-smokers. On the other hand, high-frequency repetitive transcranial magnetic stimulation induces motor cortical facilitation. However, no study has been completed to evaluate multi-session rTMS effect over prefrontal cortex with motor cortical excitability measures. Here we hypothesized that sessions of rTMS over DLPFC would not change motor cortical excitability measured with TMS. Methods: Thirty-eight chronic smokers have received two-weeks (9 sessions) of high frequency (10 Hz) repetitive TMS over the left dorsal lateral prefrontal cortex (DLPFC). Resting motor threshold (rMT), cortical silent period (CSP), recruit curve (RC), short-latency intracortical inhibition (ICI), and intracortical facilitation (ICF) were measured before and after 9-session rTMS. Clinical results of smoking accession will be reported in other presentation. Results: No significant difference was found between active TMS (39.88 ± 2.88 vs. 40.24 ± 2.79) and sham TMS (40.43 ± 3.08 vs. 37 ± 3.19). CSP does not show any difference between two treatment groups (3.37 ± 9.5 vs. -39.22 ± 44.5, t = 1.11, p =0.27). Recruit curve results of the slope did not show significant changes between the two groups (t=1.31, p = 0.21). ICI data analysis did not show any significant difference between groups (active pre post 0.45 ± 0.11 vs. 0.58 ± 0.11; sham pre post 0.64 ± 0.11 vs. 0.68 ± 0.12)(F1,60=1.73, p=0.19) . ICF data analysis did not show significant difference between active group (pre post 1.15 ± 0.30 vs. 1.20 ± 0.30 and sham groups (1.73 ± 0.30 vs. 1.24 ± 0.33) (F1,160 =1.02, p=0.32) Conclusions: This study demonstrates that 10-session rTMS over the DLPFC does not effect motor cortical excitability as measured by MT, CSP, RC, ICI and ICF. This finding suggests that motor cortical excitability (MT) is reliable measure for rTMS treatment due to the facts that rTMS treatment does not change over DLPFC. However, the motor cortical excitability may be independent from the prefrontal cortical excitability. NIH DA036752

010 Comparison of Serum Vanin-1 Concentrations in Diving Marine Mammals and Terrestrial Mammals Using Mass Spectrometry, Baylye K Boxall1, Michael G Janech2; 1Marine Biology, CofC, 2Nephrology, MUSC.

The dive response of marine mammals induces oxidative stress through peripheral vasoconstriction of the large arteries and subsequent reperfusion of the organs. Damage due to oxidative stress is mitigated by an increase in well-characterized antioxidant proteins in the blood and tissues. Few studies have been conducted to discover whether protein characteristics of the blood exist that are unique to marine mammals for alleviating oxidative stress. A proteomic study of Tursiops truncatus serum revealed that the protein, Vanin-1, is greatly elevated compared to published values for humans. Serum Vanin-1 concentrations in
dolphins ranged from 31-106 µg/mL, about 20-1000 times higher than estimates previously reported for humans. Vanin-1 is known to produce the free thiol, cysteamine, from the vitamin B5 precursor, pantetheine. Cysteamine has antioxidant properties; thus, a high Vanin-1 phenotype may be an adaptation to counter oxidative stress. This project will test the hypothesis that elevated levels of circulating Vanin-1 is a shared state amongst all diving marine mammals. To test this hypothesis, serum will be assayed for Vanin-1 concentration using liquid chromatography/tandem mass spectrometry from 10 terrestrial species belonging to five different mammalian orders: Rodentia (Muridae), Primates (Hominidae), Cetartiodactyla (Suidae and Bovidae), Perissodactyla (Equidae), and Carnivora (Canidae and Felidae), and 9 marine mammal species representing either the toothed whales (Cetartiodactyla, Odontoceti) or seals and sea lions (Carnivora, clade Pinnipedia). If serum Vanin-1 is higher in all diving marine mammals compared to all terrestrial mammals, this would suggest that elevated Vanin-1 abundance in the blood is an important adaptation for diving. ONR N000141410361, N000141612160 and N00141210294

011 The Effect of Oxygen Levels on Human Alveolar Epithelial Cells and Its Implications on Human Health At Altitudes, Amanjot S Paintlia1, John E Baatz2; 1CofC, 2Pediatrics, MUSC.

Altitude sickness is a major problem for Mountaineers and for people living in the mountains mainly due to the insufficient availability of Oxygen higher in Earth’s atmosphere. Even though the percentage of Oxygen remains the same at 21% in the atmosphere, the resulting proportion of O2 among the other gases decreases as there are less gas particles available at higher altitudes. This is a serious problem for individuals accustomed to high levels of O2 at sea level because they encounter serious health defects at high altitudes. We hypothesized that the lesser availability of oxygen affects the normal functioning of the body’s organs including the lungs, more specifically, the site of gas exchange which occurs at the alveoli. Therefore, we proposed to examine the effect of oxygen levels on the survival of human alveolar epithelial cells. It was found that Alveolar Type II cells exposed to different levels of oxygen ranging from 1.5% to 21% at 37°C in vitro conditions had their survivability impacted. There was significant cell death observed at 1.5% O2 compared to other groups cultured at 5%, 13%, and 21% O2. This was associated with the increased generation of reactive oxygen species and reduced levels of intracellular antioxidant (Glutathione) in the cells exposed to lower O2 levels compared to the control groups that were exposed to 21% O2. In support of this, the supplementation of antioxidants is reported to be useful in aiding the transition from sea level O2 concentrations to higher altitudes for travelers by reducing oxidative stress. In addition, lower levels of O2 were linked to oxidative damage of alveolar epithelial cells via induction of their apoptotic pathways. These findings provide evidence that lower oxygen levels affect the respiratory system as a result of damage to the alveolar epithelial cells.

012 Peer Approaches to Lupus Self-management (PALS): A Novel Lupus Peer Mentorship Intervention, Trevor Faith, Edith Williams, Leonard Egede, James Oates, Delia Voronca, Mulugeta Gebregziabher; CofC.

Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease that is associated with increased morbidity, mortality, health care costs and decreased quality of life. In the United States, African Americans have three to four times greater burden of lupus compared with Caucasians, with the highest rates experienced by African American women. While evidence-based self-management interventions that incorporate social support and health education have reduced pain, improved function, and delayed disability among SLE patients, persistent disparities may be due to the non-responsiveness of existing programs to the unique needs of African Americans and/or women with lupus. Peer mentoring interventions are effective in other chronic conditions that disproportionately affect minorities, such as diabetes, HIV, and kidney disease, but there is currently no empirically tested peer mentoring intervention developed for SLE patients. The PALS intervention was piloted with African American women lupus participating in the SLE database at MUSC. Seven mentors were trained and paired with 21 mentees. Educational/support sessions were conducted by telephone for 60 minutes every week for 12 weeks. Mentee outcomes of self-management, quality of life, and disease activity were obtained at baseline, mid-intervention (6 weeks), and post-intervention (12 weeks). Preliminary data suggest that the peer mentoring intervention is credible, acceptable and likely to be effective at improving self-management, decreasing disease activity and improving quality of life in women with SLE. Between baseline and 6 weeks (mid-intervention), mentees (n=20) reported increased social support; improved physical functioning, general health, social functioning, vitality, and patient activation; and decreased physical limitation, bodily pain, and emotional limitation. Given the success of the peer mentoring approach, and its responsiveness to the needs of this unique population, this intervention could result in health improvements that have not been attainable with other interventions. This could lead to significant reductions in disparities and have
013 Piece It Together: Comprehensive Wellness Program for Transitional Age, Alexandra E Serpe1, Carrie Papa2, Keely Flynn3, Janis Newton3, Lee Blackmon1, Eve Spratt2, 1COM, MUSC, 2Developmental Pediatrics, MUSC, 3Wellness Center, MUSC.

Youth with Autism Spectrum Disorder (ASD) and other neurodevelopmental disorders are at increased risk of poor health and obesity due to limited interests, sedentary lifestyles, sensory challenges, restricted diets, and medications used to treat their disorder. The Piece It Together Program was developed by multidisciplinary professionals, with expertise in personal fitness, nutrition and mental health to provide a comprehensive wellness program for teens and young adults with ASD and other mild neurodevelopmental disabilities. The goals of the program are to improve nutrition, exercise, socialization, stress reduction, and to provide opportunities to get out of your comfort zone. The program curriculum includes strength and cardiovascular conditioning, nutrition education, mindfulness and yoga training and stress reduction strategies to promote healthy lifestyle choices. The summer 2015 program had 12 participants and results show significant improvements in nutrition and self-reported depression. The 2016 summer program included twenty-one participants and multiple health care professional volunteers that attended bi-weekly classes for 1.5 hours at the MUSC Wellness Center over six weeks. Physical and self-report assessments were done at the first and last classes. Complete data analysis results are pending, but we hypothesize that we will see similar results to last year, including decreases in depression scores, increases in skeletal muscle and decreases in visceral body fat, and increases in socialization. We also hypothesize that the addition of anxiety measures and increased encouragement and support to use Fitbit wearable technology will lead to decreased anxiety scores and increased Fitbit use and social engagement through Fitbit friends. Although a small sample, individual successes are numerous and the structure of this Piece It Together program is able to successfully promote healthier lifestyle choices and provides the format for personal success for the participants.

014 Exploring Factors That Influence Non-participation and Non-adoption of Weight Management Behaviors and Participation Within a VA MOVE! Weight Management Program, Marina Miller, Michelle Nichols; College of Nursing, MUSC.

Obesity is a serious public health and prevalence rates among U.S. Veterans seeking care within the VHA exceeds those among the general population. The Institute of Medicine recommends a global approach to obesity, to include environmental influences that may affect weight management. Community-based Participatory Research (CBPR) engages community members and researchers to partner together to identify and solve health care priorities. VA medical centers offer a weight management program called MOVE! that has demonstrated success yet low utilization rates. This research sought to explore adherence, non-adherence, and non-adoption of Veterans referred to MOVE! and identify recommendations for programmatic change. Veterans referred to the McGuire VA MOVE! program in Richmond, Virginia were recruited for this non-experimental, descriptive study using CBPR. Semi-structured interviews explored reasons for adoption, non-adoption, and non-participation in the program. Additional exploration included factors affecting daily physical activity and dietary habits. Data analysis was guided by the Socioecological Model (SEM) and interviews were coded into themes according to the model. Barriers, facilitators, and opportunities for change were identified and data analysis explored correlations and themes across participant groups. Veteran participants (N=33) were those referred to MOVE! and were either non-participants (n=10), non-adopters (n=12), and adopters (n=11). Veterans identified barriers and facilitators at each level of the SEM for nutrition, physical activity, and related to MOVE! program. Participants offered Veteran centric programmatic recommendations to increase acceptability of the MOVE! program. Factors affecting adherence, non-adherence, and non-participation in the MOVE! program are multifaceted. Engaging Veterans as experts in their lives through CBPR efforts is an appropriate approach to collaboratively partner to address their health priorities. Further research is needed to pilot recommended changes.

015 Varied Vs. Specific Task Practice and Influence on Confidence in Clients Post-Stroke, Ashlyn Baxley1, Katherine Greenslit1, Ebony Pollock1, Kelly Anderson2, Michelle Woodbury3, 1Occupational Therapy, MUSC, 2Health and Rehabilitation Science, MUSC, 3Health Sciences and Research, MUSC.

Introduction/Rationale: Stroke survivors require assistance with daily activities because of arm paresis.
Rehabilitation offers opportunity to re-gain arm movement skills. Evidence-based therapy sessions require repetitive task practice to build self-confidence and movement skills. During rehabilitation sessions, survivors can practice a variety of (varied) or targeted (specific) tasks. But, which is better? We hypothesize that survivors having the most success with varied vs. specific practice will report higher self-confidence.

Methods: This was a secondary analysis of existing data obtained from n=13 stroke survivors, aged 21-90 years, who were >6 months post- ischemic or hemorrhagic stroke with moderate-minimal arm paresis. Participants attended 3 rehabilitation sessions on 3 consecutive days that included both varied and specific practice for a total of 110 reaching movements. The accuracy of each reach was recorded with a motion capture system. After the final reach, subjects reported self-confidence in their movement skills on an ordinal rating scale. The association between movement accuracy and confidence were analyzed with Spearman’s correlation coefficients.

Results: Subjects demonstrated mean accuracy of 22.46 in the varied condition and 2.84 in the specific condition. Subjects also reported an average confidence rating of 5.12/20. The correlation between confidence and varied practice was 0.57 (p=.000). The correlation between confidence and specific practice was 0.51 (p=.001). Conclusion: The results do not support our hypothesis. While accuracy in the varied condition was significantly correlated with confidence, accuracy in the specific condition was also significantly correlated with confidence. The results suggest that it is not the type of task practice that most associated with confidence, but rather their success at any type of task.

NIH P20GM109040

016 Interprofessional Impact of Ergonomics Education on Dental Students, Lauren K Schneider¹, Kierstin L Bockelman¹, Katelyn E Ruggiero¹, Jompobe Vuthiganon², Peter J Bowman¹; ¹Occupational Therapy, MUSC, ²Dental Medicine, MUSC.

The purpose of this research study is to promote proper posture and body mechanics in dental medicine students attending the Medical University of South Carolina. With increasing ergonomics education, this study seeks to prevent future musculoskeletal disorders experienced by many dentists. According to Ergonomics and Dental Work, Occupational Health Clinics for Ontario Workers, 93% of dentists reported some pain. Wrist and hand pain was the most commonly reported pain followed by pain in the neck, upper back, shoulder, and low back regions. The complaints come from a number of causes, including static posture, prolonged back and neck flexion with constant head thrusts, repetitive motions, constant and daily usage of vibrating tools, and extended work periods without stretches or breaks. This project was inspired by dialogue in an interprofessional course, in which occupational therapy students realized there was an opportunity to assist dental students in circumventing these musculoskeletal pitfalls. Beginning in 2013, under the direction of a mentoring professor, occupational therapy students observed fourth year dental students to determine their current positioning without any ergonomics education from occupational therapists. Determined from this evaluation, a plan was implemented to gradually integrate ergonomic education and training into the dental students’ curriculum. The effectiveness of this training has been evaluated using the Rapid Upper Limb Assessment (RULA), clinical observations, and pre- and post-test knowledge assessments. Scores of the RULA from dental students who received no ergonomic education will be compared to the other groups of dental students who received increasing amounts of ergonomic education, such as ergonomics lecture, a pre- and post-test about ergonomics, and skills lab practice. With increasing ergonomics education and application, we postulate that RULA scores will decrease, showing an increase in knowledge and application of proper body mechanics.

017 Can We Identify Delays Early? Validation of the Specific Test of Early Infant Motor Performance (STEP), Anne Lyle Ililges¹, Laura Wilson¹, Marie Brainard¹, Katharina Faerber¹, Jana Kitch¹, Heather Richardson¹, Patty Coker-Bolt¹, Dorothea Jenkins²; ¹Occupational Therapy, MUSC, ²Neonatology, MUSC.

South Carolina Early Intervention provides services for over 5,000 children birth to 3-years who are at risk for developmental delays. Unfortunately, the average age for initiation of services is 2-years, missing a crucial time for growth and development. Early screening of at-risk infants is limited by lengthy administration time and lack of training. A newly developed, rapid and easy to administer infant assessment, the 10-item Specific Test of Infant Motor Performance (STEP), evaluates motor behaviors from birth to 3-months. This study’s aim is to explore the concurrent and predictive validity of the STEP with “gold standard” infant motor assessments at term, 12-weeks, and 1-year corrected age (CA) in a cohort of preterm infants. This is a secondary analysis of existing data of preterm infants born 24-34 weeks gestational age (GA). The STEP; Test of Infant Motor Performance (TIMP) and the Alberta Infant Motor Scale (AIMS) were administered at term (n=21) and 3-months (n=21) CA. The Bayley Scales of Infant and Toddler Development (Bayley-III) was administered at 1-year CA (n=19). Receiver operating characteristic (ROC)
curves were created to determine a STEP cutoff score at term and 3-months CA for infants at risk for developing motor delays. Predictive validity of the STEP to Bayley-III motor composite at 1-year demonstrated sensitivity (1.00) and specificity (0.833) with the STEP at term CA and sensitivity (0.86) and specificity (0.75) with STEP at 3-months CA. Concurrent validity predicting TIMP and AIMS risk at term CA: sensitivity (0.82, 0.88) and specificity (0.82, 0.79) and TIMP and AIMS at 3-months CA: sensitivity (0.5, 1.00) and specificity (0.80, 0.81), respectively. This study provides preliminary validation of the new STEP infant assessment which could increase early detection of infants at risk for motor delays. NIH UL1 TR000062

018 A Comparison of Patterns of Real World Paretic Arm Use Among People With And Without Unilateral Neglect After Stroke, Kellyn RP Colclough, Elizabeth M Borden, Taylor M Williams, Woodbury L Michelle, Grattan S Emily, Michelle2, Elizabeth M Borden, Elizabeth M Borden1, Scott Hutchison2, 1Occupational Therapy, MUSC, 2Health and Rehabilitation Science, MUSC.

Introduction: Stroke survivors exhibit unilateral neglect (UN), an inattention to the paretic side of the body and/or environment. Survivors with UN have less functional recovery than survivors with comparable paresis but without UN. The impact of UN on community-based bilateral arm use is unknown. Wrist-worn accelerometry provides an objective way to measure real-world arm use patterns. This ongoing study is measuring bilateral arm use patterns in stroke survivors with and without UN using accelerometers. We hypothesize that UN survivors will use the paretic arm less than survivors with similar levels of arm paresis but without UN because UN exacerbates in complex home/community environments. Methods: Here we report results of the first 6 participants (3 with UN and 3 without) enrolled. Participants are eligible if ≥18 years old and with stroke-related arm paresis. Subjects are first tested for UN, then subjects with and without UN are matched according to arm impairment level. Participants wore bilateral wrist accelerometers during home/community activities for 3 days. Accelerometry data were used to calculate the Arm Activity Ratio (AAR), a ratio of paretic/non-paretic accelerometry counts. AAR=1.0 indicates equal use of both arms with smaller values indicating reliance on the non-paretic arm. Results: Subjects exhibited moderate-mild arm paresis (Fugl-Meyer Upper Extremity Assessment scores 39-62/66). AAR values for each subject pair were as follows (with and without UN): Pair 1= 0.31 and 0.28; Pair 2= 0.74 and 0.83; Pair 3= 0.44 and 0.14. Conclusions: As expected, all survivors demonstrated AAR<1, indicating primarily non-paretic arm use during daily activities. However, we were surprised that 2/3 of pairs had similar AAR values, suggesting that UN did not have a unique impact on arm use. This ongoing study will allow further investigation of additional factors (dominance, motivation, cognition) influencing arm use in the home/community. MUSC Health Professions; NIH P20GM1090400

019 Similarity Between Sitting Balance Control Performed in a 3-D Virtual Reality Environment and Those in the Physical Environment, Joshua A White, Sarah J McEarl, Scott Hutchison, 1Occupational Therapy, MUSC, 2Health and Rehabilitation Science, MUSC.

Introduction: The majority of stroke survivors are left with impaired balance and upper extremity motor control. Recent evidence indicates that virtual reality interventions can improve balance and functional reach for adults post stroke and others indicate reaching and grasping variables in a virtual environment (VE) were significantly similar to the physical environment (PE). No studies have compared balance control variables. We hypothesize that balance control during reaching in a 3D VE will be similar in the PE. Objective: To compare kinematic variables associated with balance control during reaching in the VE to a comparable task in the PE. Method: Neurologically healthy individuals with no physiological limitation to movement were recruited using a process approved by the MUSC IRB. Subjects completed 10 reaching trials under each condition, in VR and in the PE. A target was placed 150% of arm's length from the subject, at 45-degrees lateral to the sternum. The primary outcome, Center of Pressure-Curvature Ratio (CoP-CR), is defined by the actual distance traveled by the center of pressure (CoP) during reach divided by the direct distance from start to end positions. Other variables were also compared as secondary outcomes. A paired-samples t-test was conducted to compare the variable means. Results: 6 subjects completed testing. There was no significant difference in the mean scores for CoP-CR in VR (M=1.61, SD=0.24) and CoP-CR in the PE (M=1.56, SD=0.23); t(5)=0.414, p=0.696. Nor was there significant differences in any of the secondary outcomes. Conclusion: This small sample exhibited no significant differences between balance control variables of the two environments. If similar results are produced from a study with appropriately powered sample size, those results may indicate that balance control in response to a VE is comparable to a response in the PE and therefore would better translate to real outcomes. NIH P20GM109040
Background and Purpose: Most stroke survivors experience arm paresis and utilize excessive trunk movements to achieve functional goals, e.g., lean forward to compensate for inability to reach forward. A common therapy technique is to constrain trunk motion to reduce compensation. Additionally, virtual environment (VE) systems can be used to increase the amount of therapy an individual receives. However, the efficacy of integrating trunk constraint in a VE is not known. Our purpose was to design an immersive VE to test the hypothesis that elbow range of motion can be restored more efficiently by using a virtual trunk constraint versus no trunk constraint. Methods: Neurologically healthy participants were presented with a custom designed, immersive VE. Subjects' real-world arm motion controlled avatar arm motion. Two conditions were tested. First, movement of the avatar arm was constrained thus creating a “virtual hemiplegia.” Second, subjects performed a series of reaches under experimental or control conditions (with or without virtual trunk constraint). Arm and trunk kinematics were measured to test the impact of (1) virtual hemiplegia and (2) virtual trunk constraint on real-world arm and trunk motion. We expected that altering the virtual conditions would cause healthy individuals to produce paretic-like arm/trunk motions. Results: So far 7 individuals, ages 46-62, participated in the study. Virtual hemiplegia resulted in increased compensatory trunk movement (p=0.05, average of 87.09 mm). However, it also resulted in increased elbow extension (p=0.01, average of 13.81°). Since elbow extension did not decrease, we could not test the effects of trunk constraint. Discussion: Our custom VE enabled us to impose virtual hemiplegia on healthy individuals. However, our current design did not elicit arm motions similar to stroke survivors. This led us to modify our approach on how virtual hemiplegia is presented, which will be used in the remainder of the study. NIH P20GM109040

Rationale/Background: Trends in electronic learning show the importance of access to evidence-based teaching methods that utilize modern technology while preserving classroom integrity (Ambrose et al., 2010; Chick, Haynie & Gurung, 2012; Clark & Mayer, 2011; McLaughlin et al., 2014). Purpose: To assess student learning and satisfaction after integrating a mobile application (GONI) within a musculoskeletal lab course. Hypothesis: Utilizing GONI as a study tool will achieve greater student satisfaction and learning retention compared to live-recorded lab sessions. Methods: Using “flipped classroom” methodology, a goniometry app was developed and integrated using videos, clinical applications, functional activities, and quizzes for first-year occupational and physical therapy students in a musculoskeletal lab. To determine app effectiveness, data was gathered on occupational therapy student usage, technology perceptions, and long-term and short-term knowledge retention. Test scores and survey responses were compared to students who only had access to live-recorded labs. Hands-on practice time was also tracked. Outcomes: While there was no significant difference in test scores, there was a significant difference in student perceptions and use for those who had access to GONI in a flipped lab versus a traditional lab. 95% of students using GONI agreed that the app enhanced practical exam preparation and 96% agreed GONI increased confidence (compared to approximately 50% of students using lab videos). 98% of students using GONI recommended its continuation in a flipped lab setting. Minutes spent practicing hands-on skills increased by over 30% in the flipped classroom. Students were significantly more likely to study before lab when using GONI (95%) than when using traditional lab videos and 85% agreed that graded quizzes encouraged this. Conclusion: Innovative technology for learning lab skills outside of the classroom can increase hands-on classroom time, student responsibility for learning, and learning satisfaction. Quizzing students in lab can increase accountability for lab preparation. MUSC Innovation and Technology Grant, MUSC Health Professions.
022 Implementing the Days for Girls Menstrual Hygiene and Reproductive Health Education Program in Haiti, Annika Z Jansson, Sherridan M Bigg, Elizabeth N Hammond, Harmony Hudson, Patty C Coker-Bolt, Janet O'Flynn, Marie D Laurent, Leslee Jaeger, 1Health Professions, MUSC, 2Occupational Therapy, MUSC.

International response to Haiti’s on-going public health needs has focused on disaster relief and disease management. While these are critical needs, recent studies report that Haitian women are most concerned about unmet basic healthcare including menstrual hygiene and reproductive health issues which impact quality of life. The Days for Girls (DFG) program was designed to ensure young women understand the process of menstruation and have solutions for personal feminine hygiene. DFG International increases awareness of women’s health issues, promotes use of reusable feminine hygiene kits, and helps communities start sustainable DFG programs. The goal of this study is to translate the DFG program into a culturally sensitive format for Haiti. Aim 1: To conduct a 2-day workshop in Leogane, Haiti for in-country collaborators and seamstresses who will produce the DFG kits for this study. Participants will receive education on the DFG program and learn how to sew, assemble, and distribute the DFG kits to sustain program. Immediately after the workshop, training effectiveness will be measured using a survey. Aim 2: Pilot the Haiti DFG program with young women at the Episcopal University of Haiti (18-24 yrs; n=40) and the École Sainte Croix High School (11-17 yrs; n=40). Participants will be surveyed 2-months after using the DFG kits about ease of use, feasibility, impact on quality of life, school attendance, and barriers to use. As an on-going pilot study, the workshop in Leogane, Haiti will be conducted in late September 2016. The DFG kits for Aim 2 will be distributed in the fall of 2016 and spring of 2017. The results of this study could impact the acceptance of the DFG program by young women in rural areas of Haiti. MUSC Center for Global Health

023 Comparison of Electronic Visits Versus Office Visits for Common Acute Conditions, Patrick C Morency, Marty Player, Edward O'Brian, Jessica Bright, Vanessa Diaz, 1COM, MUSC, 2Family Medicine, MUSC, 3Emergency Medicine, MUSC.

Context: Electronic visits (e-visits) allow for electronic access to providers through a patient portal. A patient is provided a standard set of questions about their symptoms, which a provider evaluates to create a care plan. While telemedicine applications are increasing in popularity, there is little research done on the comparability of e-visits to the traditional care model. Objective: To compare care provided from e-visits to the care received from a traditional office visit for five common acute symptoms (sinus problems, urinary problems, rash, diarrhea, and vaginal discharge and irritation). Design: Cross-sectional comparison of care provided from surveys given to patients that simulate e-visits versus the care received during their actual office visit. Setting: Academic Medical Center. Patients and Other Participants: Adults ≥18 years old receiving care at a Family Medicine practice or urgent care center. While anticipating over 200 participants, we currently have data for 12 patients. Instrument: Patient questionnaires based on e-visit questions for each condition. Main and Secondary Outcome Measures: Concordance of diagnosis, use of antibiotics and follow up plans between e-visits and office visits. Results: Preliminary results are available for 5 vaginal, 2 urinary, 1 rash and 4 diarrhea problem visits. Participants were 83.3% female with a mean age of 45. Providers would have asked respondents to come in for an office visit for 33.3% of participants. For visits that could be completed as an e-visit, antibiotic use was concordant in 75% of visits, with 25% of office visits prescribing antibiotics when not provided in an e-visit. Our anticipated results are that e-visits will be comparable to an office visit in care. Conclusions: This study may help improve how e-visits are provided. In order for insurance companies to accept the billing from these visits in the future, further studies will be needed regarding e-visits and their efficacy.

024 RadioActivity: A Radiology Resident Wellness Pilot Study, Lawrence Wood, Madeleine Lewis, Seth Stalcup, 1COM, MUSC, 2Radiology, MUSC.

The work of radiologists is often sedentary in its design. Long hours of sitting in a reading room with many meals consumed from a hospital cafeteria may eventually lead to inadequate physical activity and poor nutrition that can be detrimental to a radiologist’s health. Educating radiology residents early in their careers and giving them the tools to improve their wellness behaviors has the potential to increase their work satisfaction, work performance, and extend their careers. This pilot study was our first step in examining the current state of radiology resident wellness. 11 radiologists at the Medical University of South Carolina participated in an intervention program consisting of weekly structured physical activity and wellness education lectures. Subjects completed a pre and post
Introduction: Tobacco use during pregnancy and the immediate postpartum period represents a significant and costly source of morbidity and mortality in both mothers and infants. Despite extensive public health efforts, many women continue to smoke throughout their pregnancy or fail to remain abstinent in the postpartum period. The current study aims to assess the prevalence of tobacco use and tobacco outcomes among perinatal patients through a novel inpatient, hospital-based, "opt-out" beside counseling and telephone follow-up system (Quit Connection).

Methods: All women over age 18 admitted to the Medical University of South Carolina hospital labor and delivery units were screened for tobacco use within the past 30 days. Women identified as current smokers were enrolled in an "opt-out" smoking cessation program consisting of bedside counseling by a tobacco treatment specialist and a post-discharge interactive voice response follow up service (IVR) assessing smoking status and providing additional cessation support. Results: Of 5649 age-eligible women admitted to labor and delivery units between February 2014 and March 2016, 553 (10%) were identified as current smokers. Women that received bedside counseling (n = 188) had been smoking for an average of 12 years and smoked an average of 11 cigarettes a day. Ninety-two percent were daily smokers prior to admission and only 10% had attempted to quit in the past year. Based on follow-up data from 110 women contacted by IVR, patients who were counseled in the hospital were twice as likely (RR=2.22, CI=1.13-4.37) to report being abstinent from smoking using intent-to-treat analysis at any time in the 30 days following discharge. Conclusion: MUSC's "opt-out" cessation program reaches a highly nicotine dependent population of perinatal smokers. This study demonstrates the feasibility of implementing an “opt-out” tobacco cessation program in a hospital setting and highlights areas of need for perinatal women in this setting. NIH NIDA, UL1TR000062

026 The Effectiveness of 1Hz RTMS to the Pre-supplementary Motor Area (pre-SMA) in the Treatment of Essential Tremor, Christopher W Austelle1, Bashar W Badran1, Chloe E Glusman1, Shonna Jenkins2, William H Devries1, Tiffani Thomas3, Mark S George1, Gonzalo J Revuelta2, 1Brain Stimulation Lab, MUSC, 2Neurology, MUSC, 3Medicine, MUSC.

Background: Essential tremor (ET) is a common and potentially debilitating disorder with limited effective therapies. ET may arise from abnormal cerebello-thalamo-cortical network activity, which could be modulated with repetitive transcranial magnetic stimulation (rTMS) of the pre-supplementary motor area (pre-SMA). Objective/Hypothesis: This randomized, double-blind, sham-controlled study aimed to determine whether 15 daily-sessions (3 weeks) of 1Hz rTMS to the pre-SMA decreases tremor in patients diagnosed with ET and reduces the latency of the second agonist burst in ballistic movements. Methods: 10 treatment-seeking adults (6 women) with refractory ET were randomized into either 15 daily active or sham rTMS treatments (1Hz, 110%rMT, 20min, 1,200 pulses) over 3 weeks (18,000 total pulses). Tremor assessments and EMG ballistic movements were conducted at baseline, and 4, 8, and 12 weeks. Results: Acutely, both active and sham groups showed significant within-group improvement from baseline, with active rTMS inducing a mathematically but not statistically significant between-group mean decrease in tremor rating scale (TRS) score compared to sham (Active: 26.11% reduction, mean TRS decrease 9.4, SD 7.36, p=0.0038; Sham: 18.82% reduction, mean TRS decrease 6.4, SD 4.615, P=0.0497). Only the active group maintained significant decreases upon 4- and 8-week follow-up (17.77% p=0.0497). Conclusions: 1 Hz pre-SMA rTMS for ET over 3 weeks was safe and well tolerated in our cohort, with a suggestion of larger and more durable improvement in the active condition. An effect size can be calculated to power a future clinical trial to study the efficacy of rTMS for the treatment of ET.
Introduction More than 2 of 10 veterans with post-traumatic stress disorder (PTSD) have a co-occurring substance use disorder (SUD). Prolonged exposure therapy has been shown to be among the most effective methods for treating PTSD, involving imaginal and in-vivo exposure. Concurrent Treatment of PTSD and Substance Use Disorders using Prolonged Exposure (COPE) is an integrated cognitive-behavioral intervention which utilizes prolonged exposure to treat PTSD and combines it with relapse prevention for SUD. The hypothesis was that COPE would lead to functional brain reorganization, with greater engagement of regions involved in behavioral control and regulation. Methods 3 male veterans with PTSD and co-occurring SUD were scanned on a Siemens Trio Tim 3T scanner while listening to audio recordings of themselves recalling a neutral memory, traumatic memory, and drug-related memory. They were later exposed to the standard twelve individual 90-minute sessions of COPE therapy. After completion of COPE therapy, the patients were re-scanned using the same protocol. Results Pre-treatment listening of the traumatic memory showed activation of the insula. Post-COPE treatment, there was more activation in the anterior cingulate, as well as in the parietal cortex and precuneus region. Post-COPE treatment listening of the drug-related memory showed diminished activation in the sensory cortex. Conclusion The insula is involved in conscious processing of autonomic signals from the body and the conscious experience of emotion. Post-COPE treatment, activation of the anterior cingulate could be linked to a stronger connection between the emotional limbic system and the cognitive prefrontal cortex. The precuneus region is a major hub in the default mode network, and activation of this region post-treatment could reflect more internally directed thought. These very preliminary results suggest some functional brain reorganization following COPE, but additional larger scale studies are needed to replicate these findings. 

NIH R25DA020537

Background: Proper environmental cleaning is becoming increasingly recognized as an important factor in reducing the incidence of hospital associated infections (HAIs). Frequently touched objects in a patient room should be cleaned routinely and thoroughly by environmental services employees or nursing staff. Audit and feedback programs using fluorescent targeting can be used to increase environmental cleaning efficacy. Methods: In June 2016, the infection control department at Medical University of South Carolina (MUSC) began fluorescent targeting audits of high-touch objects to monitor overall room cleanliness. This study will comprise of a baseline period followed by an intervention period of audit feedback and increased education of environmental services staff. Pre-intervention and post-intervention results will be compared. This is a quality improvement project and thus is exempt from obtaining IRB approval. Results: Over a three month baseline period, the percentage of cleaned surfaces totaled 50% across all units including inpatient and intensive care rooms. Conclusion: We hope to see an increase in thoroughness of environmental cleaning after implementation of routine audit feedback and education interventions.

Sudden Cardiac Arrest (SCA) affects over 300,000 Americans annually and they key to increased survival is emergent bystander intervention. A growing body of evidence has shown that timely bystander-initiated CPR and defibrillation are significantly correlated with an increased likelihood of survival. Despite these demonstrated benefits, bystanders perform these interventions in less than half of witnessed SCA cases. It was hypothesized that the level of public CPR and AED performance knowledge may play a role in the likelihood of intervening. A descriptive study of potential bystanders to SCA was conducted in a high-traffic shopping mall to estimate the overall knowledge level of CPR and AED among potential bystanders in the greater Charleston area, as well as general attitudes towards intervening. The majority of survey respondents expressed a willingness to perform the aforementioned interventions when directly asked. However, results indicate that while 70% of...
respondents consider themselves to have a general knowledge of CPR, only 18% spontaneously mentioned it when presented with a hypothetical SCA scenario. More strikingly, less than 1% spontaneously mentioned defibrillation, and 63% indicated that they would not know how to locate a public access AED when needed. Concurrently with the survey, professional first responders offered free bystander CPR and AED training on location. Over the course of 3 consecutive Saturdays, more than 360 laypersons were trained in CPR and AED use. Of the individuals who participated in both the survey and the training, 100% indicated that they were more likely to intervene in an SCA after receiving the training. The findings suggest that future public outreach efforts in South Carolina should be targeted to minimize the current CPR and AED knowledge gap. They also indicate that free, brief trainings offered at public events are a feasible way to increase the knowledge and skills of potential bystanders to SCA. MUSC COM

030 Strengthening Maternal Health Services in Nairobi, Kenya Through a Quality Improvement Focused Public-Private Partnership, Kevin C Keith¹, Eric Wachira², Cathy E Green²; ¹COM, MUSC, ²Jacaranda Health.

Perceptions on access to quality of care are major influencers in a woman’s decision to seek facility-based care. Due to the relatively high cost of care, low-income Kenyans are more likely to seek care in public facilities, where many services are theoretically free, and only when medical attention is perceived to be necessary, such as at the onset of labor. In June 2013 the Government of Kenya declared its “free maternity plus” strategy, which has resulted in more low-income women delivering in a facility. Although an important step in ensuring safe birth, facilities have not been adequately resourced to cope with this increase in demand, and thus, quality of care has declined. Consequently, Kenya has experienced a rising maternal mortality ratio of 488 deaths per 100,000 live births, and a newborn mortality rate of 27 per 1000 live births respectively. While access to care on the basis of affordability is a critical barrier to overcome, closing the quality of care gap is paramount to decreasing this rate even more so. Jacaranda Health is a Nairobi-based for-profit set of fee-for-service maternity care clinics. They are one of only six health facilities in Kenya to have received a SafeCare quality of care accreditation level 3 – the highest level so far awarded in the country. The organization has provided high-quality maternal healthcare to ~6,000 women, including over 700 deliveries across its maternity hospitals. Over 20,000 family members have benefited as a result. Beginning in January of 2014, the Kenyan Ministry of Health and

Jacaranda Health partnered to form a public-private partnership with the aim of cross-leveraging organizational strengths to improve quality of care in public maternity clinics around Nairobi and Kiambu Counties. A total of 8,700 mother-infant pairs will eventually be reaching, receiving high quality care through this public-private partnership, all with a skilled attendant. Since beginning the partnership, several quality indicators ranging from rates of neonatal sepsis to incidence of post-partum hemorrhage have shown significant improvement.

031 Relationship Between the Affordable Care Act and Insurance, Access, and Cost on the Quality of Care in Patients with Diabetes, Arjun Varadarajan¹, Kinfe G Bishu², Rebekah J Walker², Joni S Williams², Leonard E Egede²; ¹COM, MUSC, ²Health Disparities, MUSC.

Background: Diabetes is a complex chronic disease requiring regular medical care in addition to ongoing self-management to minimize the risk of long-term complications. In the United States only slightly more than half of all adults with diabetes receive guideline consistent care, including regular examinations and blood work. The passing of the Affordable Care Act (ACA) provided access for more Americans to insurance, however, may not have addressed other factors impacting access to health care, including availability, accessibility, accommodation, and acceptability. This study investigated the relationship between insurance, access, and cost of care over time and quality of care for patients with diabetes. Methods: We used the Medical Expenditure Panel (MEPS) from 2002-2011 to examine the association between insurance, access, and cost, and direct healthcare service expenditures among adults with diabetes (aged ≥18 years). Access included having a usual source of care, having delay in care, or having delay in obtaining prescription medicine. Cost included inpatient, outpatient, office-based, prescription, and emergency costs. Panels were broken into three time categories: 2002-2005 (pre-ACA), 2006-2009 (pre-ACA), and 2010-2011 (post-ACA). Bivariate analyses and unadjusted means were used to compare the trends over time, and multiple regression was used to examine factors associated with health insurance, access, and cost. Results: No significant change overtime was seen in insurance, delay in accessing care, or delay in obtaining prescription medications. A significant change was seen in having access to usual source of care (p=0.004), with a slight increase in those without a usual source of care (4.9% in 2002-2005 compared to 5.8% in 2010-2011). No significant change was seen in outpatient costs, or office-based visits, but inpatient costs decreased over time (p=0.04) and prescription
Pseudomonas aeruginosa is an opportunistic human pathogen posing particular risk to hospitalized, immunocompromised, and cystic fibrosis patients. Due to high levels of antibiotic resistance among strains, pseudomonad infections are challenging to treat. Penicillin-binding protein 3 (PBP3) has been identified by our laboratory as an essential protein for P. aeruginosa survival, thus marking it as a potential target for new antimicrobials. The goal of this project is to identify non-beta-lactam PBP3 inhibitors for development as antipseudomonal agents. A high-throughput virtual screen of over 700,000 compounds found in the ZINC Database was conducted against the coordinates of P. aeruginosa PBP3 (PDB: 3PBQ). Results were filtered on the basis of the reported poses’ physical likelihood and the compounds’ commercial availability. Upon screening the purchased “hits” for antimicrobial activity against reference strain PA14, four active compounds were identified, three of which exhibited favorable drug-like properties. Structural analogues of these three compounds were purchased, and the half-maximal inhibitory concentration (IC50) against PBP3 was determined for each. From these results, further iterations of analogue purchase and testing will be conducted, a structure-activity relationship (SAR) will be established, and a pharmacophore model will be developed. This work will serve as a foundation for the design of novel, specific PBP3 inhibitors using such methods as combinatorial chemistry and, upon obtaining ligand-protein complex crystal structures for strong inhibitors, structure-guided drug design (SGDD). NIH R21AI109385

032 The Influence of Success Rate on Motor Learning During Stroke Rehabilitation, Kelly R Anderson1, Christian Finetto2, Michelle Woodbury2, 1Health and Rehabilitation Science, MUSC, 2Health Science and Research, MUSC.

Abstract not available.

033 Role MiR-217 in the Context of the UPR Pathway During ER Stress, Alexander Oles, Yiwen Bu, Alan Diehl; Biochemistry, MUSC.

Abstract not available.

034 Identification of Penicillin-binding Protein 3 (PBP3) Inhibitors As Agents Against Pseudomonas Aeruginosa, Jaime Randise, Jonathan M Turner, Wei Chen, Christopher Davies; Biochemistry & Molecular Biology, MUSC.

Pseudomonas aeruginosa is an opportunistic human pathogen posing particular risk to hospitalized, immunocompromised, and cystic fibrosis patients. Due to high levels of antibiotic resistance among strains, pseudomonad infections are challenging to treat. Penicillin-binding protein 3 (PBP3) has been identified by our laboratory as an essential protein for P. aeruginosa survival, thus marking it as a potential target for new antimicrobials. The goal of this project is to identify non-beta-lactam PBP3 inhibitors for development as antipseudomonal agents. A high-throughput virtual screen of over 700,000 compounds found in the ZINC Database was conducted against the coordinates of P. aeruginosa PBP3 (PDB: 3PBQ). Results were filtered on the basis of the reported poses’ physical likelihood and the compounds’ commercial availability. Upon screening the purchased “hits” for antimicrobial activity against reference strain PA14, four active compounds were identified, three of which exhibited favorable drug-like properties. Structural analogues of these three compounds were purchased, and the half-maximal inhibitory concentration (IC50) against PBP3 was determined for each. From these results, further iterations of analogue purchase and testing will be conducted, a structure-activity relationship (SAR) will be established, and a pharmacophore model will be developed. This work will serve as a foundation for the design of novel, specific PBP3 inhibitors using such methods as combinatorial chemistry and, upon obtaining ligand-protein complex crystal structures for strong inhibitors, structure-guided drug design (SGDD). NIH R21AI109385

035 Development of a Peptide-Derived Orally-Active Kappa Opioid Agonist for Peripheral Pain: Preclinical Results in Rats, Tyler C Beck1, Carmela M Reichel2, Shannon M Ghee2, Kristi L Helke3, Patrick M Woster4, Isuru R Kumarasinghe4, Thomas A Dix4, 1COM, MUSC, 2Neurosciences, MUSC, 3Comparative Medicine, MUSC, 4Drug Discovery and Biomedical Sciences, MUSC.

Abstract not available.

036 Donor Nebulization of Alpha-1-antitrypsin Improves Post Lung Transplant Outcomes, Grace L Bazzle1, Kunal Patel2, Qi Cheng3, Peng Zhu2, Satish Nadig2, Carl Atkinson1, 1Microbiology and Immunology, MUSC, 2Surgery, MUSC.

Purpose: Pulmonary ischemia-reperfusion (IRI)-induced lung injury is a severe complication that increases the likelihood of primary graft dysfunction, acute rejection (AR) and early death after lung transplantation (LTx). IRI is an unavoidable consequence of the transplant process and is characterized by inflammation, oxidative stress and immune cell infiltration. Currently no therapeutics are utilized to ameliorate IR injury in LTx. Alpha 1-Antitrypsin (A1AT) is the major serine protease inhibitor in the lung, has broad ranging anti-inflammatory effects, and is clinically used for the treatment of A1AT-deficiency emphysema. Given its anti-inflammatory effects, we propose that nebulization of the donor prior to transplantation may significantly reduce IRI and promote improved LTx survival.

Abstract not available.
Patient NS is a 30 year-old female who went blind in her early twenties as a result of S-cone syndrome, a degenerative retinal disorder. A few years after losing her vision, she started experiencing visual perceptions of her hands as she moved them and objects that came into contact with her hands. Over the course of a year, these cross-modal sensations evolved to become veridical visual experiences accurately representative of her hands, objects she touched, and to some degree, objects she could infer from her immediate surroundings. We argue that these experiences are distinct from mental imagery as they occurred automatically, remained consistent over time, and were proprioceptively mediated by her head position much like normal optical vision. Moreover, she could neither consciously force these visual experiences to occur without sensory inference nor prevent them from happening when haptically exploring an object. Her previous visual experiences contributed to a strong influence of top-down processing in her perceptions. Though individuals have previously been able to develop limited veridical acquired synesthesia following extensive practice over many years with the use of a special sensory device, none reported experiencing the richness of complexity or degree of top-down processing exhibited by NS. Thus, we posit that NS’s case may represent the first case of non-optic vision, a phenomenon beyond synesthesia altogether.

038 Deletion of Specific Type-1 Transforming Growth Factor-Beta Receptor Attenuates Thoracic Aortic Aneurysm Development; Hannah Hollon¹, Robert Stroug², Sarah Lieser³, Adam Franklin³, Elizabeth Nadeau³, Rupak Mukherjee³, John Ikonomidis³, Jones Jeffrey³; ¹COM, MUSC, ²Cardiothoracic Surgery, MUSC, ³Cardiothoracic Surgery, MUSC .

Thoracic aortic aneurysms (TAA) occur as a result of an imbalance between the deposition and degradation of the extracellular matrix (ECM). This balance is regulated in part by TGF-β, which acts through two serine threonine kinase receptors. In this pathway, a Type II receptor is activated by TGF-β in order to transphosphorylate a Type I receptor, which activates the Smad signaling pathway to affect transcription in the nucleus. There are two different kinds of Type I receptors in question, TGF-βR1 and ALK-1, which have different downstream signaling mediators that could induce different outcomes. TGF-βR1 leads to matrix deposition, and it is possible that ALK-1 leads to matrix degradation. It has been shown that TGF-β is associated with TAA development, for when TGF-β is disrupted, there is a loss of ECM and an overall resulting loss of strength in the aortic wall. Intracellular mediators of TGF-β signaling were studied in TGF-βR1 and ALK-1 deficient mice and compared to determine that this switch occurs and leads to TAA formation. Histological studies were also performed to further validate these results. There was a significant increase in aneurysm development in ALK-1 wildtype control mice as compared to ALK-1 deficient mice, while there was no significant difference between TGF-βR1 wildtype control mice and TGF-βR1 deficient mice. These results were furthered by histological analysis, in that TGF-βR1 deficient control mice and mice at 4 weeks appeared like wildtype control mice at 4 weeks that have formed aneurysms. This study suggests that the imbalance between matrix deposition and degradation occurs as a result of a switch from a TGF-βR1 receptor to an ALK-1 receptor by inducing TAAs in TGF-βR1 and ALK-1 deficient mice. Further, these results suggest that signaling through the ALK-1 pathway may be essential for TAA development. NIH 5T35DK007431
039 Retinol Formation in Isolated Human Cone Photoreceptors, Cole M Milliken, Chunhe Chen, Yiannis Koutalos; Ophthalmology, MUSC.

Absorption of light by photo-pigment in vertebrate photoreceptor cells generates a photo-activated form, beginning a series of reactions that generate an electrical signal. Absorption of light destroys the photo-pigment therefore its regeneration is necessary to maintain sensitivity to light. The first step in this regeneration process is the release of all-trans retinal from the photo-activated pigment followed by its reduction to all-trans retinol. Cone photoreceptors are responsible for vision in bright-light, hence rapid regeneration of their photo-pigment is essential for their function. The purpose of our investigation was to measure the kinetics of all-trans retinol formation in isolated human cone photoreceptors. Human donor eyes were procured from the National Disease Research Interchange and shipped to Charleston on ice. Eyes were dissected and the cone-rich macula isolated and placed in physiological solution within 48 hours post mortem. Single cone photoreceptors were isolated by chopping the macula cells within a Petri dish, and subsequently incubated in the dark for 10 min with 11-cis retinal and IRBP to regenerate their photo-pigment. Regenerated cells were placed in recording chambers on a microscope stage for fluorescence measurements. All-trans retinol fluorescence was excited with 360 nm light and emission collected >420 nm. The kinetics of all-trans retinol formation was determined following exposure of an isolated cone cell to 15 sec of white light. Fluorescence of retinol in isolated human cone photoreceptors increased rapidly following exposure to white light, reaching a peak in approximately 1 min. These kinetics are notably faster than those measured in isolated rod photoreceptors. From these results we can conclude that following light exposure, human cone photoreceptors rapidly generate all-trans retinol, consistent with the need for fast regeneration of their photo-pigment. MUSC Summer Health Professions

042 Targeting the SCAP/SREBP Pathway May Be a Potential Therapy for Pancreatic Ductal Adenocarcinoma (PDAC). Keeland M Williams, Meredith R McGuire, Wei Shao, Peter J Espenshade; 1COM, MUSC, 2Cell Biology, John Hopkins.

PDAC is the 4th leading cause of cancer deaths in the US, having a 1-year survival rate of <20%. Tumor development creates hypoxic cellular environments which lead to low lipid synthesis. Sterol Regulatory Element Binding Proteins (SREBPs) act as predominant transcriptional regulators of lipid biosynthesis and uptake. The SREBP Cleavage Activating Protein (SCAP) is required for SREBP activation. I hypothesize that SCAP is needed for PDAC tumor cell development and proliferation. Subsequently, tumor cells must activate the SCAP/SREBP pathway to acquire more lipids as a key nutrient source. To test this hypothesis we generated tissue-specific knock out mice that lack Scapexpression in the pancreas (Pdx1-Cre+;Scapfl/fl, “cKOPmice”). The genotype of each mouse was verified by PCR using tail DNA. Scapexpression at the protein level were confirmed by Western blotting analysis. PCR validated the predicted genotype for both the WT Scapfl/fl and the cKOPScapfl/flmice. Protein analysis of the western blot showed that pancreatic Scap was successfully eliminated in the cKOPmice. Liver Western blot affirmed KO specificity. Additional analysis to assess pancreatic function would need to be explored to understand the impact SCAP deletion has on organ function. Future advances would be to test the extent of...

040 Characterizing the Novel Interaction Between ErbB3 and Reep5, Laurel Black, Jody Longo; 1College of Graduate Studies, MUSC, 2Pathology, MUSC.

Abstract not available.

041 The Targeted Cellular Uptake of a Dual Peptide-siRNA Complex Into Oral Cancer Cells is Mediated By Direct Interaction with the EGF Receptor, Haiwen Zhang, Andrew Jakymiw; 1Dental Medicine, MUSC, 2Oral Health Sciences, MUSC.

SiCIP2A is a siRNA that will inhibit oncogene CIP2A expression in Oral Squamous Cells Carcinomas (OSCCs) once properly delivered into the cancer cell. A dual-peptide delivery vehicle which contains GE11-R9, a peptide that targets Epidermal Growth Factor Receptor (EGFR) over expressing cancer cells; and 599, a peptide that aids in intracellular endosomal escape of the siCIP2A cargo, is designed to deliver siCIP2A into cancer cells with high cell-targeting specificity and high siCIP2A bioactivity. We show here that at and above certain molar ratios a dual-peptide/siRNA complex would form by gel shift assay and the complex at the optimal molar ratio of GE11 – R9: 599: siCIP2A = 60:30:1 can achieve the specific and bioactive delivery in vitro. EGFR targeting is confirmed through competitive binding assay with AntiEGFR. These data confirms the EGFR targeting feature of the complex. NIDCR R00DE018191, R25DE022677; NIGMS P30GM103331; T-COHR
Pancreatic islet alpha cells secrete glucagon in response to physiologic stimuli such as hypoglycemia. Glucagon increases hepatic glucose output leading to an increase in blood glucose. Excess glucagon is a feature of type 2 diabetes (T2D), making blockade or interruption of glucagon action an attractive pharmacological approach. However, interruption of glucagon signaling in mice (Gcgr -/-) lowers the blood glucose, but is accompanied by increased alpha cell proliferation and mass, hyperaminoacidemia, and hyperglucagonemia. Serum from Gcgr -/- mice stimulates alpha cell proliferation in cultured mouse islets. To test the hypothesis that high amino acid levels, specifically glutamine, stimulate alpha cell proliferation, we cultured mouse islets in media that mimicked the amino acid levels in Gcgr +/+ (low) and Gcgr -/- (high) mouse serum and found that alpha cell proliferation was greater in islets cultured in high amino acid media. By linear regression, we found that glutamate, leucine, and glutamine levels were associated with increased alpha cell proliferation. Lowering the media glutamine, but not glutamate or leucine, abolished the ability of high amino acids to stimulate alpha cell proliferation. A glutamine transport inhibitor blocked high amino acid media stimulation of alpha cell proliferation, suggesting glutamine transport in islet cells is required. However, low amino acid media with a high level of glutamine did not stimulate alpha cell proliferation, suggesting that glutamine is required, but not sufficient. These data suggest a hepatocyte-alpha cell axis where hepatic glucagon signaling regulates serum amino acid levels and that amino acids, such as glutamine, feedback to the islet to regulate alpha cell proliferation. NIH; Juvenile Diabetes Research Foundation

044 Characterizing the Role of Dicer1e in MiRNA Pathways and Oral Cancer Pathogenesis, Tessa Streeter¹, Andrew Jakymiw², ¹Dental Medicine, MUSC, ²Oral Health Sciences, MUSC.

Abstract not available.

045 SPARC Influence on Collagen Fiber Morphology in a Murine Model of Periodontal Disease, Inesha V Baker, Amy Bradshaw, Emilie Rosset; Dental Medicine, MUSC.

Abstract not available.

046 A Quality Assessment of ‘Get-With-The-Guidelines’ Data for the Study of Disparities in Stroke Recovery, Ashley R Gathers¹, Daniel T Lackland²; ¹COM, MUSC, ²Neurology, MUSC.

Objective: Even though there is a wealth of knowledge on stroke disparities, disparities revolving around stroke recovery continue to rise in minority populations and the evidence from a database perspective is indistinct. The aim was to identify data and information and perform a quality assessment of disparities on stroke recovery within the ‘Get-With-The-Guidelines’ database. Methods: A systematic literature review was performed based on the database ‘Get-With-The-Guidelines’ (GWTG). Studies that fit the eligibility criteria were identified primarily based on the title of disparities in stroke based on race/ethnicity and then surveying the abstract. Studies that did not meet these criteria were excluded. Results: Searched ‘Get-With-The-Guidelines’: Found 46 papers on stroke and 14 studies included race and disparities. 12 studies included some indication of a stroke recovery parameter. 4 studies followed patients more than a month. Conclusions: The GWTG database did include adequate parameters to assess disparities in acute stroke care. However, the data parameters were not adequate for stroke recovery assessment. The results of this assessment support the extension of the GWTG follow-up period through stroke recovery, and the inclusion of traditional high quality ‘stroke recovery’ metrics and parameters. NIH 5R25HL096316

047 Racial and Ethnic Differences in Out-of-Pocket Expenses Among Adults with Diabetes, Makiera L Simmons¹, Kinfe Bishu², Joni S Williams², Rebekah J Walker³, Leonard E Egede²; ¹COM, MUSC, ²General Internal Medicine and Geriatrics, MUSC, ³Ralph H. Johnson Veterans Affairs Medical Center.

Background: Racial and ethnic minority groups have a higher prevalence of diabetes, worse complications, and poorer health outcomes compared to Non-Hispanic Whites (NHW). The objective of this study was to
assess racial and ethnic differences in out-of-pocket (OOP) expenditures among a nationally representative sample of adults with diabetes. Methods: Cross-sectional study of 17,702 adults (≥18 years) with diabetes from the 2002-2011 Medical Expenditure Panel Survey Household Component. Dependent variable was OOP expenses. The primary independent variable was race/ethnicity categorized into NHW, Non-Hispanic Black (NHB), Hispanic, or Other. Unadjusted means were computed to compare out-of-pocket expenses overtime and by race/ethnicity. A two-part regression model was used to estimate adjusted incremental OOP expenses. Results: Nearly 65% of the sample was NHW, 15% was NHB, 14% was Hispanic, and 7% identified with another race or ethnicity. The average OOP for the sample from 2002-2005 was $2117.74, followed by $1665.10 for years 2006-2009, and $1391.22 for 2010-2011, suggesting OOP expenditures for the sample decreased significantly over time. Compared to NHW, all of the other racial and ethnic population groups had significantly lower OOP costs per year, adjusting for covariates. Compared to NHW, NHB had significantly lower OOP expenditures by more than $480 (95% CI: -621.30, -341.51; p<0.001). Hispanics had even lower OOP expenses at savings more than $590 compared to NHW (95% CI: -727.38, -455.00; p<0.001). The ‘Other’ category had the significantly lowest OOP expenses of nearly $645 compared to NHW (95% CI: -803.07, -484.47; p<0.001). Conclusions: In this sample, OOP expenses decreased significantly overtime for all racial and ethnic groups; however, NHW had the most OOP expenses. These observed differences in OOP expenditures among different racial and ethnic groups might be due to higher healthcare utilization in NHW. Additional research is needed to understand these differences in costs in adults with diabetes.

048 Lower Activation Signal Strength Supports Wnt/Beta-catenin Signaling and Enhances the Antitumor Activity of Th17 and CD8+ T Cells, Lillian R Neal1, Logan W Huff2, Michelle H Nelson3, Megan M Wyatt1, Stefanie R Bailey4, Jacob S Bowers3, Juan C Varela2, Chrystal M Paulos1, 1Microbiology and Immunology, MUSC, 2Hematology/Oncology, MUSC.

Abstract not available.

049 Donor Lung Pretreatment with a Synthetic Connexin 43 Mimetic Peptide Ameliorates Lung Transplant Ischemia Reperfusion Injury, Lindsay R Rucker1, Qi Cheng1, Kunal Patel2, Peng Zhu1, Patterson

Background: Ischemia-reperfusion injury (IRI) induced epithelial cell (EpC) injury sets the stage for rejection and the later development of chronic lung allograft dysfunction. IRI induced lung EpC injury is thought to be mediated, in part, by the breakdown of Ep cell-cell junctions, which facilitate EpC structural integrity and lung health. Here we explore the therapeutic potential of donor lung nebulization with αCT1, a novel cell junction stabilizing peptide, as a means to protect EpC from injury and thereby minimize IRI. Methods: A mouse orthotopic LTx model was employed in which Balb/c donors were nebulized with 1000µM αCT1 or vehicle control (scaCT1), 6 hours prior to donor lung harvest and transplantation into allogeneic C57Bl/6 recipients. Pulmonary function tests (PFT) were performed on recipient mice pre-tx and immediately prior to harvest. Lungs from tx recipients were analyzed for lung injury and inflammation using histological and immunological techniques at 48 hrs post reperfusion. Results: Donor lung nebulization with αCT1 reduced IRI-related damage at 48 hours, as shown by significantly reduced histological injury scores (2.5 vs 8, p<0.05) and lavage albumin concentrations. Pathological findings were corroborate by PFT airway resistance, which significantly decreased in αCT1, 0.06093 ± 0.03552, as compared to controls, 0.2706 ± 0.06119. (p<0.05). Further, numbers of immune cells in lavage fluids and lung tissues were significantly reduced. Conclusions: Taken together these findings propose a role for cell-cell junctions in the pathogenesis of LTx IRI, and further, demonstrate that stabilization of donor junctions with αCT1, prior to transplantation, significantly inhibits post-tx IRI. NIH 5T35DK007431

050 Infusion of Fewer T Cells Streamlines Potent Antitumor Response in Adoptive Immunotherapy, Hannah M Knochelmann1, Michelle H Nelson2, Jacob S Bowers3, Daniel J Neitzke, Megan E Meek, Chrystal M Paulos; 1Microbiology and Immunology, MUSC, 2Surgery, MUSC, 3Dermatology and Dermatologic Surgery, MUSC.

Adoptive T cell transfer therapy mediates potent immunity in patients with bulky metastatic malignancies in the clinical setting. Unfortunately, this therapy has been difficult to uniformly translate across cancer centers nationally due to the production costs, time, and labor required to generate the large number of tumor specific lymphocytes believed necessary to infuse into the patient. Additionally, cell infusion at this magnitude has been shown to produce severe cytotoxic effects.
We found that few Th17 cells (0.5e6) expanded for a mere four days can surprisingly cure large established melanoma as effectively as many Th17 cells (11e6) expanded for two weeks. Additional information revealed that Day 4 Th17 cells engrafted as effectively as those expanded for longer duration even though 20X fewer were initially infused into the animal. These cells were shown to have an effector memory phenotype in contrast to the naïve phenotype shown in younger cells. Importantly, our preliminary data suggest that there exists reduced immune response against self tissue with this treatment strategy. Follow up studies are currently ongoing in the lab to understand the molecular and cellular properties by which this optimal T cell subset operates to regress large tumors. These findings have significant clinical implications, as lowering the number of T cells infused may lessen severe autoimmune toxicity, decrease the patient’s wait for and cost of treatment, and streamline the progression of immunotherapy in the clinic. MUSC MSTP; NIH T32 GM08716; NCI R01 CA175061

051 The Tinman At the Heart of Pre-Eclampsia: Placental Regulation of Angiogenic Signaling By a Cardiac Transcription Factor, Kymbreana Coley, Kyu-Ho Lee; Regenerative Medicine and Cell Biology, MUSC.

The goal of this project was to establish the normal expression pattern of the transcription factor Nkx2-5 and its downstream target, Sam68, in mouse placental cell layers at embryonic days 12.5 and 14.5. Previous data demonstrated that Nkx2-5 was differentially expressed in developing mouse placenta, and that peak levels of Nkx2-5 and Sam68 expression occur at E12.5 and E14.5, respectively. Immunohistochemistry protocols were followed to determine the localization and distribution of Nkx2-5 and Sam68. It was determined that Nkx2-5 is localized to the villiostrophoblast and decidual lining in E14.5 embryos, in both nuclear and non-nuclear compartments. In contrast, E12.5 embryos expressed Nkx2-5 in the spongiotrophoblast layer and villiostrophoblast layer with less visualization in the decidua. Similar patterns of distribution were also observed for Sam68, which was predominantly nuclear. These data complement previous findings of elevated human placental Nkx2-5 and Sam68 expression in the setting of pre-eclampsia (PE), a major complication of pregnancy. They suggest a disease model where PE results from perturbation or persistence of normal developmental expression of Nkx2-5 and Sam68. The data obtained from these studies will serve as a reference for future comparison to analysis of placental samples from mice that overexpress Nkx2-5 in a mouse model of PE. Comparison of the data can determine how different levels of Nkx2-5 expression are correlated to the development PE. MUSC Summer Health Professions Research Program

052 Controlled Release of Connexin Mimetic Peptide From Reaction Electrospun Collagen Fibers, Alexandra T Cocca1, Heather Bainbridge2, Veronica Rodriguez2, Steven Fann2, Michael J Yost2; 1COM, MUSC, 2Surgery, MUSC.

Pressure ulcers, one of the most common types of chronic wounds, account for more than 3 billion dollars annually to the US health care system. Chronic wounds are characterized by over-exuberant and or extended inflammation which leads to pathological processes and non-healing wounds. It has been shown that extracellular ATP is a crucial factor in determining the intensity of the inflammatory response. The novel JM2 peptide developed in the Yost and Gourdie Labs has been shown to inhibit connexin-mediated ATP release, significantly reducing inflammation. The Yost lab has developed a multilayered smart wound dressing to address the issues with chronic wounds. One of the layers is designed to control release the JM2 peptide drug directly into the wound environment, thus attenuating the purinergic driven inflammation. Aliquots of reaction electrospun collagen fibers were treated with a 180uM solution of JM2 peptide and then UV crosslinked with 6.3e5 µ/cm2. The JM2 peptide solution was removed and replaced with 1mL of phosphate buffered saline (PBS), and placed in the 37°C, 5% CO2, incubator. The buffer was removed and replaced at each time point: 1, 2, 3, 6, 9, 18, and 24hrs. I analyzed aliquots of buffer from each time point using SDS Page and Western Blot with biotin as a marker. Control collagen fibers were UV crosslinked prior to addition of JM2 peptide. Quantitative analysis of peptide release in treatment group showed significant release throughout the first 24hrs versus control group which was almost entirely released in the first two hours. By UV crosslinking electrospun collagen after addition of the peptide, we can slow the release of JM2 within 24hrs. This technology could be used to begin treating these difficult to heal wounds. Further studies will determine what is the most efficacious ways of closing these wounds. NSF EPS-0903795, OIA-1317771
053 Micro CT Analysis of Optimal Treatment of Malignant Long Bone Fractures, S Tucker Kornegay, William R Barfield, Alex Chiaramonti, Zilan Lin, E Lex Hanna, Yongren Wu, Vincent D Pellegrini; Orthopedics, MUSC.

Introduction: Treatment of malignant fractures presents a clinical challenge to balance appropriate fracture fixation with tumor irradiation. Fixation of long bone fractures with intramedullary (IM) nails directs bone healing via endochondral ossification, whereas repair with plating induces healing by intramembranous ossification. Fixation of long bone fractures are commonly repaired via IM nails due to their load-sharing capabilities. Yet, bone-healing patterns in patients with metastatic disease requiring radiation have not been well described in the literature. Methods: We sought to identify optimal bone healing in femur fractures exposed to radiation therapy through a bilateral femur fracture model using Sprague-Dawley rats. Fracture repair was accomplished through intramedullary nailing or plating. Fractures were subsequently exposed to radiation three days postoperatively and compared to a control group that did not receive radiation. Femurs were harvested at 1, 3 and 6 months and subsequently analyzed for volume and density using micro computed tomography. Results: Bone volume of control and radiation groups that underwent fixation via intramedullary nails were statistically different at 1 month (p<0.05). At 1 month, there was no significant difference (p>0.05) among bone volume of control and radiation groups fixed with plating. These results indicate that at 1 month radiation had preferentially impaired endochondral ossification in nailed femurs. At 3 and 6 months, the data did not indicate statistically significant differences (p>0.05) among either fixation method. The cartilage callus of radiated fractures fixed with nails continued to grow in size at 3 and 6 months indicating that the fractures had not healed at later time points. Conclusions: One month data suggests plating may be a preferred treatment in malignant fractures. Yet, future research is needed to better elucidate endochondral ossification time points in rat models. A review of femurs that demonstrated non-union at 3 and 6 months is also warranted. Department of Defense

054 Development and Characterization of an Amphipathic Unidirectional Fluid Removal Wound Dressing, Grant N Kahley1, Michael J Yost2,1COM, MUSC, 2General Surgery, MUSC.

Chronic wounds are increasingly common and pose a major dilemma in the clinical setting. Traditional healing devices fall short in addressing the complications demonstrated by chronic wounds. For this reason, Dr. Yost et al. are working to develop a Smart WOUND Dressing (SWOD) composed of three distinct layers. The layers include a bottom collagen fiber layer with an anti-inflammatory peptide, an inner layer with a prevascular endothelial-fibroblast construct, and a top ultrafiltration layer composed of regenerated cellulose and coated with silver due to its antimicrobial properties. This study describes the development and characterization of the top layer of the SWOD. Results show silver coated membranes were amphipathic. In addition, silver coated 30kDa membranes retained their filtration capabilities.

055 Relaxation Therapy for the Management of Pain in the Emergency Department (RPED), Courtney M Poston1, Steven Saef2, McRae Hamer2; 1COM, MUSC, 2Emergency Medicine, MUSC.

Patients will benefit from the use of a simple biofeedback technique called regulated breathing to treat pain in the Emergency Department (ED). Data from the literature confirms the efficacy of biofeedback techniques in the treatment of both chronic and acute pain syndromes in the hospital. The primary aim of this study is to determine the effectiveness of regulated breathing (intervention) in the treatment of acute and chronic pain in patients who seek treatment in an academic ED. The secondary aims of this study are to define associations between the duration of pain, source of pain, and type of pain and the effectiveness of regulated breathing. Using data collected from a continued quality improvement survey, we were able to compare patients' vital signs, pain score using a visual analog scale slide rule, and patient demographic information from their chart. The inclusion criteria for our study are that the patients be oriented to person, place and time (A&O x3), capable of verbal consent, and have no prior history of acute or chronic respiratory distress that prevents them from deep breathing. Prior evidence has shown regulated breathing seems to play a role in the reduction of blood pressure, heart rate, and Visual Analog Scale (VAS) pain score, in patients who come into the hospital for chronic or acute pain1. The research question that we aimed to address is as follows: Will patients benefit from use of a simple mind-body therapy known as regulated breathing (RB) to treat pain in the ED? To address our Research question we developed several hypotheses. Our null hypothesis states that there will be no difference in pain scores before and after the intervention known as RB for Emergency Department (ED) patients with pain. Our alternative hypothesis states that there will be a difference in pain scores before and after the
intervention known as RB for ED patients with pain. *MUSC Summer Health Professions*

056 Safety and Efficacy of Novel Facemask for Positive Pressure Ventilation, Samuel T Keane¹, William R Hand², Tod A Brown¹, Michel J Sabbagh¹, Tamas Szabo², Kathryn H Bridges², Robert D Warters²; ¹COM, MUSC, ²Anesthesia, MUSC.

Introduction: Manual positive pressure ventilation is an essential skill in airway management. The “Standard” mask requires the “C&E” technique of forming a seal to the face while lifting the jaw. The novel mask features a design that allows a more ergonomic grip allowing downward pressure with the palm while the other fingers lift the jaw. Han and the Waters Scales exist to describe bag mask ventilation in patients undergoing general anesthesia. Methods: IRB approval was obtained from (MUSC IRB-II). Patients undergoing surgery with endotracheal anesthesia and paralysis were recruited. Patients were masked with both the standard mask (C and E technique) and the novel mask before and after paralysis. Han and Warters scores were recorded for each mask under both conditions. The order of mask use was randomized. Results: 48 patients completed informed consent. The average BMI was 28.49 and average Mallampati classification 2; 10.42 (%) patients were predicted to be difficult to mask.(3) 25 patients were randomized to use the Novel mask first. Before administration of paralytic, 18 patients had different scores between the novel and standard facemask using the Warters grading scale. 14 patients had lower scores using the novel facemask; four had higher scores using the novel mask. After paralysis, 10 patients had different scores between the two masks on the Warters scale; all 10 had lower scores using the novel mask. The differences in scores on the Warters scale between the two masks were statistically significant (p=0.008 before paralysis, p=0.002 after paralysis). No statistical significance was shown when the Han scale was used for grading (p=0.055 before paralysis, p=0.250 after paralysis). Discussion: Preliminary data appear to demonstrate improved performance of the novel mask compared to Standard mask when using the Warters grading scale. Further research may delineate the differences.

057 Assessment of Traumatic Brain Injury in Infants with Diffusion Kurtosis Imaging, Michael O Tyler¹, Emily Lowther², Macy Adams³, Rachel Deardorff³, Jens Jensen³, Donna Roberts³; ¹COM, MUSC, ²SC Governors School for Science and Mathematics, ³Radiology, MUSC.

Abusive Head Trauma (AHT), also known colloquially as Shaken Baby Syndrome, demands careful consideration of the known facts in the context of the overall scenario. The clinical presentation of AHT can vary widely, and many of the signs of abuse can also potentially be due to accidental trauma. While most concede that trauma from a short fall or similar minor accident can have the same appearance as that of abuse, the question of how plausible it is for accidental trauma to sometimes look like abusive trauma is much more difficult to answer. Clearly, the issue of differentiating intentional abuse from traumatic abuse is a problem that should be approached from multiple angles. This paper presents a preliminary study investigating the potential application of Diffusion Kurtosis Imaging in the study of potential victims of AHT. Our results were able to highlight 3 out of the 4 severe or fatal cases in our study, suggesting they suffered axonal damage. Why the fourth case was not poses an interesting question for debate. This patient differed from the other 3 in that they were over a year older in age and did not have an extended anoxic episode following their traumatic event. The questions surrounding AHT are complex and answers will not come easily. Until they are found, we can only speculate. Such speculation should not be used to inform us as we make important decisions in the clinic or the courtroom, but may be used to help us consider new avenues of research to pursue. *MUSC Summer Health Professionals Program; NIH 5T35DK007431*

058 Patient-Related Risk Factors for Periprosthetic Ankle Joint Infection: An Analysis of 6,977 Total Ankle Arthroplasties, Alyssa Althoff¹, Brian Werner²; ¹Orthopedics, MUSC, ²University of Virginia.

Periprosthetic infection following TAA is a significant complication that often results in explant to resolve the infection. The purpose of this investigation was to determine patient-related risk factors for periprosthetic infection following TAA. The PearlDiver patient records database was used to query the 100% Medicare Standard Analytic Files from 2005-2012 for patients undergoing TAA using CPT and ICD-9 procedure codes. Patients undergoing TAA with concomitant fusion procedures or more complex forefoot procedures were excluded. Postoperative infection within 6 months was then assessed using both ICD-9 codes for diagnosis of postoperative periprosthetic joint infection or a procedure for this indication. A multivariate binomial logistic regression analysis was then utilized to evaluate patient-related risk factors for postoperative infection, including demographic and comorbidity variables. Adjusted odds ratios (OR) and 95%
confidence intervals (CIs) were calculated for each risk factor, with \( P < 0.05 \) considered statistically significant. 6,977 patients met all inclusion and exclusion criteria. There were 294 (4\%) patients with a diagnosis of or a procedure for periprosthetic or postoperative infection. Independent risk factors for periprosthetic infection include: age less than 65 years (OR 1.44, \( P = 0.036 \)), BMI less than 19 kg/m\(^2\) (OR 3.35, \( P = 0.013 \)), BMI greater than 30 kg/m\(^2\) (OR 1.49, \( P = 0.034 \)), and tobacco use (OR 1.59, \( P = 0.002 \)). Comorbidities that were independently associated with periprosthetic infection include: diabetes mellitus (OR 1.36, \( P = 0.017 \)), inflammatory arthritis (OR 2.38, \( P < 0.0001 \)), peripheral vascular disease (OR 1.64, \( P < 0.0001 \)), chronic lung disease (OR 1.37, \( P = 0.022 \)), and hypothyroidism (OR 1.32, \( P = 0.022 \)). Significant patient-related risk factors for periprosthetic ankle joint infection following TAA include younger age, low BMI, obesity, diabetes, inflammatory arthritis, peripheral vascular disease and hypothyroidism Hospital for Special Surgery Womens Sports Medicine Center.

059 Coronary CT Angiography-derived Morphological Markers for the Prediction of Stent Fracture and Major Adverse Cardiac Events, Matthew W Bickford\(^1\), Junjie Yang\(^2\), Christian Tesche\(^2\), Mortiz Albrecht\(^2\), Joseph Schoepf\(^2\); \(^1\)COM, MUSC, \(^2\)Radiology, MUSC.

The objective of this project is to evaluate morphological and quantitative plaque markers derived from coronary CT angiography (CCTA) for the prediction of stent damage and major adverse cardiac events (MACE). Pooled data from one center in China was retrospectively analyzed. 133 patients who had undergone a dual-source CCTA study before and after stent placement. Various compositional and morphological markers were derived from CCTA and compared between a group who had stent fracture (sf) and those who did not: Total plaque volume (TPV), calcified and non-calcified plaque volumes (CPV and NCPV), plaque burden (PB in %), remodeling index (RI), lesion length (LL), calcium volume within the plaque, lipid content, fibrosis, vessel segment volume, and lumen volume. Discriminatory power of these markers for predicting MACE was assessed. Fractures and restenosis tended to occur in stents deployed over plaques with higher total Agatston Calcium Scores, larger vessel volume, larger plaque volume, larger lumen volume, larger calcium volume, and higher fibrosis levels. The same conclusions could be drawn from the incidence of compression with the exception of lower average calcium volume in stents that did not fracture. CCTA-derived markers showed predictive value for stent damage on a per-patient and per-lesion level. Combination of markers showed strongest predictive power. These markers indicate additional prognostic information and may aid to identify patients at risk for future cardiac events as stent damage has been linked to an increased risk of MACE. MUSC Summer Health Professionals Program.

060 Assessment of Risk Factors for Increased Resource Utilization in Kidney Transplantation, Steven C Vranian\(^1\), Kelly L Covert\(^2\), Caitlin R Mardis\(^3\), John W McGillicuddy\(^1\), Ken D Chavin\(^1\), Derek Dubay\(^4\), Dave Taber\(^3\); \(^1\)Transplant Surgery, MUSC, \(^2\)Pharmacy Practice, Bill Galton College of Pharmacy, \(^3\)Transplant Service Line, MUSC, \(^4\)Transplant Surgery, MUSC.

A limited number of studies have sought to identify patients at risk for medication errors and subsequent adverse clinical outcomes. This study aimed to identify significant risk factors for deleterious outcomes in kidney transplant recipients based on drug-related problems (DRPs) and self-administered surveys. Adult kidney transplant recipients visiting clinic at our facility between Sept and Nov 2015 were eligible to participate. Patients were surveyed for demographics, medication adherence and health status/outlook. We assessed for associations between survey results, pharmacist-derived DRPs and health resource utilization over an 8-month follow-up period after initial assessment. Based on significant associations, two patient risk cohorts were identified and compared for health care utilization using Poisson regression analysis. 237 patients were included. For the patient-reported data, those that receive Medicaid insurance or rated their health as poor (M/PHS) were identified as a significant risk cohort. For pharmacist assessment, patients that received an incorrect medication or lacked appropriate follow-up medication monitoring were identified as a significant risk cohort (pharmacy errors [PE]). The M/PHS cohort experienced 11.4 encounters per patient year, and the PE cohort experienced 34.2 encounters per patient year, while non-risk cohorts experienced 8.8 and 9.0 encounters per patient year, respectively. Regression demonstrated that the M/PHS cohort experienced 43\% more total encounters (p<0.05), 31\% more admissions, and 35\% more outpatient transplant clinic visits (p<0.05). The PE cohort experienced 4.2 times the rate of total encounters (p<0.05), 4.1 times the rate of admissions (p<0.05) and 2.3 times the rate of outpatient transplant clinic visits (p<0.05). This prospective observational study identified both patient-reported and pharmacist-derived risk factors that increased the rate of health care encounters by 30 to 400\% during the follow-up period. Further research is warranted to validate these risks, determine their impact on graft and patient survival, and develop risk-
mitigation strategies to improve care and outcomes. NIH K23DK099440, T35DK007431

061 Out with The Old and in with The Great: Alcohol Septal Ablation Outcomes on Race, Gender and Age, Akayla Ford¹, Billy Mullinax², Amy Wahlquist, Jeremy Rier, Barbara Griffin, Shawn Shaji, Christopher Nielson, Valerian Fernandes, Sheldon Litwin; ¹Cardiology, MUSC, ²Ralph H. Johnson VA Medical Center.

Abstract not available.

062 Safety of Reduction Mammaplasty in the Adolescent Population, Marion W Tapp¹, Robinder Singh², Fernando A Herrera ²; ¹COM, MUSC, ²Plastic and Reconstructive Surgery, MUSC.

Breast reduction is one of the most frequently performed plastic surgery operations. The purpose of this study was to determine whether increased BMI and total mass reduction was a predictor of complications in the adolescent patients. A retrospective comparative study was performed from 2010-2015 of all female patients between the age of 14-18 undergoing reduction mammaplasty. Patient demographics, pedicle technique, BMI, weight of resection, major and minor complications were recorded. Pearson correlation coefficient was used to determine the association between BMI and total weight resected. The patients with complications were compared to those who did not develop complications and were further analyzed using a student t test. A total of 51 patients were identified. Pearson coefficient was 0.7685 suggesting a strong correlation between increasing BMI and higher total weight resected. No major complications occurred, 15 patients developed minor complications. These included superficial wound dehiscence <1cm. The average BMI for the complication group was 36.3 with an average mass reduction of 2142 grams. 36 patients did not develop any minor complications. The average BMI for this group was 31.7 and an average total mass reduction of 1697 grams. There was a significant difference between BMI (p=0.024) and total mass reduction (p=0.023) between groups. Breast reduction surgery is a commonly performed procedure, which improves symptoms and carries a low major complication rate even in the adolescent population. Our study showed that no major complications occurred and that 29% of patients developed minor complications. Those patients that developed minor complications were more likely to have a higher BMI and total mass reduction compared to those that did not develop any complications.

063 Neuroimaging of Cerebrovascular Inflammation Following Endovascular Thrombectomy in Acute Ischemic Stroke, Yangchun Li¹, Arindam Rano Chatterjee²; ¹COM, MUSC, ²Radiology, MUSC.

Endovascular thrombectomy has become the standard care for eligible patients with acute large vessel ischemic stroke. However, the implications of iatrogenic arterial endothelial damage associated with different thrombectomy techniques are currently not well described or understood. In the present study we examined MR images in a case of rotatory vertebral artery compression causing multiple posterior circulation infarctions requiring multiple separate aspiration and stent-retriever thrombectomies. Concentric post-contrast T1w arterial wall enhancement was present in high-resolution vessel wall MR images (HRMRI) acquired following stent-retriever thrombectomy but absent following aspiration thrombectomy. The enhancement demonstrates greater vascular damage and inflammation as a result of stent-retriever manipulation. In contrast, routine MR sequences failed to show the evidence of inflammation seen in HRMRI. HRMRI may be used non-invasively to discriminate between intracranial vessel inflammation with implications for prognostic and therapeutic stratification. NIH 5T35DK007431

064 Measuring the Impact of Genomic Testing on Treatment Decision in Newly Diagnosed Prostate Cancer Patients, Rohail Rashid Kazi¹, Stephen Savage², Sandip Prasad², Susan Caulder³, Claire Pittman³; ¹COM, MUSC, ²Urology, MUSC, ³Ralph H. Johnson VAMC.

Detection and staging of prostate cancer has traditionally been accomplished through the use of digital rectal exam (DRE), prostate-specific antigen (PSA) levels, and prostate biopsy measured by Gleason score, which was established in the 1960’s. For patients with intermediate to very high risk prostate cancer (based on NCCN guidelines), treatment is nearly always indicated. However, patients with low and very low risk prostate cancer have the option of forgoing immediate treatment and instead choosing active surveillance of their prostate cancer. This can be a difficult and highly discretionary decision to make as long term mortality associated with these strata is relatively low, with few other determining factors available. Recently, commercially available genomic
tests on biopsy tissue that provide information on the aggressiveness of cancer may allow physicians and patients to make better and more informed treatment decisions in such cases. This is a multi-institute prospective study measuring the impact of genomic testing (Prolaris) on first-line therapy decisions in recently diagnosed, treatment-naïve patients with early stage localized prostate cancer. While this is an ongoing study, data from the Ralph H. Johnson VAMC over the past 10 months has shown that in 52% of cases (14/27), genomic testing had a moderate to high level of influence on treatment decisions, when compared to traditional pathologic information. Treatment decision was changed either to or from active surveillance after genomic testing in 22.2% of patients (6/27) with genomic testing being cited as the reason for change in 83.3% of such cases. On a ten-point scale, the average absolute value of the change in likelihood of choosing active surveillance from pre-test to post test was 2.15. These data suggest that genomic testing may aid in physicians and patients in making therapy decisions for very low and low risk patients by providing additional data on cancer aggressiveness. Charleston Research Institute

065 Mesenchymal Stem Cell Cotransplantation in Total Pancreatectomy with Islet Autotransplantation, Taylor L Turnbull¹, Hongjun Wang², David B Adams², Katherine A Morgan²; ¹COM, MUSC, ²Surgery, MUSC.

Total pancreatectomy with islet autotransplantation (TPIAT) is an effective means of pain control and avoidance of pancreatogenic diabetes in selected patients with chronic pancreatitis. However, insulin independence is achieved in only 25% of patients long term as there is significant islet loss during engraftment. Autologous mesenchymal stem cells (MSCs) may enhance islet engraftment by mitigating inflammation and promoting angiogenesis. MSCs were harvested from 3 consenting patients two weeks prior to TP-IAT and expanded ex vivo. The MSCs were infused into the portal vein along with autologous islets following total pancreatectomy. Glucose and c-peptide levels were assessed following a mixed meal tolerance test (MMTT) at 6 months post-op. Daily insulin requirements as well as physical and psychological quality of life scores were compared to data from historical controls. At 6 months post-op, experimental patients demonstrated lower mean glucose levels (164.88 mg/dl) in a MMTT than a control patient (343.25 mg/dl) who did not receive MSC cotransplantation. Experimental patients demonstrated an average c-peptide production of 0.25 AUC/islet IEQ/kg greater than the control. At 6 months post op, experimental patients required an average of 10 units of insulin per day while a group of 133 historical controls required an average of 20.84 units per day. Experimental patients demonstrated a greater increase in average physical quality of life scores following surgery (7 points) than did control patients (6.62). Psychological QOL scores decreased by an average of 1.66 points in experimental patients and increased by an average of 3.89 points in control patients. MSC cotransplantation during islet autotransplantation is feasible and safe. Further study is needed to assess this provocative approach to enhancing endocrine outcomes after TPIAT. NIH DK097544, DK105183, DK099696; MUSC Summer Health Professionals Research Program

066 Regulated Breathing for Pain Management in the Emergency Department: Association of Response with Patient Demographics, Heyward B Mack¹, Steven Saef², McRae Hamer²; ¹COM, MUSC, ²Emergency Medicine, MUSC.

Introduction: The need for treatment of acute or chronic pain is perhaps the most frequent reason why patients seek care in the Emergency Department (ED). Opiates are one of the mainstays of treatment for these patients; however, their use has been problematic in American healthcare with large numbers of overdoses and deaths directly attributable to their overuse and toxicity. In the current practice environment clinicians are being encouraged to use non-pharmacologic and non-opiate-based treatment regimens. Mind-body therapies (MBT) including psychological therapies, biofeedback, mindfulness, and relaxation therapies provide an alternative to opiates that has shown efficacy in venues outside the ED. This study sought to determine the effect of one type of MBT, regulated breathing (RB), on the management of pain in the ED. This particular abstract sought to determine if a relationship existed between demographics and the impact of RB. Methods: A total of 81 patients were enrolled in the study. Thirty-eight patients were randomly selected to receive the intervention of RB in which patients were taught how to perform several iterations of a structured breath known as the “square breath”. Patients rated the magnitude of their pain using a visual analogue scale (VAS) sliderule graded form 0-10 centimeters. Pain ratings were obtained at time=0, time=30-60 minutes. A post-intervention VAS score was obtained after a Research Assistant guided the patients through the performance of several square breaths. Pre- and post-intervention VAS scores were compared looking for associations between patient demographics and responsiveness to RB while controlling for type (somatic vs. visceral) and duration of pain. Results: Magnitude of pain as measured with a VAS sliderule before and after application of RB showed no significant change in association with
067 Transient Swelling of the Jugular Venous Plexus Following Decompressive Craniectomy and Cranioplasty, Edward W Duffy, Michael Antonucci; Radiology, MUSC.

Decompressive craniectomy is a neurosurgical procedure in which part of the skull is removed to relieve elevated intracranial pressure and prevent downward brain herniation in patients with brain swelling (for instance, from trauma, stroke, tumor). This results in vulnerable, uncovered brain parenchyma and a cosmetic deformity. As such, following resolution of the edema, a cranioplasty is performed to restore the skull contour. While relatively routine, a cranioplasty is not without risks. Reported complications include hematoma, infection, seizure, herniation, and death. Many patients will undergo a brain CT following cranioplasty both to assess surgical outcome and to identify any potential early complications. We have identified three patients in which a post-cranioplasty CT revealed a previously undescribed finding: transient dilatation of the cervical epidural venous plexus. We explore the significance of this finding and underscore the importance of not mistaking it for a new hematoma. This project is comprised of a retrospective review of the imaging studies and medical charts of three patients who demonstrated this unusual post-cranioplasty imaging findings. Three patients who underwent emergent craniectomy and subsequent cranioplasty demonstrated hyperdensity surrounding their upper cervical spinal cord on post-operative CT. No referable symptomatology was reported and follow-up imaging demonstrated prompt resolution. Each patient had a constellation of additional findings suggesting impaired cerebrospinal fluid hemodynamics. Our findings suggest that a small subset of cranioplasty patients develop venous congestion, from impaired intracranial fluid dynamics, following acute restoration of the confines of the bony calvarium. The sudden change in intracranial volume results in a transient pressure shift and drives a temporary increase in volume draining venous structures. This process can be mistaken for a hematoma on CT, but ultimately reflects a rapidly changing physiologic process. Future study is warranted to identify pre-disposing conditions and the lack of ultimate clinical significance.

068 Overall Cost-Effectiveness of Acute Chest Pain CT in Comparison with Standard Treatment, Jonathan T Pannell, Christian Tesche, J L Wichmann, S Baumann, Carlo De Cecco, Joseph Schoepf; Radiology, MUSC.

Previous studies have demonstrated more efficient time-to-diagnosis and time-to-discharge with cardiac CT angiography (cCTA) as the initial imaging test in patients presenting with acute chest pain over traditional management protocols, along with reduced cost of the index episode of care; however some failed to identify benefits in down-stream test utilization. We evaluated the comparative cost-effectiveness and efficacy of cCTA in the overall care for chest pain patients. We performed a retrospective single-center analysis in 2,156 patients who presented to the emergency department (ED) with acute chest pain. Patient cohorts matched by patient characteristics and pretest likelihood for coronary artery disease (CAD) had undergone cCTA as a primary imaging test (n=1,139) or a traditional standard of care protocol (n=1,017). Cost-relevant factors of ED visits, utilization of downstream tests, and total patient care cost were compared. No significant differences between groups were observed for age, gender, race, BMI, or CAD risk factors (all P>0.08). In addition, no significant differences in the diagnosis of CAD, pulmonary embolism, or aortic dissection were observed (all P>0.11). Time to discharge (4.5 vs. 7 hours), hospital admission rate (12.6% vs. 54.2%), length of hospital stay (48 vs. 72 hours), and readmission rate within 30 days (3.5% vs. 14.6%) were significantly lower (all P<0.001) in cCTA patients. Reduced rates of additional downstream testing (e.g. nuclear stress test) and invasive coronary angiography (4.9% vs. 22.7%; P<0.001), and ultimately lower total cost per patient (11,783$ vs. 18,996$, P<0.001) were observed in the cCTA arm.

069 Clinical Features and Neurological Complications of Children Hospitalized with Chikungunya Virus in Honduras, Nancy L Hagood1, Kenton R Holden2, Andrea Summer3, José A Samrâ1; 1COM, MUSC, 2Neurology, MUSC, 3Pediatrics, MUSC, 4Pediatrics, Hospital Escuela Universitario.

Background: The first case of Chikungunya virus in Honduras was identified in 2014. The Aedes aegypti mosquito is present widely across Honduras, facilitating an outbreak of Chikungunya virus (CHIKV) in 2015 that has significantly impacted children. Methods: A retrospective chart review of 235 children presenting
with CHIKV to the National Autonomous University of Honduras Hospital Escuela in Tegucigalpa, Honduras was completed to assess clinical features and neurological complications of pediatric CHIKV. Results: Of 235 children admitted with CHIKV, the majority had symptoms of fever, generalized erythematous rash, and irritability. Only 14% had clinical arthritis. Ten percent of patients had their clinical course complicated by seizures. Nine percent of the total patients were diagnosed with meningoencephalitis. Conclusion: Chikungunya virus can cause severe complications in children, the majority of which impact the central nervous system.

070 Safety of Trans-Jugular Liver Biopsy in Patients with Suspected Cirrhosis, Henry J Burchett1, Mona Haj2, Don Rockey3, 1COM, MUSC, 2Gastroenterology, MUSC, 3Medicine, MUSC.

Trans-jugular liver biopsy (TJLB) is often used in patients with liver disease when percutaneous liver biopsy (PLB) is precluded. The goal of this retrospective study of patients who had undergone a TJLB was to assess why TJLB was used over PLB and if it had lower complications when adjusted for risk, how many patients had received the procedure since January of 2005, and associated complications and indications for the procedure. The patient data was retrieved from the EPIC electronic health record computer system and input into a web based liver specific database. This information was then analyzed with Microsoft Excel. As the study is ongoing, our results are preliminary. From the preliminary results, almost twice as many men underwent a TJLB compared to women. Cirrhosis was indicated the most, with elevated liver function tests (LFTs), ascites, and hepatitis C following in number of indications. The HVPG was elevated in TJLB with an average pressure of 10.75mmHg, with a majority of patients having an HVPG greater than 5mmHg and almost half of the patients had a HVPG greater than 10mmHg. Splenomegaly was also present in some patients. These preliminary results indicate that TJLB patients have severe underlying liver disease and associated symptoms and could be the reason why TJLB was opted over PLB.

071 Diagnostic Accuracy and Radiation Dose Reduction in High-Pitch Acquisition CT Coronary Artery Calcium Scoring with Tin Filtration, Chelsea D Eason, Christian Tesche, Schoepf Joseph; Radiology and Radiological Science, MUSC.

Abstract not available.

072 Presentation of a Calcifying Aponeurotic Fibroma in the Distal Forearm of a Pediatric Patient, Lauren E Hemmingsen, Meryl Eklund; Radiology, MUSC.

This case follows from a radiologic perspective an 11-year old girl who presented at MUSC with a long-standing, painless mass on her left forearm. Radiologic findings and biopsy confirmed the mass to be a Calcifying Aponeurotic Fibroma (CAF). These masses, also known as Keasbey tumors or Juvenile Aponeurotic Fibromas, are rare, benign tumors occurring prototypically in the extremities of pediatric patients. In this patient, The CAF impeding growth, caused deformation of the distal radius, and inhibited range of motion. The tumor was surgically removed with full restoration of function although the risk of recurrence is high with Calcifying Aponeurotic Fibromas. This case study aims to highlight radiologic findings associated with CAFs to improve diagnosis and management of a rare tumor. MUSC Radiology

073 Regulated Breathing for Pain Management in the Emergency Department: Impact on Patients with Visceral Vs. Somatic Pain, Bastien H Bacro-Duverger1, McRae Hamer2, Meggan Deveaux1, Heyward Mack1, Courtney Poston1, Steven Saef2, 1COM, MUSC, 2Emergency Medicine, MUSC.

Introduction: Pain is one of the most frequent chief complaints seen in the Emergency Department (ED). With the current opioid addiction crisis, the investigation of alternative pain management strategies has become highly relevant. This study sought to determine whether one type of mind-body therapy, regulated breathing (RB), would be practical and effective when used for pain management in an ED setting. This particular abstract focused on whether patients with visceral or somatic types of pain received benefit from RB.

Methods: A total of 81 patients were enrolled in the study. The null hypothesis stated there would be no difference in visual analogue scale (VAS) pain scores before and after a regulated breathing session for patients with visceral vs. somatic pain. Patients rated their pain using a VAS sliderule graded form 0-10 in centimeters. Pain ratings were obtained at time=0 and at time=30-60 minutes. One half of enrolled patients were randomly selected to receive the intervention of regulated breathing. The change in VAS scores before and after the intervention were compared to those of
the control group for the subgroups of patients reporting somatic and visceral pain while controlling for demographics and duration of pain. Results: A significant difference was noted in the responsiveness to RB between patients with somatic pain vs. those with visceral pain (p=0.006). Further analysis by subgroup showed that there was a benefit for those with visceral pain: Pain reduction of 2.65 cm on the VAS between pre- and post-intervention scores; (95% CI -3.54, -1.76) but not for somatic pain: pain reduction of 0.34 cm (95% CI -1.09, 0.41). Conclusion: Our results showed that among patients who participated in RB there was a significant difference in response between those with somatic vs. visceral pain. A benefit was seen for patients reporting visceral pain but not for those reporting somatic pain.

074 Non-binary Myocardial Infarct Quantification Technique Accounting for Partial Volume Averaging Predicts Segmental Left Ventricular Myocardial Contraction, Rayphael S Hardy¹, Moritz Albrecht², Balazs Ruzsics², Pal Suranyi², Rob J van der Geest², Gabriel A Elgavish², Akos Varga-Szemes², Joseph U Schoepf², ¹COM, MUSC, ²Radiology, MUSC.

Binary myocardial infarct (MI) quantification techniques ignore the heterogeneous distribution of MI and do not take partial volume averaging into consideration, resulting in an overestimation in MI size. Non-binary approaches, such as Percent Infarct Mapping (PIM), are able to address these shortcomings. The aim of this study was to investigate the influence of true MI content determined by PIM on segmental myocardial contraction. One-hundred-nine patients (54±14 years, 58 males) with suspected prior MI underwent 1.5T MRI (MAGNETOM Avanto, Siemens AG, Erlangen, Germany). Short-axis balanced steady-state free-precession (bSSFP) cine imaging, post-contrast (0.1mmol/kg gadobenate-dimeglumine) T1-mapping (modified Look-Locker inversion recovery (IR), scheme 4(1)3(1)2), and late gadolinium enhancement (LGE) imaging (bSSFP with IR pulse) were performed. Myocardial contraction was quantified as radial wall thickening (RWT) using the centerline method (including 100 chords per slice) according to the 17-segment model. Segmental MI content was calculated based on both T1 and LGE images applying the previously described PIM algorithm (PIMT1 and PIMLGE, respectively) using an in-house developed application integrated into the Research Mass Software. MI was also quantified based on LGE images using a binary approach (full-width at half-maximum, FWHM). Relationship between MI percentage (MI%) and RWT was tested using a linear regression. Both PIMT1 and PIMLGE showed good correlation with segmental myocardial contraction. The PIM-based methods measured lower MI% due to their ability to account for partial volume averaging. Non-binary approaches may become preferred techniques for quantitative LGE evaluation. MUSC Summer Health Professionals Scholarship Program

075 Predictive Value of Coronary CT Angiography Derived Plaque Quantification In Patients With Acute Coronary Syndrome, Darby Shuler, Christian Tesche, Damiano Caruso, Carlo N De Cecco, Jess Rames, Moritz Albrecht, Taylor M Duguay, Joseph Schoepf; Radiology, MUSC.

Purpose: To evaluate quantitative markers derived from coronary CT angiography (cCTA) plaque analysis in patients with first acute coronary syndrome (ACS) compared to patients with stable coronary artery disease (CAD) and to assess the predictive value of these markers. Materials and Methods: In this IRB-approved, HIPAA-compliant investigation we retrospectively analyzed data of 40 patients (56.9±9.3 years, 55% male) admitted with their first ACS (non-ST-segment elevation myocardial infarction [NSTEMI] or unstable angina pectoris ([UAP]) and Framingham risk score matched controls with stable CAD. All patients had undergone cCTA as part of their clinical work up prior to invasive catheter angiography (ICA). ACS-related culprit lesions on cCTA were identified based on ICA findings. Several quantitative plaque markers were derived from cCTA and compared between both groups on a per-lesion and per-patient level: Total plaque volume (TPV), calcified and non-calcified plaque volumes (CPV and NCPV), plaque burden (in %), remodeling index, lesion length, presence of Napkin-ring sign, segment involvement score (SIS), and segment stenosis score (SSS). Discriminatory power of these markers for predicting ACS was assessed. Results: Patients with ACS showed significantly higher values for obstructive CAD, SSS, SIS, NCPV, lesion length, and remodeling index compared to the control group (all p<0.05). On a per-lesion level, culprit lesions had significantly higher values for plaque burden, TPV, NCPV, remodeling index, lesion length, and prevalence of napkin-ring sign in comparison to control lesions (all p<0.05). For the ROC analysis on a per-patient level, a stepwise model including clinical risk scores and plaque markers demonstrated incremental discriminatory power (AUC 0.92, p<0.0001). Similarly, on a per-lesion level, a combination of markers provided incremental prognostic value (AUC 0.88, p<0.0001) for predicting ACS. Conclusion: cCTA-derived plaque markers associated with ACS show predictive value, both on a per-patient and per-lesion level. A combination of markers added to the Framingham risk score yields the greatest discriminatory ability and may aid in the
Regulated Breathing for Pain Management in the Emergency Department: Impact on Patients Based on Duration of Pain, Meggan M DeVeaux\textsuperscript{1}, Bastien Bacro-Duverger\textsuperscript{1}, Heyward Mack\textsuperscript{1}, Courtney Poston\textsuperscript{1}, McRae Hamer\textsuperscript{2}, Steven Saef\textsuperscript{2}, \textsuperscript{1}COM, MUSC, \textsuperscript{2}Emergency, MUSC.

Pain is one of the most frequent chief complaints seen in the Emergency Department (ED). With the current opioid addiction crisis in the United States, the investigation of alternative pain management strategies has become highly relevant. In this light, Mind-body Therapies (MBT) such as regulated breathing (RB) have assumed increased importance. This study sought to determine whether RB would be effective when used for pain management in an ED setting and to determine if certain patient characteristics were associated with increased benefit. It was hypothesized that there would be no correlation between the duration of pain and the effect of RB. A total of 81 patients were enrolled in the study, 43 in the control group and 38 in the RB intervention group. Patients rated their pain using a visual analogue scale (VAS) sliderule graded from 0-10cm. Half of enrolled patients were randomly selected to receive the intervention of RB in which patients were instructed on how to perform several iterations of a structured respiration known as the “square breath”. Patients receiving the intervention provided a post-intervention pain score. Change in VAS scores between the control and intervention groups were compared by subgroups defined by duration of pain. RB showed a strong trend toward having a therapeutic effect which was associated with the duration of patients’ pain ($p=0.06$). Patients with a longer duration of pain were more likely to benefit. Patients who had experienced a longer duration of pain appeared to be more likely to benefit from RB as a means to control their pain. Further study with a larger sample will be needed to confirm this finding.

Diagnostic Utility of the Upper Gastrointestinal Series, Meredith Pritchett\textsuperscript{1}, Anil Rao\textsuperscript{2}, Cephus Simmons\textsuperscript{2}, \textsuperscript{1}COM, MUSC, \textsuperscript{2}Radiology, MUSC.

Abstract not available.

Medical History and Past Interventions in Youth At Risk for Autism

**Spectrum Disorder**, Emily B Crosby\textsuperscript{1}, Catherine C Bradley\textsuperscript{2}, Amy E Wahlquist\textsuperscript{3}, Jane Charles\textsuperscript{2}, Andrea D Boan\textsuperscript{4}, Laura A Carpenter\textsuperscript{2}, \textsuperscript{1}COM, MUSC, \textsuperscript{2}Pediatrics, MUSC, \textsuperscript{3}Public Health Sciences, MUSC, \textsuperscript{4}Neurology, MUSC.

Purpose: Research has found that a number of early developmental factors are associated with Autism Spectrum Disorder (ASD). Youth diagnosed with ASD have also been shown to have elevated rates of co-occurring medical and behavioral diagnoses; however, it is unclear how these comorbidities vary for youth at differing levels of risk for ASD. The aims of this study are to evaluate prenatal, birth, intervention, behavioral, developmental, and medical history for a sample of youth at varying levels of risk for ASD ($n = 292$). Methods: Data for this study comes from the South Carolina Children’s Educational Surveillance Study (SUCCESS), which is the largest ASD screening and assessment study that has been completed in the United States to date. School-aged children 8-11 years of age were identified as being at risk for ASD using the Social Communication Questionnaire (SCQ). Participants ($n = 292$) completed developmental assessments to determine ASD case status according to both DSM-IV-TR and DSM-5 criteria. Clinical best estimate diagnoses were based on lifetime history of ASD symptoms. Results: Among the 292 at-risk youth presenting for diagnostic evaluations, 52 met DSM-5 criteria for ASD. Most parents of children diagnosed with DSM-5 ASD (80.4%) indicated early concerns about their children’s development compared to only 38.5% of non-ASD youth. The most common comorbid diagnoses by parent report were ADHD (63.3%), Speech/Language Impairment (69.2%), learning disorders (49%) and anxiety disorder (32.7%). Eating problems, tics, and growth problems were also more prevalent in the ASD group. Child Behavior Checklist scores were elevated in the categories of Withdrawn/Depressed, Social Problems, Thought Problems, and Attention Problems for youth with DSM-5 ASD compared to scores of at-risk children. Only 36.5% of youth meeting DSM-5 criteria for ASD had ever received ABA, although 83% had received speech therapy in the past. Conclusion: Previous research has shown that a variety of early developmental and medical issues are associated with ASD, however it is not yet clear how these issues impact youth at varying levels of risk for ASD. Differences between the at-risk groups that did and did not meet criteria for ASD in this study have implications for improving clinical care and identifying early risk factors for ASD. From a behavioral standpoint, CBCL findings adhered to the ASD pattern previously demonstrated by Mazefsky et al. (2011), suggesting the questionnaire’s possible utility as a screening tool for ASD. Finally, low ABA participation in the group diagnosed with ASD suggested a need to
improve access to non-school based interventions in the catchment area. *MUSC Pediatrics; Autism Speaks 7793, 8408; NIH UL1TR001450; CDC RFA-DD10

**079 Abdominal Wall Reconstruction Using Component Separation, a Retrospective Review of a Single Institution**, Stewart A Bryant¹, Michaela Close¹, Brian Hill², Rohan Kambeyanda², Fernando Herrera²,¹*Medicine, MUSC, Plastic Surgery, MUSC.*

Intro: This study looked to review institutional performance of ventral hernia repair using component separation. This information may help to predict the likelihood of complication in future patients. Methods: Patient data from abdominal wall reconstructions using component separation were collected retrospectively from July, 2009 through December, 2015. These included patient BMI, pre-operative albumin, smoking history, comorbidities, additional procedures, length of surgery, and hospitalization, as well as post-operative complications. Results: During the study period, 196 component separations were well documented within the plastic surgery department. The average patient BMI was 32.6, pre-op albumin was 3.58 g/dL, and 18.4% were current smokers. Post-operative complications occurred in 16.8% of patients. Patients who developed post-operative complications had higher BMI’s (p-value 0.025) and lower albumin levels (p-value 0.050). Current smokers were more likely to develop complications (p-value 0.008). Over one third of patients had additional procedures at the time of the ventral hernia repair. The addition of a plastic surgery procedure did not increase the patient’s risk of developing a complication (p-value 0.25). Patients who developed complications had a significantly longer hospital course (p-value <0.001) but no difference in total operative time (p-value 0.975). Comorbidities did not positively correlate with complication rates (p-value 0.65) or hospital stay lengths (p-value 0.43). Conclusion: This study reviewed outcomes for patients undergoing component separation. This review helped to identify risk factors that increase the likelihood of post-operative complications and length of hospital stay. Additionally, this study suggests that comorbidities and additional procedures at the time of the hernia repair may not have as large of impact on complication risk as previously considered.

**080 Incidence of Sialoadenitis in Patients Undergoing Radioactive I131 Therapy: How Treating Physician and Dose Affect Outcomes and Chances of Salivary Gland Symptoms**, Tristan R Young¹, Leonie Gordon², Marques Bradshaw²,¹*COM, MUSC, Radiology, MUSC.*

Background: Radioactive I131 is a compound used in treatment of hyperthyroid patients and thyroid remnant ablation patients post thyroidectomy. The radioactivity of the iodine can damage other glands, such as the salivary glands. Our study investigated incidence of Sialoadenitis symptoms in patients undergoing these therapies, accounting for dose and treating physician. Methods: We did a retrospective data analysis of patients undergoing Radioactive I131 treatments between 2014 and 2016. Follow-up visits in charts were reviewed for symptoms of Sialoadenitis (dry mouth, facial swelling). We compared attending nuclear medicine physician and dose sizes used for symptom incidence and treatment effectiveness. Results: We found low incidence of Sialoadenitis in hyperthyroidism (1.5%) and remnant ablation/thyroid malignancy treatments (8.6%). For treating physician, there was one occurrence of dry mouth in hyperthyroidism patients, a 3.2% chance versus a 0% chance for the other two physicians. The two attendings performing ablation treatments both had low symptom incidence (12.9% and 5.7%). Incidence of unresolved hyperthyroidism was 8.7% and recurrent disease in cancer patients was 4.3%. Comparing dosing for hyperthyroidism treatments, a dose of <10 mc had unresolved hyperthyroidism incidence of 42.9% compared to unresolved hyperthyroidism incidence in 10-35 mc doses of 4.8%. We found no significant difference between treating physician and incidence of symptoms. Conclusions: We found no significant difference between treating physician and incidence of symptoms. Our biggest discovery involved dose sizing for hyperthyroidism treatment. While the sample size being treated with <10 mc for hyperthyroidism was small at 7, we believe that the increased risk of unresolved hyperthyroidism (42.9% to 4.8%) in 62 patients treated with 10-35 mc doses is notable compared to only a 1.6% increase in incidence of Sialoadenitis symptoms in patients in the larger dosing size. Because of this, we are recommending against using doses of less than 10 mc at our institution.

**081 Women in Pediatric Radiology: Does a Gender Disparity Exist?**, Holly Alford¹, Anil Rao²,¹*COM, MUSC, Pediatric Radiology, MUSC.*

Abstract not available.
082 Economic Impact of Community Sports Coverage By Outreach Athletic Trainers on a Health System: Implications for Program Growth and Sustainability, Jeannie F Buckner¹, Kirstie Hewson², Michael Barr³, Thomas Crawford⁴, Shane Woolf⁴, Harris Slone⁴; ¹COM, MUSC, ²CHP, MUSC, ³Sports Medicine, MUSC, ⁴Orthopaedics, MUSC.

Coverage of high school and community athletics integrated within a comprehensive sports medicine program is becoming the standard of care to optimize medical treatment of athletes. While the economic benefit of clinic-based athletic trainers (AT) has been clearly demonstrated, there has been little published on the benefit of outreach AT. The purpose of the present investigation is to examine the cost-effectiveness of outreach AT for both orthopaedic providers and the health system as a whole. Review of an electronic prospective database of the outreach AT referrals to our institution was conducted for a four-year fiscal period (July 2011-June 2015). New patients and patients with established care were identified; cumulative referred episodes of care and downstream revenue were recorded. New patients were defined as having no association with the hospital in the three years prior to the initial referral. All episodes of care were referred initially through the AT program; Data were recorded for the ensuing fiscal year of service. 8,570 total episodes of care resulted from 843 patients referred into the system, yielding $2,286,733 in total revenue. 187 new patients yielded 1,602 referred episodes of care. On average, each referred patient generated 10.17 episodes of care, with each episode generating an average of $267. Combining revenue from both professional-based and hospital-based care, $2712 per patient was generated through the AT program over the four-year period. Musculoskeletal revenue from hospital care and the orthopaedic revenue from professional care yielded $761,052 in total revenue, a 33% capture rate of the total profit of the program; the remaining 66% was distributed across the health system. Affiliation between high school and community sports teams and orthopaedists through outreach AT is an economically sustainable, symbiotic relationship. Additionally, there is not only a positive economic impact for providers, but a distinct benefit to the health system.

083 A Clinical and Radiographic Presentation of Lemierre’s Syndrome (postanginal Sepsis) in a Pediatric Patient, Colin M Johnson¹, Caroline M Swift², Meryle J Eklund³; ¹COM, MUSC, ²Radiology, MUSC, ³Pediatric Radiology, MUSC.

This case study is on a pediatric female patient with a rare form of leukodystrophy. The patient first presented to the ER with a seizure at 14 months old. She was otherwise healthy, and had no history of seizures. CT and MRI findings showed bilateral, symmetric frontal white matter changes consistent with a diagnosis of Alexander Disease. These findings included white matter cavitation, volume loss in the basal ganglia, and enhancing brainstem lesions. Here we present relevant images that were integral in making the diagnosis.

084 Brain Imaging in a Pediatric Patient With Alexander Disease, Lauren Jutras¹, Meryle Eklund²; ¹COM, MUSC, ²Radiology, MUSC.

This case study is on a pediatric female patient with a rare form of leukodystrophy. The patient first presented to the ER with a seizure at 14 months old. She was otherwise healthy, and had no history of seizures. CT and MRI findings showed bilateral, symmetric frontal white matter changes consistent with a diagnosis of Alexander Disease. These findings included white matter cavitation, volume loss in the basal ganglia, and enhancing brainstem lesions. Here we present relevant images that were integral in making the diagnosis.

085 Machine Learning Algorithm Versus Computational Fluid Dynamics Modeling for Coronary CT Angiography Derived Fractional Flow Reserve, Han Lin, Joseph Schoepf, Christian Tesche; Radiology, MUSC.

The purpose of this study is to compare a prototype of machine learning algorithm (cFFRML) with computational fluid dynamics modeling (cFFRCFD) for CCTA derived FFR determination. Their performance was compared and assessed against stenosis grading on CCTA and QCA for detecting hemodynamically significant lesions as defined by invasive FFR measurements. 67 coronary lesions in 58 patients (61±12 years, 64% male) who had undergone CCTA followed by invasive FFR were included in this single-center retrospective study. cFFR values were derived on-site from CCTA datasets using both cFFRCFD and cFFRML based on coronary artery anatomy and ventricular mass integrated with hemodynamic parameters. The cFFRML algorithm shows a higher specificity with no significant difference in diagnostic accuracy for detecting lesion-specific ischemia compared to the cFFRCFD approach. Both algorithms outperform CCTA and QCA in the detection of flow-limiting stenosis. Thus, on-site computational FFR derivation using the machine learning algorithm represents an alternative non-invasive approach for enhancing CCTA specificity in the detection of lesion-specific ischemia. NIH; MUSC Summer Health Professionals Research Program.
086 Hemiepiphysodeis for Tibia Vara with Percutaneous Transphyseal Screws, Mark A Pacult, Robert F Murphy, William R Barfield, James F Mooney III; Orthopedics, MUSC.

Introduction Tibia vara, also known as Blount disease, is an osteochondrosis that affects the medial physis of the proximal tibia. Patients commonly present with knee pain and a varus deformity about the knee. This disorder is frequently associated with morbid obesity and is progressive, leading to further alteration of the mechanical axis of the lower extremity, resulting in continued deformity and pain. Depending on the age of the affected patient, treatment options for tibia vara consist of osteotomy with internal or external fixation, tibial hemiepiphysial plateau elevation, and hemiepiphysodeis, or guided growth. The purpose of this study is to report on our experience with percutaneously placed transphyseal screws to correct deformity in children with Blount disease. Our hypothesis was that percutaneously placed transphyseal screws could be used to effectuate deformity correction with minimal blood loss, complications, or hardware failure. Methods We examined 10 pediatric patients with a total of 14 extremities with a varus deformity. Gender, diagnosis, hardware, BMI, and blood loss during surgery were obtained from electronic medical records data. Angular deformity measurements were obtained by measuring the mechanical axis deviation (MAD), medial proximal tibial angle (MPT), and mechanical lateral distal femoral angle (LDF) from radiographs before surgery and at most recent follow-up. Pre- and post-surgical measurements were compared by a paired samples t-test to assess statistical significance of effectuated changes. Results Mean age at surgery was 11.12±2.53 years. The mean change in MAD was -3.67±3.79 cm (p=0.002). MPT pre surgery was 81.19±6.88 degrees; post surgery was 90.14±5.28 degrees (p=0.001). LDF pre surgery was 92.76±3.81 degrees; post surgery was 91.20±4.84 degrees (p=0.256). Conclusions Literature suggests that more comorbidities and additional procedures at the time of the hernia repair may not have as large of an impact on complication risk as previously thought.

087 A Retrospective Review of Ventral Hernia Repairs with Component Separation, Michaela F Close1, Stewart Bryant1, Bryan Hill2, Rohan Kambeaya2, Fernando Herrera2, 1COM, MUSC, 2Plastic Surgery, MUSC.

In this study we evaluated our institution’s experience with component separation repair of ventral hernias. We conducted a retrospective review of all component separations for ventral hernia between July 2009 and December 2015. Recorded data included BMI, pre-operative albumin, smoking history, comorbidities, additional procedures, length of surgery and hospitalization, and post-operative complications. From a total of 196 component separations performed in this study period, post-operative complications developed in 16.8% of patients. Of all the patients, the average BMI was 32.6, pre-op albumin was 3.58, and 18.4% of patients were current smokers. We found that patients who developed a post-operative complication had a higher BMI (p-value 0.025) and lower albumin (p-value 0.050) compared to patients who did not develop complications, and current smokers were more likely to develop complications (p-value 0.008). Also, over one third of patients had additional procedures at the time of the ventral hernia repair. We found that the addition of a plastic surgery procedure did not increase the patient’s risk of developing a complication (p-value 0.25). Patients who developed complications had a significantly longer hospital course (p-value <0.001), but no difference in total operative time (p-value 0.975). Increased number of comorbidities did not statistically correlate with an increased complication rate (p-value 0.65) or length of hospital stay (p-value 0.43). Overall, we identified risk factors that increase the likelihood of post-operative complications and length of hospital stay. Understanding these risk factors could be pertinent to patient care. Additionally, this study suggests that more comorbidities and additional procedures at the time of the hernia repair may not have as large of an impact on complication risk as previously thought.

088 Correlating MR Neurography with Intraoperative Findings in Patients with Ulnar Neuropathy, Philip M Coffey1, Eric Bass2, Komal Sharma3, Abhay Varma4, Maria V Spampinato5, 1COM, MUSC, 2Neuroradiology, MUSC, 3Radiation Oncology, MUSC, 4Neurosurgery, MUSC.

The present standard of care for the diagnosis of ulnar nerve impingement includes clinical presentation and nerve conduction studies. Magnetic Resonance Neurography (MRN) has historically only been used in a supportive role for cases with additional complications, but it has the potential to provide useful information for presurgical planning. Recent research has shown a strong correlation between ulnar nerve impingement and both increased T2 signal intensity and increased cross-sectional nerve area on T1 scans. Our study examines the utility of MRN as the primary diagnostic modality alongside the clinical exam by
correlating MRN findings with intraoperative findings. Eighteen patients who underwent surgery for ulnar neuropathy who also had MRN preoperatively were retrospectively selected for the study. These patients were grouped according to whether they were found to have ulnar nerve compression in the cubital tunnel or in the region proximal to it intraoperatively. Our results show significantly higher T2 signal-to-noise ratio and T1 area correlating with the area of compression found intraoperatively. These results suggest that MRN can be used to identify whether the patient has ulnar nerve impingement and specifically where along the course of the nerve that impingement is most pronounced. This information can be valuable to the surgeon in preoperative planning and can also be useful for patient education. Furthermore, MRN is a painless study, while nerve conduction studies have been shown to be invasive, painful, and impractical in some patients. Our study suggests that MRN may be the most appropriate diagnostic modality for patients with ulnar neuropathy in today’s practice.

89 Early Teenage Type 1 Diabetic Females Report Parental Stress, Abby T Lewis\(^1\), Kimberly Lewis\(^2\), Remberto Paulo\(^2\), Michele Hutchison\(^2\), Deborah Bowlby\(^2\); \(^1\)COM, MUSC, \(^2\)Pediatric Endocrinology, MUSC.

Stress is thought to contribute to poor management of treatment regimens for adolescent T1D patients (2). The American Diabetes Association (ADA) highlights stress as one of the main factors in achieving glycemic control, particularly in adolescent T1D patients (3). This study was designed to examine the primary diabetes related stressors in adolescent T1D patients. A retrospective chart review was conducted for 87 patients aged 11-18 years old. The patients’ demographics, diabetes information, and other relevant healthcare information were collected. Responses to the Response to Stress Questionnaire developed by the Stress and Coping Research Lab at Vanderbilt University were also collected for each patient. The average age was 15.1 ± 1.8 years, with 55% females, and 54% Caucasian. The average duration of diabetes was 5.56 ± 4.29 years and the average A1c was 8.7 ± 1.81%. 25% of the patients had significant concomitant chronic illnesses with the most prevalent being asthma (10%), microalbuminuria (4.5%), and celiac disease (3.5%). 25% of the patients had psychiatric diagnoses. 11.5% of patients were diagnosed with ADHD, 8% with anxiety disorder, and 7% with depression. 30% of the patients lived in single parent households, and 6% had open cases with the Department of Social Services (DSS). Overall, the top stressors, in order, for the entire cohort were “Parents bugging me about taking care of myself”, “Dealing with diabetes care (diet, supplies, etc)”, and “Seeing my family worry about me”. The most stressed patients were African American females age 11-13 with A1c values at goal (below 7.5 %), and a short duration of diabetes (less than 3 years). MUSC Student Health Professionals Program

90 Rural-Urban Differences in Quality of Care Indicators Among Adults with Diabetes, Darian Vernon\(^1\), Kinfe Bishu\(^2\), Joni Williams\(^2\), Rebekah Walker\(^2\), Leonard Egede\(^2\); \(^1\)Medicine, MUSC, \(^2\)Ralph H. Johnson VA Medical Center.

Background: Evidence suggests the prevalence of diabetes in adults living in rural areas is higher than that of those living in urban areas. Disparities in quality of care (QoC) indicators such as hemoglobin A1c testing, examining feet, getting eyes dilated, checking blood pressure, and visiting the doctor annually have been shown to be less prevalent in patients with diabetes residing in rural versus urban areas. Therefore, the aim of this study was to assess differences in QoC indicators based on rural/urban status in a sample of adults with diabetes.

Methods: Data of 17,702 adults (aged ≥18 years) from the 2002-2011 Medical Expenditure Panel Survey Household Component (MEPS-HC) was used to examine the association between QoC indicators and Metropolitan Statistical Area (MSA) status. Five binary indicators were used as dependent variables to measure QoC. MSA was included as the primary independent variable to indicate whether or not the reporting unit was found in an MSA at the end of the year. Sample demographics by MSA status were assessed. Unadjusted analyses were computed for descriptive statistics and proportions of QoC indicators over time. Logistic regression evaluated associations between QoC indicators and MSA status, while controlling for confounders. Results: Overall, 80% of the sample resided in an MSA, approximately 65% of the sample was NHW, 15% was NHB, 14% was Hispanic, and 7% identified with other races and ethnicities. Thirteen percent of the sample was 18-44 years of age, 47% was 45-64 years of age, and 40% was 65 years of age and older. Adjusted logistic regression models showed residents living in an MSA were 22% more likely to have their feet checked during the year (Odds ratio (OR)=1.22; 95% Confidence Interval (CI) 1.09, 1.38; p=0.001) compared to residents living in a non-MSA. Similarly, MSA residents were 15% more likely to have their eyes dilated in a given year (OR 1.15; 95% CI 1.03, 1.30; p=0.017) compared to non-MSA residents. Conclusions: In this sample of adults with diabetes, urban residents were more likely to have their feet checked and their eyes dilated during a given year, when adjusting for relevant confounders. These findings add to the body of evidence showing disparate care between rural and urban residents and stress the need for equitable care to all adults with diabetes,
regardless of residence, to stave off the debilitating effects of uncontrolled diabetes. Additional research is needed to explore the impact of these differences further. NIH 5T35DK007431

91 Development of Cost Effective Universal Surveillance Program For Carbapenem-Resistant Enterobacteriaceae, Albalawi Fadyah¹, Michael G Schmidt¹, Lisa Steed²; ¹Microbiology and Immunology, MUSC, ²Pathology & Laboratory Medicine.

Abstract not available.

092 Effects of Glycation on the Promotion of Prostate Cancer, Dion A Foster; COM, MUSC.

Abstract not available.

093 Assessing Feasibility: Pastoral Care in the Management of Hypertension, Toni M Stevenson, Daniel Lackland; COM, MUSC.

Abstract Objective: My aim was to work with church leadership to assess their willingness to adopt a program to utilize home blood pressure monitors and Heart360 to increase blood pressure awareness. By receiving the support of the pastor first, I hoped to transition to working with members of their respective congregations. I hypothesized that the pastor would be more than willing to adopt the program. Methods: The initial approach was to bring three local pastors together to discuss implementing a home blood pressure monitoring program in their churches. This did not go as planned. Instead of attempting to implement the program right away, we decided to meet with each pastor individually to gain a better understating of the barriers that prevented him or her from participating. Results: Though we were able to contact each of the pastors we were unable to meet with them to start the program. As a result of the lack of progress, the aim was changed to grasp the reasons why pastors were so difficult to reach. Once this is accomplished a protocol will be developed to assist future researchers when attempting to access churches via pastoral support. Conclusions: More research is needed before it can be determined if a program utilizing home blood pressure monitoring, Heart360, and church leadership is a successful way to increase blood pressure awareness. Future goals are to assess barriers to pastoral involvement. Keywords: hypertension, pastoral care, Heart360

094 The Effect of Chemogenetic Activation of the Prelimbic Cortex on Relapse to Cocaine Seeking in Rats, Calvin J Hu¹, Ben M Siemsen², Giuseppe Giannotti², Jacqueline F McGinty²; ¹COM, MUSC, ²Department of Neuroscience, MUSC.

Relapse is a major clinical obstacle in the treatment of cocaine addiction. Preclinical studies using rodent models have shown that the prelimbic (PrL) cortex plays a critical role in relapse. Previously, our lab has shown that two hours after cocaine self-administration (SA) there is a transient dephosphorylation of several glutamatergic signaling effectors including ERK and NMDA receptors, GluN2A/B, with a parallel increase in STriatal-Enriched tyrosine Phosphatase (STEP) activity, in the PrL cortex. These experiments went on to show the importance of these phosphoprotein disturbances in relapse. Importantly, intra-PrL cortex inhibition of STEP immediately after SA suppresses relapse after abstinence, likely by preventing the cocaine-induced dephosphorylation events occurring during early withdrawal. Using Gq-DREADDS (Designer Receptors Exclusively Activated by Designer Drugs-hM3Dq), we hypothesized that counteracting the effect of STEP in the PrL cortex during early withdrawal by stimulating glutamatergic neurons will suppress relapse following abstinence and extinction training. Twenty-four rats were stereotaxically microinjected in the PrL cortex with either an AAV encoding hM3Dq or eGFP driven by the CaMKIIa promoter, and received a chronic indwelling IV catheter. Immediately following 12-14 cocaine SA sessions, CNO (3 mg/kg, i.p.) was injected. Rats were then exposed to 6 days of homecage abstinence, followed by a post-abstinence (PA) relapse test under extinction conditions, further extinction to criterion, and cue- and cocaine prime-induced reinstatement tests. Preliminary results indicate a trend towards decreased active lever pressing during the PA test in hM3Dq rats. There is an additional trend towards reduced active lever pressing during the cue-induced reinstatement test. Additional cue and cocaine prime tests are ongoing. These preliminary results suggest that stimulating glutamatergic neurons in the PrL cortex during early abstinence is sufficient to suppress relapse following abstinence and extinction training. This may be due to increasing ERK phosphorylation, which future experiments will determine. NIH R01DA033479, F31DA041021, R25DA020537

095 Effects of Oxytocin Following Traumatic Stress on Methamphetamine Seeking in Female Rats, Catherine M Svetcharnik¹, Casey E O'Neill², Jacqueline F
096 Individual Variability in Brain Response to Drug Cues Predicts RTMS Treatment Efficacy, Norvel W Brown, Tonisha E Keaney-Ramos, Logan T Dowdle, Oliver Mithoefer, William Devries, Mark S George, Colleen A Hanlon; Psychiatry and Behavioral Sciences, MUSC.

BACKGROUND: Cue-induced craving is a primary cause of relapse in treatment-seeking cocaine users. Exposure to cocaine cues promotes reactivity in brain regions associated with motivation and reward, such as the medial prefrontal cortex (mPFC). Consequently, an innovative new treatment strategy is to attenuate cue reactivity by inhibiting the mPFC with continuous theta burst stimulation (cTBS). This project’s goal was to explore baseline drug-cue reactivity as a potential biomarker for rTMS treatment response. METHOD: Twenty-four cocaine-dependent individuals completed MRI tasks Before and After Real cTBS and Before and After Sham cTBS. Two specific research questions were evaluated: Is brain response to cocaine cues stable over time and does rTMS differentially affect individuals with varying cue reactivity? Participants were split into “cue-reactive” and “cue-nonreactive” cohorts based on the presence or absence of reactivity to drug cues, which was determined by general linear modeling (GLM). Each primary research question was evaluated with secondary GLM models as well as binarized classification based on the volume of the significant clusters from the GLM analysis (p<0.05 uncorrected clusters). RESULTS: Fourteen participants were cue reactive in the Before Real cTBS condition while eleven were cue nonreactive. There was no significant difference in brain response to drug cues between Visit 1 and Visit 2. Among cue-reactive individuals, there was a significant decrease in brain response to drug cues following real cTBS. This was not significant following Sham cTBS. Conversely, among cue-nonreactive participants, there was a significant increase in brain response to drug cues following real cTBS. CONCLUSION: These results suggest that baseline levels of brain activity evoked by cocaine cues are stable biomarkers that influence the directional effects of cTBS on the brain. Specifically, among individuals that are cue-reactive, cTBS decreases cortical reactivity to cues; yet in individuals that are cue-nonreactive, cTBS increases cortical reactivity to cues. NIH R25DA020537, P50AA010761, R01DA336617

097 The Ethnography of Novel Drugs of Abuse At Two Outdoor Music Festivals in Colorado, Alexis L Smith1, Jacob Fox2, Andrew Monte3; 1COM, MUSC, 2School of Medicine, University of Colorado, 3Emergency Medicine, University of Colorado.

Drugs of abuse (DOA) are widely used in the United States and are ubiquitous at music festivals. Festival attendees are high-risk for novel psychoactive substance (NPS) use, which is becoming more prevalent worldwide. No U.S. studies have employed an ethnographic approach to investigate the etiology of both traditional DOA and NPS use amongst this population. The objective of this study was to improve understanding of the demographic using NPS and DOA in multiple domains with focus on users’ individual experiences and insight. We conducted an ethnographic survey of subjects at Sonic Bloom and Arie music festivals in Colorado (summer 2015-2016). The anonymous, multi-domain ethnographic survey documented knowledge, beliefs, practices, and attitudes underlying DOA use amongst festival attendees. We gathered demographic information, summarized responses using descriptive statistics, and determined correlations between DOA/NPS use and demographic variables. We enrolled 171 participants, age 18 or older, who endorsed DOA use at the festivals. The study cohort, primarily experienced DOA users, perceived minimal risks associated with use (33.3%) and attest to normalization and availability of DOA at music festivals (68.4%). Participants popularly cited empathogenic, entactogenic, and entheogenic effects of DOA as their primary motivations for use. NPS use was endorsed by 42.4% of survey respondents, all of whom identified as experienced DOA users. Lifetime NPS use was higher in males (OR=3.00, p<0.005) and respondents with a history of depression (OR=2.52, p<0.05), prescription drug misuse (OR=2.84, p<0.005), alcohol dependence (OR=4.14, p<0.001), or chemical dependency treatment (OR=2.89, p<0.05). Our data suggests that DOA use was prevalent among males, Caucasians, and those with some college education. Participant knowledge of DOA/NPS was limited. Attitudes focused on substances reducing social inhibition and stimulatory effects. Beliefs surrounded risks of drug adulteration. Practices revealed that motivations were primarily to enhance participants’ experience. Reported effects varied, but were consistent within drug repertoire.

098 Complement Peptide C3a Induces Non-lytic ATP Efflux, Plasma Membrane Depolarization, and Candida Glabrata Cell Death, Jessica Dinh1, Silvia Vaena2, Caroline
Background: APPE rotations are designed to improve and test a pharmacy student’s ability to provide pharmaceutical care, while ultimately determining if the student has achieved the competencies required to practice pharmacy. Various opportunities are available throughout the pharmacy curriculum to practice clinical skills in preparation for APPE rotations. During the spring semester of the P3 year a new course (SCCP 757) was made available to students that allowed them to interact with real patients on an inter-professional team. Objective: To determine if completing course SCCP 757 prior to APPE rotations affected students’ perception on their preparedness for APPE rotations. Methods: An anonymous survey was sent via email to the third year class and promptly closed the evening before the initiation of APPE rotations. The survey included 11 questions; Question #1 determined participation in the course and the remaining assessed the student’s confidence in various competencies. Results: Survey response rate was 70%. The mean responses of the student’s that participated in the SCCP 757 (group 1) tended to be higher than those of the students that did not (group2). The difference between the both groups was statistically significant for questions #2 (How prepared do you feel for APPE (4th) year rotation?) and #5 (I am confident in my ability to perform a medication reconciliation for a patient), p=0.015 and p=0.036 respectively. Only one question that had a lower average response in group 1, but this difference was not significant. Conclusions: Students that participated in this elective course seemed to feel better prepared in the competencies investigated by this survey. This course may benefit students by exposing them to direct patient care and interdisciplinary teams, ultimately better preparing students for APPE rotations.

100 AboutFace: Pilot Study of a Digital Storytelling Resource Used to Reduce Stigma and Increase Treatment-Seeking Behavior Among Veterans, Danna L Cook¹, Jessica L Hamblen², Brian E Bunnell¹, Tatiana M Davidson¹, Kenneth J Ruggiero¹, ¹Nursing, MUSC, ²Oral Health Sciences, MUSC.

Evidence-based treatments are widely available to Veterans, but rates of treatment seeking remain low and premature dropout is common. Novel, scalable and sustainable solutions are needed to improve treatment seeking and address key access-to-care barriers such as stigma. Peer education via digital storytelling may be an efficient way to address potential treatment-seeking barriers. AboutFace is a peer education resource developed by the National Center for PTSD. Investigation of the site’s usability and feasibility are necessary to examine its potential to affect treatment seeking and stigma. Usability testing was conducted with 20 treatment-referred Veterans at the Ralph H. Johnson VAMC. Veterans navigated AboutFace for approximately 60 minutes. They completed a thematic, semi-structured interview and the WAMMI. Interviews were recorded, transcribed, and coded for common themes (e.g., general satisfaction). Analysis of the interrelations between these themes and Veteran characteristics (e.g., age, race) were also conducted to improve the site with sensitivity to varying demographics. Reactions to AboutFace were primarily favorable. The majority of participants strongly agreed that the website seems logical (85%) and helps users find what they are looking for (65%). The participants offered suggestions for improvement, such as adding video diaries of Veterans with more diverse experiences (e.g., different squads) and upgrading the layout (e.g., more visible hyperlinks). Digital storytelling is a novel approach that may be useful in addressing stigma and readiness for mental health treatment. Users from the target population should inform development to optimize usefulness, relevance, and reach. We also recently launched a feasibility trial with 60 Veterans randomized to usual care (e.g., educational print material) vs. usual care plus AboutFace. The feasibility trial will set the stage for a large RCT to examine whether a brief intervention featuring AboutFace can improve Veterans’ likelihood of seeking and completing mental health treatment. NIH I21HX001729

101 Fournier’s Gangrene: Preoperative Predictors of Reconstruction, Morbidity And Survival, Bill Rawls, Nima Baradaran, Lindsay Cox, Eric Rovner, Urology, MUSC.

Introduction: Fournier’s gangrene (FG) is a bacterial infection of the genital, perineal or rectal area that leads to necrosis of the overlying skin requiring urgent debridement. The aim of the current study is to retrospectively analyze factors associated with morbidity, mortality and future reconstruction of FG. Methods: After IRB approval, patients diagnosed with
FG who underwent surgical debridement at our institution were identified. Results: Thirty patients underwent surgical debridement of FG from 2005-2016 at a median age of 54 (range 37-86). The most common associated comorbidities include diabetes (57%), end-stage renal disease (17%), and malignancy (13%). A total of 60% and 68% of patients had body mass index over 25 and hemoglobin A1c over 7, respectively. Sources of infection included skin (14 patients), anorectal (7), trauma (4), genitourinary (2) and unknown (3). Two patients had genitourinary abnormalities associated with development of FG: 1 urethro-cutaneous fistula and 1 deep penile abscess causing urinary obstruction. Urinary diversion was achieved using foley catheter (24 patients), suprapubic tube (4), urterosigmoidostomy (1) and perineal urethrostomy (1). Most commonly isolated wound organisms were staphylococcus (28%), streptococcus (20%), prevotella (8%) and actinomyces (8%). A total of 67% patients required intensive care until (ICU) admission for median 6 days and 2 days of vasopressor support. Fifty percent underwent reconstruction after median 1.4 months (range 0.4-7.5): 27% split/full thickness skin graft, 13% fasciocutaneous flap and 13% scrotal advancement flap. Two patients required penectomy. One-month mortality was 10% (3 deaths), which increased to 20% (6 deaths) within 3 years. FGSI over 6 was associated with the need for multiple debridements and ICU stay (p<0.05). FGSI>8 and CCI>5 were significant predictors of 1-year mortality (p<0.05). Conclusions: FGSI and CCI are predictors of 1-year mortality, need for multiple debridements, and ICU stay.

102 Quality of Diabetic Care Among Recent Immigrants to the United States, Romik Srivastava, Kinfe Bishu, Rabekah Walker, Joni Williams, Leonard Egede; Center for Health Disparities, MUSC.

The relationship between diabetes and immigration status in the United States has yet to have been extensively studied, especially with the quality of care for diabetic immigrants. Both the quality of care of diabetes and the impact of immigration on the healthcare system, however, have been studied. In 2012 the total economic cost of diabetes was $245 billion. The odds of comorbidity are greater for individuals with diabetes. The quality of diabetes care needs improvement on all levels of healthcare. One of the differences in quality of care has been attributed to health disparities. The immigration system has made access to healthcare difficult for recent immigrants. Low income immigrants are more likely than low income citizens to lack access to care. For all immigrants, language barriers exist and make patient-provider communication difficult. For undocumented immigrants, fear of deportation prevents them from going to a hospital. For Asian and Latino immigrants, loyalty to family has been cited as a barrier to patient-provider trust. The relationship between immigration and diabetes was the objective of this study, and was measured in terms of the quality of care variables that are delivered for diabetes: the dilated eye exam, foot exam, A1c test, an annual doctor’s visit, and having blood pressure checked. It was hypothesized that all the quality of care variables were significantly lower in diabetic immigrants. The results showed that, after adjusting for sociodemographic factors, that the only quality of care measure that was significantly correlated with diabetes in recent immigrants was having blood pressure checked; recent immigrants were less likely to have had their blood pressure checked. Improvements in clinical applications, research, and policy must be taken in order to improve this measure. MUSC Summer Health Professionals Program

103 Induction of Primary Tumor in Nude Mice Via Injection of Modified DsRed-expressing Cal27 Cells, Jeffrey P Langdon, Andrew Jakymiw, Haiwen Zhang; Center for Oral Health Research, MUSC.

The development of new treatments and diagnostics for oral cancer requires oral cancer model systems. The goal of this experiment was to confirm the tumorigenicity of oral cancer model DsRed-expressing Cal27 cells developed by Bais et al. This was accomplished by producing tumor xenografts in athymic mice that exhibited fluorescence under DsRed settings. The fluorescence of the Cal27 DsRed cells was confirmed via fluorescence microscopy. The fluorescence of tumors in live mice was demonstrated by in-vivo and ex-vivo fluorescence imaging. Histology confirmed the presence of tumor cells and fluorescence microscopy of tongue sections characterized the fluorescence generated to the tumor cells. The addition of matrigel matrix to cell injections did not show a benefit regarding tumor formation or growth. T-COHR

104 The Role of Scleraxis in Fibroblasts, Charles A Johnson1, Andrea Nillas2, Titus A Reaves2; 1COM, MUSC, 2Regenerative Medicine and Cell Biology, MUSC.

Scleraxis is a transcription factor in the BHLH family originally shown to regulate the development of embryonic tissue into tendon and bone—suggesting a link to collagen production and release. Recently, scleraxis has been shown to play a role in the development cardiac fibrosis (resulting from aberrant activation of fibroblasts). Fibrosis can occur in several organs and is characterized by over-active fibroblasts
that produce abnormal collagen, which can lead to prolonged disease. Keloid Disease (KD) is a relatively common fibroproliferative disorder with an unknown etiology occurring exclusively in human skin. KD involves the differentiation of dermal fibroblast into keloid fibroblasts and typically occurs following a cutaneous insult in the genetically susceptible. Intestinal fibrosis is a complication (approximately 20-25% of patients diagnosed) of inflammatory Bowel Disease (IBD) and is characterized by dysregulated production of collagen from fibroblasts that results in excessive contraction of intestinal tissue and intestinal strictures. We hypothesize that scleraxis is expressed by different fibroblasts (dermal, keloid, and intestine) and can modify the activation of such fibroblasts. Transfection (siRNA) studies show that when scleraxis is reduced in fibroblasts there is an increase in attachment to fibrinogen (CD11b ligand). Exposure of each fibroblast to cytokines does not appear to regulate expression of scleraxis. It also appears that scleraxis has a link to CD11b, which is expressed by fibroblasts. These results highlight scleraxis as a target molecule in the treatment of diseases involving over-activation of fibroblasts. NIH T35DK007431

105 The Effect of Ceramide Analogs on Human Head and Neck Squamous Cell Carcinomas. Sumin Han1, Besim Ogretmen2; 1Dentistry, MUSC, 2Cancer, MUSC.

Abstract not available.

106 Novel Anti-Inflammatory Nanoparticle Scaffolds for Periodontal Treatment. Paul J Han1, Michael S Valerio1, Joy Kirkpaptrick1, Ian Hale2, Frank Alexis2, Keith L Kirkwood1; 1Oral Health Sciences, MUSC, 2Bioengineering, Clemson.

Periodontal disease, also called periodontitis, is the inflammation and erosion of supporting bone structures surrounding dentition. An estimated 64.7 million Americans were diagnosed with periodontitis in 2009. There are many conventional therapies to treat periodontal diseases such as root planing, scaling, or surgical debridement. However, adjuvant therapies can be used to help modulate the host response. The MAP kinase pathway is a major signaling pathway that leads to cytokine production and inflammation. This pathway can be blocked by MAP kinase phosphatases (MKP). Auranofin has been shown to induce MKP-1 expression. Our vehicle for drug delivery was biodegradable nanoparticles. It was hypothesized that the use of Auranofin loaded into biodegradable nanoparticles decreases the level of bacterial-induced inflammation and bone loss in vivo. Bone volume fraction analysis showed that bone loss and inflammation was attenuated by high doses of Auranofin attached to nanoparticles. However, to support these findings, histological scorings are still undergoing at this time. NIH P30 GM103331, T32 DE017551, 5R25 DE022677, R01DE021423, R01DE018290, GSK IADR Innovation in Oral Health Care Award; T-COHR

107 Uninsured Patients: A Distinct Subpopulation of Breast Cancer Patients, David Morrow1, Shai White-Gilbertson2, Heather Collins3, Madelene Lewis4; 1COM, MUSC, 2Cancer Registry, MUSC, 3Center for Biomedical Imaging, MUSC, 4Radiology, MUSC.

Abstract not available.

108 Incidence and Impact of Adverse Drug Events Contributing to Hospital Readmissions in Adult Kidney Transplant Recipients, Michelle Arms1, John W McGillicuddy2, Satish N Nadig2, David J Taber2; 1COM, MUSC, 2Transplant Surgery, MUSC.

Introduction: Long-term graft survival in kidney transplant recipients remains sub-optimal. The impact of adverse drug events (ADEs) contributing to hospitalization and as a predominant risk factor for late graft loss has not been well-studied in this population. Methods: This was a retrospective longitudinal cohort study of adult solitary kidney recipients transplanted between 2005 and 2010 with follow up through May 2016. Patients were divided into three cohorts: no readmissions, readmissions not due to an ADE, and ADEs contributing to readmissions. Medication regimens and progress notes were utilized to assess for ADE contribution to hospitalization using validated methodology. The rationale of the ADE contribution to the readmission was categorized in terms of probability, preventability, and severity. Predominant readmission etiologies across time, from 2005 to 2013 were compared to assess for temporal trends. Results: 837 patients with 963 hospital readmissions were included in the study with a total follow up of 3,734 patient years (26 admissions per 100 patient years). Of the 837 patients, 47.9% had at least one hospital readmission during follow up; 65.0% of readmissions were deemed as having an ADE contribute to the readmission. The predominant causes of readmissions related to ADEs included non-opportunistic infections (39.6%),...
opportunistic infections (10.5%), acute rejection (18.1%) and acute kidney injury not related to rejection or infection (11.8%). From 2005 to 2013, readmissions over time due to under-immunosuppression significantly decreased at a rate of -1.6% per year, while readmission due to over-immunosuppression, as indicated by infection, cancer or cytopenias, significantly increased at a rate of 2.1% increase per year (difference 3.7%, p=0.026, see Figure 1). Significant risk factors for readmission related to an ADE included African American race, increased time on dialysis, increased time on waitlist and increased kidney donor profile index (KDPI). Protective factors included only being the recipient of a living donor kidney. Delayed graft function, acute rejection, serum creatinine, graft loss and death were all significantly higher in those with an ADE that contributed to a readmission, as compared to those with a readmission not due to an ADE or those that did not have a readmission during follow-up (p<0.05, see Table 1). Conclusion: These results provide novel evidence demonstrating that ADEs contribute to a substantial number of readmissions after kidney transplant, which significantly increases the risk of graft loss and death, as compared to those readmitted for other causes or those without readmissions after transplant. NIH T35 DK007431

109 Effect of Matching or Overconstraining Knee Laxity During Anterior Cruciate Ligament Reconstruction on Knee Osteoarthritis and Clinical Outcomes: A Randomized Controlled Trial With 84-Month Follow-up. Matthew R Akelman1, Paul D Fadale2, Michael J Hulstyn2, Robert M Shalvoy2, Arlene Garcia2, Gary J Badge2, Jeffrey Duryea3, Fleming C Braden2; 1COM, MUSC, 2Orthopaedics, Brown University, 3Radiology, Harvard University.

ACL reconstruction is commonly performed to restore joint function after ACL injury. The “initial graft tension” applied at the time of graft fixation modulates joint contact mechanics, which in turn may promote knee arthrosis. The objective of this randomized controlled trial was to compare outcomes between two initial graft tension cohorts and a matched control group. The two laxity-based tension protocols under study were: 1) to restore normal anteroposterior (AP) laxity at the time of surgery relative to the contralateral uninjured knee (“low-tension” group, n=46), or 2) to over-constraining AP laxity by 2mm (“high-tension” group, n=44). All outcomes were compared to a matched control group (n=35), and measured pre-operatively and out to 84 months post-op. AP laxity values for both tension groups were not significantly different from each other at 84 months (P=.83). However, there was a significant difference in laxity between the high-tension group and the control group (P<.01). The IKDC scores (P<.01) and 1-leg hop for distance (P<.02) for both tension groups was significantly worse (P<.01) than the control group. Four of five low-tension KOOS scores were significantly less than the control group (P<.03), while two of five high-tension group KOOS scores were significantly less (P<.04) than the control group. Four of the eight SF-36 health domains for the low-tension group scored significantly worse than the control (P<.05). Mean differences in the OARSI scores were significantly different between the two tension groups and control group (P<.02). The mean WORM score for the low-tension group was greater than the control group (P<.01) but not between the high tension and control groups (P=.17). The outcomes for both high- and low-tension groups are not equivalent to a matched control group 7 years post-operatively, and suggest that knee arthrosis is progressing 7-years post-operatively. NIH R01 AR047910

110 Testing the Antimicrobial Effects of Copper Nanoparticles on Enterococcus Faecalis in an Endodontic Treatment Model, Andrew C Lane1, Monica Estes1, Hubert H Attaway2, Sarah E Fairey2, Michael G Schmidt2; 1Dental Medicine, MUSC, 2Mircobiology and Immunology, MUSC.

Enterococcus faecalis is a known to be prevalent in the root environment of a tooth, which has undergone root canal treatment. Chemo-mechanical debridement with subsequent disinfection is the standard of care for endodontic therapy. Yet, E. faecalis is resistant to the present day treatment protocol. Currently, no antimicrobial endodontic sealers for root canal treatment are on the market. Some sealers display antimicrobial properties in vitro but do not carry a label indicating their antimicrobial properties. Bacterial invasion of the root of a tooth usually leads to endodontic treatment or removal. Here we report on the supplementation of an endodontic sealer using a non-leaching and continuously surface- active antimicrobial agent in the form of CuI nanoparticles. Methods: Copper iodide (CuI) nanoparticles were incorporated into ThermaSeal® Plus Root Canal Sealer (Dentsply) to make small discs via ultrasonic mixing achieving final concentrations of 10, 25, 50, 100 mg per 1ml of sealer. Assessment of antimicrobial activity of the sealer infused disc was accomplished by inoculating the surface of each disk with 100 µl of a defined viable concentration of 1.0 x 108 cells/ml of anaerobically grown Enterococcus faecalis (ATCC 29212). The inoculated disks were incubated anaerobically at 37°C for 4-18 hours. Antimicrobial efficacy was determined by calculating the difference between the concentration
of cells placed at time zero and the concentration observed on each disk at 4-18 hours. T-COHR

111 Characterizing the Existence of Hematopoietic Stem Cell-derived Osteoblasts in Murine Calvaria, Arjun R Majumdar, Meenal Mehrrotra, Uday Baliga, Inhong Kang; Pathology, MUSC.

Skeletal bone is unique among all tissues in that it is continually remodeled throughout life. This requires the recruitment and proliferation of stem cells with capacity to differentiate to functional osteoblasts. Current dogma suggests that osteoblasts are derived from the bone marrow mesenchymal stem cells. But we have previously demonstrated that hematopoietic stem cells (HSC) give rise to osteoblasts in long bone as well as non-stabilized fracture repair. But presence of HSC-derived cells has not been demonstrated in calvaria, which is a flat bone rich in osteoprogenitor cells. We therefore hypothesize that there is a HSC-derived osteoblast population in the calvaria which can contribute to bone homeostasis (by their ability to lay down mineral). We used CD45, which is marker for hematopoietic cells, to identify HSC-derived osteoblasts in the calvaria. Analysis of the paraffin sections of the calvaria demonstrates the presence of numerous CD45+ osteoblasts and osteocytes. This was confirmed by flow cytometry of calvarial cell cultures which shows about 40% of CD45+ cells. To confirm functionality of these osteoblasts, sorted CD45+ calvarial osteoblasts were grown in differentiation media for 21 days and alkaline phosphatase (ALP) staining (enzyme present in osteoblasts; identifies osteoblasts) and alizarin red (AR) staining (detects calcium ion deposits in mineralizing cultures) was done. Positive ALP and AR staining was visualized in the CD45+ calvarial cell cultures, indicating that these are functional osteoblasts laying down mineral. These studies will be innovative as a HSC-derived osteoblastic population in the calvaria has not been described before. These studies are significant because it can be used as a therapy, with or without the growth factors, for various bone injuries such as calvarial defects and other craniomaxillofacial bone defects. This study is a useful initial step in defining a novel population of osteoblasts in the calvaria. MUSC Pathology and Laboratory Medicine; NIH R01AR066094, R03DE024536

112 Consumption of Contaminated Fish in the Great Lakes Region and Breast Cancer Risk: New York State Anglers Cohort Study (NYSACS), Ariel R Christensen1, Matthew Bonner2, Jeff Korte1, Sophia Sourlis1, Matthew Bozigar1, John Vena1, 1Public Health Sciences, MUSC, 2Epidemiology and Environmental Health, University of Buffalo.

Abstract not available.

113 Long-Term Outcomes Of Hypertrophic Cardiomyopathy Patients Following Alcohol Septal Ablation Exhibit No Improvement In BMI Despite Improved Heart Function And Returning To General Population Mortality, Billy J Mullinax1, Akayla Ford1, Amy Wahlquist2, Valerian Fernandes3, 1COM, MUSC, 2Biostatistics and Epidemiology, MUSC, 3Cardiology, Ralph H. Johnson VA Medical Center.

Patients with hypertrophic cardiomyopathy (HOCM) traditionally relied on a septal myectomy procedure to resolve their left ventricular outflow tract (LVOT) gradient. More recently, however, the less invasive alcohol septal ablation (ASA) catheterization procedure has been increasingly utilized. In our retrospective study of 579 HOCM patients (aged 53 ± 16) there is a total of 659 ASA procedures leading to a 12% redo rate, 6.9% permanent pacemaker placement (PPM) rate, and 1% procedural death rate. We have a subset of 272 (aged 53.4 ± 16.2) patients with 10.9 (± 3.7) years of follow-up (FU) data that displayed no significant change in BMI from the date of surgery (29.8 ± 6.4) to their post-surgical check up (30.5 ± 7.0), which was also noted in the BMI of the remaining 307 patients (aged 59.6 ± 13.7) from the date of surgery (29.9 ± 6.4) to their post-surgical check-up (30.6 ± 7.1). These patients did exhibit decreased unprovoked LVOT and increased treadmill time following ASA. The long-term data shows that the ASA HOCM patients have a mortality rate for 5, 10, and 15 years of 0.086, 0.153, and 0.162, respectively. The mortality rates were compared to age, gender, and race matched controls using a LogRank test that showed no significant difference in the standardized mortality ratio (SMR) of the ASA patients (SMR=.918 overall and SMR=1.026 in >10 FU cohort) and the control population (p=.412 overall and p=.836 in >10 FU cohort). Therefore, improvement in HOCM patient heart function despite no change in BMI along with no significant difference in normal mortality may suggest that even though ASAs returned the HOCM cohort to normal mortality and improved heart function the patients did not utilize it to decrease their BMI. Charleston Research Institute
Background: Metabolic alkalosis is a common complication among critically ill patients and may increase morbidity and/or limit ability to wean from mechanical ventilation. Acetazolamide is often used to help correct the metabolic alkalosis. Objective: To determine the optimal dosing regimen of acetazolamide for metabolic alkalosis in the Pediatric Intensive Care Unit (PICU) population. Methods: All patients in the PICU at MUSC Children’s Hospital who received acetazolamide in 2015 were included in this retrospective review. Patient demographics; diagnoses; serum bicarbonate, pCO2, and pH; and acetazolamide dose, frequency, and duration were recorded. Objectives were to determine if there was a difference in net decrease in bicarbonate (primary objective) or in pH or pCO2 (secondary objectives) related to different acetazolamide regimens. Results: Sixteen patients received acetazolamide; dosing regimens included 5 mg/kg/dose daily, every 12 hours, or every 8 hours (31.25%, 31.25%, and 37.5%, respectively). Median total dose was 18 [IQR 14, 48] mg/kg. Median duration was 2 [1, 4] days. In all patients regardless of dosing regimen, median serum bicarbonate decreased from 36 at baseline to 27 on the day after therapy completed (p=.003). When data was analyzed based on different dosing frequencies, there were no significant differences in bicarbonate or pCO2 among groups, and pH changes were noted only for daily and q8h regimens. Bicarbonate decreased more if acetazolamide duration was ≤2 days vs >2 days (decrease of 9 vs 2 mmol/L, p=.045) from baseline to day 1 but no significant difference was found from baseline vs the day after therapy for bicarbonate, pCO2, or pH. Conclusion: No acetazolamide regimen was associated with clear benefits over any other, and all were associated with decreased bicarbonate, thus, 5 mg/kg/dose daily appears as effective as more frequent regimens. Shorter duration (<3 days) may be more effective than longer regimens.
from abuse including cognitive-motor impairment, diminished attention and memory, and potential for fungal infections and negative cellular immunity effects on post-liver transplant patients. Liver transplant selection committees must determine how to handle transplant candidates who use marijuana given the discrepancy between federal and state laws, and the vague national guidelines (e.g. UNOS) related to marijuana use pre and post-liver transplantation. The purpose of the present study is to determine optimal treatment of pathologic fractures via plating. The purpose of this study was to study especially when considering adjuvant treatment such as radiation therapy. The two pathways to be studied include endochondral ossification via intramedullary nail implantation and intramembranous ossification via plating. The purpose of this study was to determine optimal treatment of pathologic fractures when adjuvant radiation therapy is utilized. Eighteen rats underwent bilateral femur fractures with a nail placed in one leg and a plate placed on the other (9 control rats, 9 radiated rats; 3 rats harvested at each time point). Each specimen was examined under a microscope to determine callus area. A color analysis was completed which provided the total callus and cartilage area observed in each specimen. Callus areas were as follows: (all measurements in mm²): 6 weeks control-nail(31.75±, plate=29.67, p=0.88); 6 weeks radiated-nail(23.05, plate=26.79, p=0.70); 3 months control nail(76.54, plate=28.42, p=0.04); 3 months radiated nail(9.85, plate=16.49, p=0.05); 6 months control-nail(46.12, plate=50.08, p=0.63); 6 months radiated-nail(35.39, plate=57.08, p=0.22). The results show that the IM nail promotes more cartilage growth (which leads to calcified callus formation) compared with plates as well as more callus growth in all control groups when compared to the radiated bones. Results from this study were also compared to a previous study in which the bones were harvested at one month. When comparing the 1-month data to previous data a large drop off in cartilage growth was seen between one month and 6 weeks. One-month data shows significant difference in cartilage growth. No differences at 6 months may be caused by the deterioration of radiation effects. Department of Defense

119 Malignancy Prevalence Among Patients with Autoimmune Overlap Syndromes, Maham Awan¹, Jim C Oates², Gary S Gilkeson², Diane L Kamen³; ¹Medicine, MUSC, ²Rheumatology, MUSC, ³Rheumatology, MUSC.

Background: Autoimmune disorders, such as systemic lupus erythematosus (SLE), scleroderma (SSc), rheumatoid arthritis (RA), and Sjogrens syndrome (SjS), are associated with higher risk of certain malignancies. However, little is known about the prevalence and types of malignancies among patients with autoimmune overlap syndromes (OS), defined as the co-occurrence of two or more autoimmune disorders in one patient. Our study tests the hypothesis that OS patients will have an increased risk of malignancy compared to non-OS patients due to the combined immune system dysfunction and the effect of different patterns of immunosuppressant use. Methods: This study was performed using data from a longitudinal registry of patients with SLE and scleroderma at MUSC. Data was reviewed including the patient demographics, medical history, historical and current medications, disease damage, and presence of malignancy. T-tests and regression analyses were used to compare these parameters between OS and non-OS patients with SLE and/or SSc. Results: Out of 755 patients in the study, OS patients (n=232) were 93.1%
female compared to non-OS patients (n=523) who were 85.9% female (p<0.05), 54.7% of OS patients and 59.1% of non-OS patients were black (p=NS). The most common autoimmune diseases found in OS patients with SLE and/or SSc were: SJS, RA, and myositis. While followed in the registry, 6.0% of OS patients died compared to 5.0% non-OS patients (p=NS). OS patients had an older age of diagnosis with SLE compared to non-OS patients (p<0.05). 12.3% of OS patients had a malignancy compared to 7.5% of non-OS patients (p<0.05). Conclusion: OS patients had an increased prevalence of malignancy compared to non-OS patients. OS patients were more likely to be women and older at time of SLE diagnosis. Further studies should be pursued to validate these results and see if stricter cancer surveillance is beneficial in OS patients.

**NIH UL1 RR029882, P60 AR062755**

120 LCL-461 is a Lipid Based Therapeutic Drug That Overcomes Drug Resistance in Acute Myeloid Leukemia, Mohammed Dany¹, Besim Ogretmen²; ¹Biochemistry and Molecular Biology, MUSC, ²Biochemistry, MUSC.

Mutations in FLT3 receptor tyrosine kinase are common targets in Acute Myeloid Leukemia (AML); however, FLT3 targeted therapy shows limited success due to development of resistance. Ceramide, a bioactive sphingolipid, is synthesized de novo by Ceramide Synthases (CerS) and mediates cancer cell death in response to various chemotherapeutic agents. This study investigates the biological role of ceramide lipid in the response of AML to FLT3 targeted therapy and aims at finding mechanism-based alternative therapeutic strategies to overcome resistance to FLT3 inhibitors. We found that AML cell lines and patient samples expressing FLT3 have suppressed CerS1 expression and lower levels of its product C18-ceramide compared with FLT3 negative AML cells. Silenced FLT3 expression or its pharmacological inhibition increased CerS1 and C18-ceramide levels while FLT3 overexpression suppressed them. The increase in C18-ceramide after FLT3 inhibition is required for cell death as silencing CerS1 expression or inhibiting its enzymatic activity protected from FLT3 inhibitors-induced cell death in vitro and in vivo. Mechanistically, FLT3 inhibition resulted in CerS1 translocation from cytosol to mitochondria to generate C18-ceramide. The mitochondrial C18-ceramide then binds directly to LC3B-II to recruit autophagosomal membranes to mitochondria for the execution of lethal mitophagy and degradation of mitochondria. We also show that this process is regulated upstream by early Drp1 activation and p-Drp1 S637 de-phosphorylation, whereby silencing Drp1 expression or preventing its S637 dephosphorylation blocked the translocation of CerS1 to mitochondria, prevented ceramide mitochondrial accumulation, halted the events of lethal mitophagy, and protected from FLT3 inhibitors induced cell death. Due to the importance of ceramide accumulation in mitochondria for AML cells to respond to FLT3 inhibition, we proposed a synthetic lipid compound LCL-461 composed of C18-ceramide conjugated to a pyridinium ring in the sphingosine backbone. Mass spectrometry proved that LCL-461 accumulates selectively in mitochondrial fractions of AML cells due to the positively charged conjugated pyridinium ring. LCL-461 was effective in inducing cell death in several AML cell lines of different FLT3 mutation statuses and resistance profiles as well as in in vivo xenografts derived from patient samples, with minimal cytotoxicity effects on normal human bone marrow cells. LCL-461 induced cell death via the same LC3B dependent lethal mitophagy mechanism detected upon FLT3 inhibition. This highlights the potential of LCL-461 as an agent that can bypass FLT3 signaling by accumulating in mitochondria to induce lethal mitophagy and AML cell death regardless of whether patients are sensitive or resistant to FLT3 targeted therapy.

121 Polyethylene Insert Subluxation in Rotating Platform Total Knee Arthroplasty: The Role of Flexion/Extension Gap Laxity, Nicole E Durig¹, Yongren Wu², Alex Chiaramonti², Vincent D Pellegrini²; ¹Orthopaedic Surgery, MUSC COM, ²Orthopaedic Surgery, MUSC.

Clinical observations suggest flexion-extension gap imbalance, as determined by asymmetric medial to lateral soft tissue tensioning or unequal gap sizes in flexion and extension, may lead to functional flexion instability after total knee arthroplasty (TKA). We hypothesize that surgical techniques that create such gap imbalance or asymmetry increase the risk of mechanical failure (e.g. subluxation or spin out) in a rotating platform (RP) total knee device and are associated with increased risk of patient-reported instability, pain, and revision arthroplasty. Biomechanical testing was performed on 6 fresh-frozen cadaveric knees and implanted with an RP TKA using gap balancing technique with different sized femoral components (3-6) and thicknesses of polyethylene (PE) inserts (10-15mm) to systematically represent varying levels of flexion/extension gap mismatch. Each configuration was subjected to 3 physiologic testing positions in balanced and with eccentric varus loading. Rotational displacement and torque were measured over time as an axial load and long-axis rotation were applied. Yield and max torque and other parameters of interest were calculated using a post-processing, custom MatLab code. Lateral condyle liftoff and...
polyethylene rotation on the tibial baseplate were visually recorded and measured directly with a caliper. In a primary knee with increased flexion gap laxity due to decreasing PE insert thickness, increasing knee flexion from 0 to 60 degrees resulted in significant decreases in both yield torque (-19.60 +/- 4.11 N-m, p=0.002) and maximum torque (-19.60 +/- 3.69 N-m, p=0.001). Polyethylene rotational displacement was significantly decreased with increasing flexion (mean difference 0.31 +/- 0.09 cm, p=0.024). Flexion/extension gap asymmetry, soft tissue laxity and eccentric medial loading encouraged lateral condyle liftoff and directed rotation to occur on the femoral rather than the tibial interface of the RP TKA polyethylene insert. The depth of the tibial surface concavity determines femoral condylar capture and defines a narrow margin for error in flexion gap asymmetry that can lead to functional instability in the RP TKA design. MUSC Orthopaedic Surgery

122 A Comparison Between High Resolution Manometry Studies Obtained in Academic Vs. Community Based Healthcare Setting, Abid T Javed1, Kevin Batte2, Mustafa Abdul-Hussein3, Don O Castell3, 1COM, MUSC, 2Medicine, MUSC, 3Gastroenterology, MUSC.

Introduction: Interpretation of studies can vary between practitioners despite the advent of standardized diagnostic criteria. We compared manometry studies obtained in an academic institution against those obtained in a community based healthcare setting to assess for congruency in manometry modality, captured metrics, and variations in diagnosis.Methods: We reviewed esophageal manometry (EM) studies from patients who underwent high resolution manometry (HRM) in our institution between 6/1/2014- 2/15/2016 to identify those who also underwent EM at referring community based center. These studies were evaluated for manometry modality, interpretation method (conventional manometry vs HRM), and final interpretation. Results: A total of 52 patients who had EM both in the community and academic setting were identified. 96% (49/51) of community manometry studies were performed using HRM software. However, only 29% (15/51) of the study findings were interpreted using HRM parameters. One study was excluded due to unidentifiable modality. In 21% (11/51) of the cases, no clear diagnosis was made; rather a description of the findings was noted. The community and academic diagnoses were the same in only 42% (22/51) of EM studies. In a breakdown of individualized diagnoses, 7 achalasias diagnoses were made in the academic setting versus 4 in the community setting; for ineffective esophageal motility (IEM), 14 vs. 3; for diffuse esophageal spasm, 3 vs. 0; for nutcracker esophagus, 2 vs 2; for major motility abnormality, 9 vs. 0; and for studies read as normal, 15 vs. 12. Two studies did not have a diagnosis of any of the above. Discussion: Although high resolution manometry is becoming more widespread in the community setting, the majority of physicians continue to use conventional parameters to interpret findings. This partially contributes to the discordance (~60%) in diagnoses between academic and community settings.

123 Comparative Pharmacodynamics of Imipenem and Imipenem-Relebactam Against Wild-type and Resistant Populations of P. Aeruginosa and Non-Proteae Enterobacteriaceae, Joshua M Knight, Roger L White; College of Pharmacy, MUSC.

A beta-lactamase inhibitor combination, imipenem (IMI)/relebactam (REL), is currently in Phase 3 (P3) clinical trials. This Monte Carlo analysis (MCA) was used to assess the impact of imipenem (IMI)/relebactam (REL) compared to IMI alone against wild-type (WT) and imipenem-resistant (R) P. aeruginosa (PA) and non-proteae Enterobacteriaceae (NPE). Single-compartment pharmacokinetic parameters, current MIC distributions, and clinical pharmacodynamics (PD) targets from peer-reviewed literature were used to perform a 10,000 subject Monte Carlo simulation. A CrCl distribution from our institution, ranging from 10-120ml/min, was used to simulate individual clearances. The goals analyzed were 20%, 40%, and 60% time above the MIC. The initial dose used for both agents was 500mg q6h. The analysis assessed two methods of dealing with decreased renal function: the IMI package insert guidelines and the P3 dosing for IMI-REL. The effect of volume of distribution (0.24L/kg to represent healthy volunteers and 0.31L/kg to represent critically ill patients) and the effect of infusion time (0.5 and 3 hours) were also examined. Target attainment (TA%) was ≥90% for IMI-REL for all PD targets and organisms except for T>MIC ≥60% for R-PA (81 to 89%). With IMI, TA% was ≥90% only for WT-NPE. TA% for IMI-REL was 35-50% greater than that of IMI. TA% was similar at both volumes (±11% difference). Differences in TA% due to the length of the infusion were minimal; however, with resistant populations, TA% was often slightly higher with the 0.5 hr. infusion at T>MIC≥20% and slightly lower at T>MIC≥60%. TA% for IMI was slightly higher with P3 IMI/REL dosing. The addition of relebactam restored imipenem’s activity against the resistant organisms evaluated. Imipenem alone still has sufficient activity against non-proteae Enterobacteriaceae, but appeared ineffective against the other organisms studied. The effects of increased patient volume had a negligible effect on target attainment.
124 Evolving Trends in Racial Disparities for Perioperative Outcomes with the Kidney Allocation System, Daisy Sanchez¹, Derek Dubay², Baliga Prabhakar², David J Taber²; ¹COM, MUSC, ²Transplant, MUSC.

Introduction: To make kidney allocation for transplantation as effective and equitable as possible, a new Kidney Allocation System (KAS) was implemented on December 14, 2014. The purpose of this study was to assess the impact of KAS on perioperative outcomes and if changes differed by race/ethnicity. Methods: This was a time series analysis using aggregated data acquired in monthly intervals from October 1, 2012 through September 30, 2015. The analysis included all data reported to the University HealthSystem Consortium (UHC) by accredited US Kidney Transplantation Centers for adult solitary kidney recipients of deceased donor transplants. Results: The 35-month time frame included 25 months of pre-KAS data and 10 months of post-KAS data. A total of 28,809 deceased donor kidney transplants were included. After KAS implementation, the estimated transplant rate per month decreased significantly for Caucasians by 17.6 cases per month (p=0.0001, Figure 1), and increased significantly for AAAs by 37.8 (p=0.0001), Hispanics by 16.3 (p=0.0001), and other races by 8.2 cases per month (p=0.0001). Delayed graft function (Figure 2), 7 and 14-day readmissions significantly increased after KAS, but this did not vary by race. Hispanics saw a 7.7% decrease in ICU admissions after KAS, which differed as compared to other racial/ethnic cohorts (p=0.0026). Costs increased significantly after KAS in all groups except Hispanics. Mortality, length of stay, in-hospital complications and 30-day readmissions were not significantly impacted by KAS. Conclusion: These results demonstrate that KAS has substantially impacted transplant rates, which differed by race/ethnicity. KAS also led to increased costs, readmissions and DGF which did not differ by race. The impact of KAS on ICU cases, which was different in Hispanics requires further investigation into potential etiologies. MUSC Summer Health Professions

125 Determination of Venom Components From Conus Purpurascens Through Proteotranscriptomic Approaches. Meghan K Grandal¹, Clay Davis², Ben Neely², Evan Clark³, Frank Mari²; ¹Drug Discovery and Biomedical Sciences, MUSC, ²NIST, Hollings Marine Lab, ³Biomedical Sciences, FAU.

Cone snail venom is a complex mixture of peptides and proteins naturally selected to target receptors and ion channels in the victim and thereby modulate the neuromuscular, cardiovascular, and nervous systems. Because of its specificity for vital systems, venom provides a rich source of novel drug leads. Conopeptides can be highly modified which contributes to their bioactivity. In this study we use proteotranscriptomic approaches to obtain sequences from the venom of Conus purpurascens. High resolution ESI-LC-MS/MS was used to yield unique masses from milked venom. It was hypothesized that these masses represented many distinct peptides; however we were able to determine that the unique masses correspond to different combinations of post translational modifications. This supports previous reports of the cone snails’ ability to produce differentially modified venom peptides. The effect of these modifications on the peptide activity has important implications for therapeutic potential and is a direction for future research. Using these proteotranscriptomic approaches we were able to identify a novel five-disulfide conotoxin, p8a, in differentially modified forms. NIST; GAANN Fellowship, MUSC

126 Two-Dimensional Mapping of the Breast Cancer N-Glycome By MALDI-IMS, Danielle A Scott, Peggi Angel, Elizabeth Yeh, Richard R Drake; Cell and Molecular Pharmacology, MUSC.

We have applied a recently developed matrix-assisted laser desorption/ionization imaging mass spectrometry (MALDI-IMS) method to spatially profile N-linked glycans in human breast cancer formalin-fixed paraffin-embedded (FFPE) tissue sections and tissue microarrays (TMA). Tissues are incubated with PNGaseF, and released glycans are sequentially detected in each tissue region by MALDI-IMS. Other methods to detect the localization of glycans in tissues rely on detection of broader glycan structural motifs (i.e., lectins or carbohydrate antigen antibodies), whereas our method is able to simultaneously identify and distinguish components of the N-glycome on a single slide. Routinely, 40-50 N-glycans are detected per FFPE tissue. To demonstrate the ability of MALDI-IMS to generate biomarker panels, breast cancer tissue blocks and TMAs containing matched tumor and non-tumor regions were profiled. Through the combined analysis of breast cancer FFPE tissues and TMAs we have been able to identify glycans specific to stromal and tumor tissue, confirmed by histology. Within the tissues, we have identified a series of high-mannose glycans that are predominantly associated with tumor regions, as well as more highly branched and fucosylated glycans in higher grade tumors. In addition to this, N-glycan panels derived from TMAs representing HER2 receptor positive and triple negative breast cancers were compared to identify shared and
128 Identification of DZIP1 Mutations in Patients with Mitral Valve Prolapse, Diana B Fulmer¹, Katelynn A Toomer¹, Lilong Guo¹, Amanda J Johnson¹, Linda K Williams¹, Joshua H Lipschutz³, Russell A Norris¹; ¹Regenerative Medicine and Cell Biology, MUSC, ²Renal Medicine, MUSC.

Mitral Valve Prolapse (MVP) is a potentially life-threatening cardiac condition that affects 1 in 40 individuals. Currently the only treatments for MVP are surgical, which means this disease represents a significant healthcare burden both for the medical system and the patient. The lack of treatment is likely due to poor understanding of the etiology and inception of the disease. Previous work from our group had identified a genetic and developmental basis for MVP. Since this initial discovery, we have identified additional genetic causes for the disease. Here we present new data that reveal mutations in the DZIP1 gene in multiple families with non syndromic MVP. DZIP1 is a cytoplasmic and nuclear expressed protein that has previously been shown to be important in primary cilia formation and signaling. To understand the function of DZIP1 in the heart, we performed a two-hybrid screen to identify direct protein-protein interaction partners. This resulted in the identification of Chibby1 (Cby1), an important regulator of both Beta-catenin signaling and ciliary vesicle docking. Co-immunoprecipitation experiments have demonstrated that Cby1 binds directly to Dzip1 in multiple cell types including cardiac valves. Additionally, immunohistochemistry and Western analyses have defined that Chibby1, localizes to the base of primary cilia and can regulate the cellular localization of Beta-catenin and its downstream effectors (e.g. Lef1). Dzip1 deficient mice exhibit pronounced reduction of Chibby expression, defects in ciliogenesis and increased Beta-catenin signaling in the developing mitral valves. This leads to the conclusion that aberrant Beta-catenin signaling cascades and disruption of ciliogenesis are pathways that contribute to the inception and progression of mitral valve prolapse. NIH HL007260

129 Studying the Link Between Pannexin-1 and NOX2-mediated ROS in Response to Danger Signal ATP Stimulation in Primary Gingival Epithelial Cells, Jaden S Lee, JoAnn S Roberts, Nityananda Chowdhury, Zachary Messick, Özlem Yilmaz; Oral Health Sciences, MUSC.

Abstract not available.

130 A Light-Sheet Microscopy Based Three-Dimensional FRAP System, Chen Xun, Chen Peng, Hepfner Richards, Li Yang, Yao Hai, Ye Tong; Bioengineering, Clemson-MUSC.

Fluorescence recovery after photobleaching (FRAP) is a versatile and widely used tool for the determination of local diffusion properties within solutions, cells, tissues, and biomaterials. Coupled with multiphoton excitation and imaging, three-dimensional (3D) FRAP methods have been recently demonstrated in measuring anisotropic solute diffusion tensors within biological fibrosis tissues. However, the multiphoton microscopy based FRAP methods have been found in limited applications due to their slow volumetric imaging speeds; only very large molecules with slow diffusivity can be studied. Light-sheet microscopy have been rapidly developed in recent years to provide fast volumetric imaging speed that can record dynamic functional processes in brains and heart tissues of living animals. In this report, we describe a homebuilt light-sheet microscopy based FRAP system that combines the two-photon light-sheet imaging and bleaching so that both of the imaging speed and penetration depth have been improved. The system can reach about 10 volumes/second with the volume size of 64x64x64 pixels, which allows measuring diffusivities of many biological molecules in cells and tissues. With these critical improvements, we have demonstrated that three-dimensional anisotropic solute diffusion properties in biological samples can be non-destructively measured.

131 Differential Relationships Between Diabetes Knowledge Scales and Diabetes Outcomes, Aprill Z Dawson, Rebekah J Walker, Leonard E Egede; Medicine, MUSC.

Diabetes affects more than 29 million people in the US. Patients who increase their diabetes knowledge also increase their diabetes control. Three knowledge assessments used are the Michigan Brief Diabetes Knowledge Test (DKT), Starr County Knowledge
Hypothesized that targeting glutamine utilization by PI OCR and cell proliferation, whereas glucose and respiration as removal of glutamine completely inhibited the principle source of fuel driving mitochondrial respiratory capacity. We determined that glutamine oxygen consumption rates (OCR) and overall mitochondrial respiration characterized by higher basal rates were similar, PI resistant cells exhibited increased differences in cellular bioenergetics. While glycolysis rates were similar, PI resistant cells exhibited increased mitochondrial respiration characterized by higher basal oxygen consumption rates (OCR) and overall respiratory capacity. We determined that glutamine was the principle source of fuel driving mitochondrial respiration as removal of glutamine completely inhibited OCR and cell proliferation, whereas glucose and pyruvate were dispensable. Therefore, we hypothesized that targeting glutamine utilization by PI resistant cells using a small molecule GLS1 inhibitor CB-839 would restore their sensitivity to the cytotoxic effects of PIs. CB-839 repressed basal OCR and total respiratory capacity and reduced cell viability to varying degrees in a panel of PI sensitive and resistant MM cell lines. Most notably, we found that CB-839 synergistically enhanced the cytotoxic activity of multiple PIs in a genetically diverse panel of 15 PI sensitive and resistant MM cell lines. The effects of CB-839 were the most apparent in combination with carfilzomib (Crflz), where it enhanced Crflz-induced death by >4-fold. CB-839 enhanced Crflz-induced apoptosis as measured by the activation of caspase 3, 7, and 8. Mechanistically, the combination of CB-839 and Crflz induced a strong and synergistic ER stress response, characterized by the induction of ATF4 and CHOP. Our findings suggest that the acquisition of PI resistance may involve adaptations in cellular bioenergetics that may be exploited therapeutically by targeting glutamine metabolism. Furthermore, our results support the combination of clinical stage compound CB-839 with PIs, particularly Crflz, for the treatment of refractory MM. NIH P20GM103542

132 Glutaminase Inhibitor CB-839 Enhances Proteasome Inhibitor Sensitivity in Multiple Myeloma Cells, Ravyn M Thompson, Leticia Reyes, Brittany Smith, Nathan G Dolloff; Cell and Molecular Pharmacology and Experimental Therapeutics, MUSC.

Multiple myeloma (MM) remains largely incurable due to the emergence of therapeutic resistance. We therefore set out in this study to identify druggable molecular mechanisms that convey resistance to proteasome inhibitors (PIs; e.g., bortezomib/VELCADE, carfilzomib/KYPROLIS), which are cornerstone agents in the treatment of MM. In comparing isogenic pairs of PI sensitive and resistant cells, we observed stark differences in cellular bioenergetics. While glycolysis rates were similar, PI resistant cells exhibited increased mitochondrial respiration characterized by higher basal oxygen consumption rates (OCR) and overall respiratory capacity. We determined that glutamine was the principle source of fuel driving mitochondrial respiration as removal of glutamine completely inhibited OCR and cell proliferation, whereas glucose and pyruvate were dispensable. Therefore, we hypothesized that targeting glutamine utilization by PI resistant cells using a small molecule GLS1 inhibitor CB-839 would restore their sensitivity to the cytotoxic effects of PIs. CB-839 repressed basal OCR and total respiratory capacity and reduced cell viability to varying degrees in a panel of PI sensitive and resistant MM cell lines. Most notably, we found that CB-839 synergistically enhanced the cytotoxic activity of multiple PIs in a genetically diverse panel of 15 PI sensitive and resistant MM cell lines. The effects of CB-839 were the most apparent in combination with carfilzomib (Crflz), where it enhanced Crflz-induced death by >4-fold. CB-839 enhanced Crflz-induced apoptosis as measured by the activation of caspase 3, 7, and 8. Mechanistically, the combination of CB-839 and Crflz induced a strong and synergistic ER stress response, characterized by the induction of ATF4 and CHOP. Our findings suggest that the acquisition of PI resistance may involve adaptations in cellular bioenergetics that may be exploited therapeutically by targeting glutamine metabolism. Furthermore, our results support the combination of clinical stage compound CB-839 with PIs, particularly Crflz, for the treatment of refractory MM. NIH P20GM103542

133 The Role of ADAMTS5-mediated Cleavage in the Development of the Mandibular Condyle in the Temporomandibular Joint, Alexandra W Rogers, Loren E Dupuis, Kittrell Rice, Christine B Kern; Regenerative Medicine and Cell Biology, MUSC.

Abstract not available.

134 Use of KDM4B Inhibitors to Target Periodontal Disease Progression, Joy Kirkpatrick¹, Keith Kirkwood², Patrick Woster¹; ¹Drug Discovery and Biomedical Sciences, MUSC, ²Oral Health Sciences, MUSC.

Abstract not available.

135 Modulation of Signaling and Metabolic Preference of NK Cells By Different Forms of NKG2D Ligands and Its Implications, Payal Dhar, Fahmin Basher, Jinyu Zhang, Jennifer D Wu; Microbiology and Immunology, MUSC.

The significance of ligand-induced activation of the NK cell activating receptor NKG2D has been well established in controlling tumor growth in different experimental animal models. Amongst different types of
NKG2D ligands, MHC I chain related molecule MICA/B is known to be expressed most prevalently in various human cancers. In particular, proteolytically shed form of MICA/B (sMIC) has been shown to suppress the immune system through multiple pathways and also found to correlate with cancer progression. Previous studies in our lab using two humanized bi-transgenic animals, one expressing the native ligand (TRAMP/MICB) and the other expressing the shedding-resistant mutant (TRAMP/MICB.A2) revealed opposite roles of these ligands in regulating tumor immunity. MICB expressing mice exhibited increased tumor progression, whereas MICB.A2 expressing mice showed tumor free survival. These findings raised the intriguing question of why do these structurally similar forms of MIC have such vastly different effects on tumor immunity. To understand this, we investigated the possibility of differential stimulation of NK cell effector functions by the two forms of the ligand by delineating the underlying signaling and metabolic pathways. In-vitro co-culture studies of NK cells with tumor cell lines expressing sMICB and MICB.A2 indicated a trend towards increase in gene expression of cytokines and cytokine inducing transcription factors by NK cells when stimulated with the sMICB. In contrast, NK cells stimulated with MICB.A2 displayed increased expression of cytotoxic effector molecule Granzyme B. This suggests that signaling through sMICB may polarize the NKG2D signaling pathways with preferential activation of inflammatory cytokine pathways. Preliminary data from in-vitro co-culture studies also demonstrated an increased glucose uptake as well as increased gene expression of glycolytic enzymes by NK cells activated with sMICB. Neutralization of sMICB using non-blocking neutralizing antibody rescued this phenomenon, suggesting that NK cells stimulated by sMICB might have higher metabolic demands to fulfill their bioenergetic needs for preferential activation of cytokine pathways. Our data uncovered a new potential mechanism whereby sMIC promotes tumor progression. NIH R01 CA204021, R01CA208246

136 Development of Novel Penicillin-binding Protein 2 (PBP2) Inhibitors As Drug Candidates for Penicillin- and Cephalosporin-resistant Neisseria Gonorrhoeae, Jonathan M Turner, Patrick M Woster, Christopher Davies; Biochemistry & Molecular Biology, MUSC, Drug Discovery & Biomedical Sciences, MUSC.

Gonorrhea is the second most common sexually transmitted infection in the United States, with nearly 350,000 cases reported in 2013 by the Centers for Disease Control. Untreated infections can lead to pelvic inflammatory disease, infertility, gonococcal arthritis, and increased risk of contracting and transmitting HIV. Strains of N. gonorrhoeae with decreased susceptibility to extended-spectrum cephalosporins (ESC) have emerged, marking this pathogen as a major public health concern. Two strains exhibiting high-level ESC resistance have now been isolated, one in Japan (H041) and one in France (F89). Cephalosporin resistance in N. gonorrhoeae is conferred by mosaic penA alleles encoding penicillin-binding protein 2 (PBP2) variants containing ~60 amino acid substitutions compared to wild type. Although H041 is classified as the first multidrug-resistant strain of N. gonorrhoeae, it does retain some susceptibility to ertapenem and meropenem, suggesting that discovery of new carbapenems is a viable approach to developing anti-gonococcal agents. The aim of this study is the design and synthesis of novel carbapenem-based compounds exhibiting greater PBP2 inhibition compared to known β-lactams. The Davies lab has solved a high-resolution crystal structure of a mutant of PBP2 in complex with meropenem, allowing for design of ligands with enhanced complementarity to the altered binding pocket. From the molecular structures of meropenem and ertapenem, a virtual library was designed employing functional group variation and isosterism. Each compound was docked to the PBP2 construct in silico to simulate the dynamics of binding. Using these data, and considering such factors as tractability of synthesis, a group of lead compounds was identified. A facile synthetic route involving the reaction of thiols with p-nitrobenzyl-(4R,5S,6S)-3-(diphenyloxy)phosphoryloxy-6-[(1R)-1-hydroxyethyl]-4-methyl-7-oxo-1-azabicyclo[3.2.0]hept-2-ene-2-carboxylate was developed and adapted for the production of the selected compounds. PEN1.296 is the first compound selected for synthesis with the goal of testing its ability to inhibit PBP2 and whether it exhibits antimicrobial activity against cephalosporin-resistant strains of N. gonorrhoeae. NIH TL1 TR001451, UL1 TR001450, R01 GM066861, T32 GM008716

137 BDNF As a Biomarker for Alzheimer’s Disease, Krishna L Bharani, Laura Columbo, Aurelie Ledreux, Granholm Ann-Charlotte; Neuroscience, MUSC, Denver University.

Abstract not available.

138 Rapid Anastomosis and Endothelial Reorganization Around Cellular Implants, Sanket Pattanaik, Heather Bainbridge, Matthew Rhett, Stephen A Fann, Michael J Yost; General Surgery Research, MUSC.
Background: Tissue engineered constructs (TECs) are designed to assume the function of damaged or dysfunctional native tissue in a host. Unfortunately, no published studies have demonstrated appreciable survival of cells within constructs even at 72 hrs following implantation. The long term viability of these constructs may be hampered by stressors during earlier time points following implantation. We hypothesize that a combination of ischemia due to poor vascularization and a destructive innate immune response may reduce viability of TECs. To address poor vascularization of constructs, we employ a Scaffold-free Prevascular Endothelial-fibroblast Construct (SPEC) that relies on a coculture of endothelial cells and fibroblasts to generate an extracellular matrix. We will utilize SPECs to explore the role of the innate immune response during implantation. Methods Twenty-seven Sprague-Dawley rats were engraved with implants within a muscular pocket between the vastus lateralis and biceps femoris: nine with SPECs; nine with fibroblast spheroids; nine with silicone implants. Seeded cells were tagged with a deep red fluorescent marker. Rats were sacrificed at 6h, 12h, and 24h intervals and constructs were explanted. Constructs were stained and imaged for markers of vascular development, and markers of apoptosis/inflammation Results Vessels perfused with host red blood cells were found within the constructs within all rats implanted with SPECs one day following implantation. Additionally, evidence of endothelial reorganization around the implants was seen around all three types of implants within 6 hours, with increased vessel-like branching apparent around the SPECs and the fibroblast spheroids. This endothelium appeared to encapsulate constructs, with branches interdigitating with construct-derived endothelial structures in the SPECs. Interestingly, complement deposition was observed at the 6h time point in our constructs, coexisting with endothelial structures in the constructs. 

NIH T32 GM08716

139 Rapamycin Reverses Metabolic Alterations Induced By Static Cold Preservation in Models of Cardiac Transplantation, Danh T Tran¹, Catherine Dong², Ali Alawieh³, Gyda Beeson³, Carl Atkinson¹, Satish N Nadig⁴; ¹Microbiology & Immunology, MUSC, ²COM, MUSC, ³Drug Discovery & Biomedical Sciences, MUSC, ⁴Surgery, MUSC.

Abstract not available.

140 Structural Analysis of Mutated Penicillin-binding Protein 2 From a Cephalosporin-resistant Strain of Neisseria Gonorrhoeae, Brandon Young, Christopher Davies; Biochemistry and Molecular Biology, MUSC.

According to the World Health Organization, there are over 78 million cases of gonorrhea that occur each year, comprising 22% of new sexually transmitted infections. If left untreated, such infections can have lasting results, including pelvic inflammatory disease or infertility. Gonorrhea is caused by Neisseria gonorrhoeae, a Gram negative diploccoccus. Over time, N. gonorrhoeae has developed resistance to most antibiotics used to treat gonorrhoea, including β-lactams, fluoroquinolones, and tetracyclines. The first line treatment for this infection is now the extended-spectrum cephalosporin (ESCs) ceftriaxone with azithromycin. In recent years, however, new strains of Neisseria gonorrhoeae have emerged that exhibit resistance to ESCs, including strains H041 (isolated in Japan), 35/02 (isolated in Sweden), and F89 (isolated in France). A major factor in cephalosporin resistance is mutations in the penA gene encoding penicillin-binding protein 2 (PBP2). PBP2s are peptidoglycan transpeptidases that function during the latter stages of cell-wall synthesis and are the well-known targets for β-lactam antibiotics. Compared to wild-type, PBP2 from the intermediate cephalosporin-resistant strain 35/02 contains 58 mutations whereas that from the high-level-cephalosporin resistant H041 has 61 mutations. The crystal structure of PBP2-H041 has been solved and shows significant structural changes compared to the wild-type enzyme, mostly in the active site region. Strain F89 exhibits a similar-level of ESC resistance as H041, but its PBP2 appears more closely related to that from 35/02 because only one amino acid is different, a A501P mutation. This suggests the molecular mechanism of cephalosporin resistance differs between F89 and H041. To test this, we must determine the structure of F89. Toward this goal, we have expressed and purified PBP2 derived from F89 and initiated crystallization trials. In parallel, we are using molecular modeling approaches to predict the structure of the protein. Our hypothesis is that the A501P increases the rigidity of the protein in the active site region that hinders formation of a productive acyl-enzyme intermediate with cephalosporins but not peptide substrate. NIH R01GMO6686113

141 Levels of Engagement in a Parenting Program: How Parenting Stress Impacts Intent to Enroll, Enrollment, and Attendance, Chelsey M Hartley, Angela D
Moreland Johnson; Psychiatry and Behavioral Sciences, MUSC.

Elevated parenting stress has been identified as a risk factor for parent psychopathology (Kelly, 1992; Forgays, 1992; & Deater-Deckard et al., 1994) and poor parenting behaviors, including child maltreatment (Deater-Deckard, 1998). There are a number of prevention and intervention parenting programs that have shown to decrease parental stress and promote positive parenting, although varying levels of engagement are significantly associated with program impact. Importantly, it is unclear how parenting stress impacts levels of engagement in parenting programs. Given that parenting stress is high among parents enrolled in parenting programs (Kazdin & Whitley, 2003), it is likely to be associated with reasons for engaging in programs. The purpose of the current study was to evaluate the relationship between parenting stress and levels of engagement, specifically, intent to enroll in a parenting program, actual enrollment in the program, and attendance once enrolled. We hypothesized that parenting stress would be significantly associated with each level of engagement. The study investigated the relation of parenting stress to engagement in the PACE (Parenting our Children to Excellence) program in an ethnically diverse sample of 610 parents. Results demonstrated that parenting stress impacted every level of engagement. First, parenting stress was significantly associated with parent’s intent to enroll in a parenting program such that parents who reported more parenting stress were less likely to report that they would attend a parenting program. Next, parents who decided not to enroll in the PACE program reported significantly higher parenting stress than parents who decided to enroll. Finally, among parents who enrolled in the PACE program, attendance was significantly lower among parents who reported higher parenting stress. This suggests that parenting stress significantly impacts levels of engagement. Future research should consider targeting parenting stress as a barrier for recruitment, enrollment, and attendance of parenting programs.

142 HSP90 Beta Controls the Conversion of Endoderm to a Hepatic Fate By Regulating HNF4A Protein Levels, Ran Jing, Stephen Duncan; Regenerative Medicine and Cell Biology, MUSC.

Hepatic progenitor cells derive from the ventral endoderm in response to cues from the developing heart and surrounding mesenchyme. We have previously shown that the transcription factor HNF4A is required for the formation of hepatic progenitors from endoderm that has been derived from human induced pluripotent stem cells (iPSCs). We reasoned that we could uncover regulatory pathways with novel roles in hepatocyte differentiation by identifying cellular processes that regulate HNF4A levels. We, therefore, performed a medium throughput screen of 1120 small molecules with well-characterized mechanisms of action to detect those that affect the abundance of HNF4A in iPSC–derived hepatic progenitor cells. This approach identified several small molecules that depleted HNF4A. Of those, we chose to focus on an inhibitor of Heat Shock Protein 90-beta. We show that mutation of the gene encoding HSP90-beta represses hepatocyte differentiation during the formation of hepatocytes from iPSCs. We reveal that HSP90-beta, although dispensable for expression of HNF4A mRNA, directly interacts with HNF4A, protein to regulate its half-life. Our results demonstrate that HSP90-beta has an unappreciated role in controlling hepatic progenitor cell formation and highlight the efficiency of using small-molecule screens during the differentiation of iPSCs to reveal novel molecular mechanisms that control cell fate. NIH DK102716, HG006398, HD082570

143 Genetic Analysis of the L2 and A30.5 Proteins: Key Regulators of Poxvirus Membrane Biogenesis, Justin Radomski, Paula Traktman; Biochemistry and Molecular Biology, MUSC.

Vaccinia is the model virus used to study the lifecycle of poxviruses, large DNA viruses that include agents of human disease such as smallpox and monkeypox. Unusual for DNA viruses, poxviruses replicate in the cytoplasm of the cell, autonomous from the nucleus. Because of this autonomy, the virus encodes a large number of genes devoted to replication and morphogenesis. The initial steps of morphogenesis, known as membrane biogenesis, remain unclear. The viral membrane is thought to originate from the endoplasmic reticulum; however, how the membrane is diverted from that organelle is currently not known. Various viral proteins have been identified as being vital to this process. We have been developing genetic tools to study the A30.5 and L2 proteins, two of the regulatory proteins that reside in the ER membrane. Although these proteins are thought to be essential for membrane biogenesis, their mode of action remains unknown. In order to dissect their mode of action, identify functional domains and investigate protein–protein interactions, we have generated an L2 complementing cell line (CV1:L2HA) and an L2 deletion virus (vΔL2) as well as two inducible A30.5 viruses (vind3XFA30.5; vindA30.5V5). With these reagents, we will assess the full range of phenotypes observed when these proteins are absent. vΔL2 is severely compromised in two different non-complementing cell lines. For structure/function analysis, we will perform complementation analyses with a variety of mutated
alleles to identify key domains within L2. The tet-
inducible A30.5 viruses, in contrast, are only modestly
impaired, with viral yield reduced 3-10 fold in the
absence of inducer. The inducible viruses are
somewhat leaky, with 8-14% of A30.5 expression under
non-induced conditions. To determine whether this
leakiness is the cause of the weak phenotype of the
vindA30.5 viruses, we are now generating a
complementing CV1:3XFLAGA30.5 cell line and a
vΔA30.5 deletion virus. NIH R01AI107123

144 The Effects of POWER Training on
Gait and Muscle Function in Individuals
Poststroke, Jennifer L Hunnicutt, Stacey E
Aaron, Aaron E Embry, Chris M Gregory;
Health Sciences and Research, MUSC.

Background & Purpose: Lower extremity muscle power
training can improve poststroke mobility, but data on
potential kinetic adaptations are not available. The
purpose of this analysis is to determine the effects of
Poststroke Optimization of Walking Using Explosive
Resistance (POWER) training on the paretic limb's
contribution to walking. Methods: Eleven individuals (7
male; 43 years; 46 mos poststroke) with chronic
poststroke hemiparesis participated in this study.
Subjects completed 12 weeks (2 sessions/week) of
training that included a series of progressive, intensive
leg press and jump training exercises, sit-to-stands,
step-ups, and calf raises. Subjects also performed
progressive overground fast walking (forward and
backward) to emphasize the task-specific lower
extremity power generation. Kinetic data was collected
via a split-belt instrumented treadmill while participants
completed three walking trials at their self-selected
( SSWS) and fastest comfortable walking speeds
(FCWS). Using the anterior-posterior ground reaction
forces (GRFs), the percentage of total propulsion
generated by the paretic limb was calculated by dividing
the propulsive impulse of the paretic leg by the sum of
the paretic and nonparetic propulsive impulses, then
normalized to participant’s body mass. Other outcomes
included maximum voluntary isometric contraction
(MVIC) and peak isotonic power of the knee extensors
and overground walking at SSWS and FCWS. Paired
samples t-tests were used to determine the effects of
training pre-post. Results: Subjects significantly
improved their knee extensor MVIC (p=.034) and power
generation (p=.002) in the paretic limb. Both
overground SSWS (p=.001) and FCWS (p=.002)
significantly improved. However, there were no
significant improvements in paretic propulsion.
Conclusions: Although subjects improved strength,
power, and gait speed, they did not exhibit changes in
paretic limb contribution during walking. Future data will
look into other potential underlying kinetic and
kinematic mechanisms contributing to the significant
and clinically meaningful improvements in gait speed
observed in this cohort. VA I01 RX000844

145 The Role of P97 in DNA Inter-strand
Crosslink Repair, Halley B Rycenga, Jordan
Gruber, George Fullbright, David T Long;
Biochemistry, MUSC.

Accurate repair of DNA damage is critical to maintain
genome integrity and regulated cell growth. Cumulatively, it is estimated that cells acquire up to one
million individual DNA lesions per day. Human cells that
are defective in lesion repair or that are exposed to an
overwhelming amount of DNA damage can enter one of
three states: (1) an irreversible state of dormancy called
senescence, (2) programmed cell death, or (3)
unregulated cell division that can lead to tumor
formation. Elucidating the mechanism that cells employ
to fix or remove different DNA lesions will yield a better
understanding of both cancer development and
treatment. Replication of DNA containing inter-strand
crosslinks (ICLs) blocks progression of the CMG
helicase complex (comprised of Cdc45, MCM2-7, and
GINS). CMG displacement from chromatin is required
for repair enzymes to access the obstructed lesion and
thus is a critical step for DNA restoration. Our
laboratory recently showed that the ubiquitin-selective
segregase p97/Cdc48/VCP is required to unload the
stalled CMG and promote ICL repair in Xenopus egg
extracts. We are now investigating several key
questions that will explain how p97-mediated removal
of CMG is regulated during crosslink repair, what role
this process plays in cellular sensitivity to DNA
crosslinking agents, and whether CMG unloading
represents a general mechanism of DNA damage
tolerance in cells. These findings will provide a
comprehensive understanding of p97’s emerging role in
genome maintenance. NIH R00GM102325,
R35GM119512, TL1 TR001451, UL1 TR001450

146 Evaluating Stopping Boundaries for
Bayesian Multi-Arm Multi-Stage Design
with Binary Endpoints, Zhenning Yu, Caitlyn
Ellerbe, Viswanathan Ramakrishnan;
Biostatistics, MUSC.

Abstract not available.
**147 Genome-scale Genetic Knockout Screen Identifies Modifiers of EGFR Dependence in Non-small Cell Lung Cancer Cells.** Jon DiMaina, Chris Duckworth, Hiu Wing Cheung; *Pathology and Laboratory Medicine, MUSC.*

Non-small cell lung cancers (NSCLC) with epidermal growth factor receptor (EGFR) gene mutations exhibit a strong dependence on its signaling for growth and survival. Tyrosine kinase inhibitors (TKIs) of EGFR can provide superior clinical benefits over chemotherapy, however, most patients experience relapse with resistant tumors within a year despite initial response. We aim to identify genes contributing to TKI resistance in EGFR-mutant NSCLC cells. We performed a genome-scale CRISPR-Cas9 knockout screen in HCC827 lung cancer cells, an EGFR-mutant and TKI sensitive cell line. We constructed a pooled sgRNA library targeting more than 18,000 protein-coding genes and transduced it into HCC827 cells. We cultured them in the presence of Erlotinib, an EGFR TKI, or DMSO control. At the end of the treatment period we used next-generation sequencing to measure the relative abundance of each sgRNA; enrichment of sgRNAs in Erlotinib-treated groups over control groups inferred genes whose loss-of-function confer TKI resistance. A novel candidate gene identified by our screen is the E3 ubiquitin ligase HUWE1. We showed that suppression of HUWE1 by a doxycycline-inducible shRNA in HCC827 cells re-activates AKT and ERK1/2 and suppresses apoptotic cell death in response to erlotinib treatment. Furthermore, suppression of HUWE1 enabled growth of xenograft tumors in response to erlotinib treatment. Immunohistochemical analyses of xenograft tumor sections confirmed increased activities of AKT and ERK1/2 and reduction of apoptosis in shHUWE1-expressing tumors. In summary, our studies identified HUWE1 as a novel modifier of sensitivity to EGFR TKI in lung cancer cells and showed that reduced expression of HUWE1 activates bypass signaling to promote tumor cell survival and growth in response to EGFR inhibition. *Pathology and Laboratory Medicine, MUSC.*

**148 In Vivo Fluorescence Imaging Predicts Drug Uptake for Temperature Sensitive Liposomal Doxorubicin.** Anjan Motamarry, Christian Rossmann, Dieter Haemmerich; *Pediatrics, MUSC.*

Background/Purpose: Thermosensitive liposomal doxorubicin (TSL-Dox) is a promising nanoparticle drug delivery system that rapidly releases the contained drug in response to hyperthermia (>40 ºC). Combined with localized heating, TSL-Dox allow highly localized delivery (~10-30x local dose compared to unencapsulated Dox). The goal of this study was to demonstrate ability to image drug delivery in real-time, and quantify the effect of heating duration on drug delivery. Methods: Nude mice carrying subcutaneous tumors (lewis lung carcinoma) were anesthetized and injected with TSL-DOX at a dose of 2mg/kg. Localized hyperthermia was induced by heating tumors for either 15 or 30 min by a custom-designed hyperthermia probe (~2 mm diameter), heated to 50 ºC, and placed on the skin above the tumors. In vivo fluorescence imaging (excitation 485 nm, emission 610 nm) was performed before, during, and for 15 min following hyperthermia. After imaging, tumors were extracted and drug uptake quantified by fluorometry. Results: Local drug uptake could be visualized in real-time during hyperthermia, and fluorescence intensity correlated with amount of drug delivered to the tumor. Fluorescence increased by ~2.4 times when hyperthermia was increased from 15 to 30 min, demonstrating the effect of heating duration on drug uptake. Tumor drug concentration was 28.9 +/- 10.3 ug/g after 30 min hyperthermia, with undetectable drug amounts in control tumors not exposed to hyperthermia. Conclusions: In vivo fluorescence imaging may allow real-time monitoring of local drug delivery, and is predictive of delivered dose. Modulating the duration of hyperthermia allows control of locally delivered dose. *NIH R01CA181664.*

**149 The Role of Transcription Factors in Sinoatrial Node Differentiation.** Yunkai Dai¹, Kemar Brown², Rich Robinson³, Ann Foley¹; ¹Bioengineering, Clemson, ²Mount Sinai College of Medicine, ³Columbia University.

Pacemaker cells are exceedingly rare, accounting for <10,000 of the approximately 10 billions cells of the heart. Damage to the sinoatrial node (SAN) leads to bradyarrhythmias and eventually, heart failure. The molecular mechanisms that drive the SAN fate are poorly understood, although a transcriptional program that mediates this fate has been identified. Our previous studies showed that Map3K7/TAK1 is expressed in the embryonic myocardium with stronger expression in the atria and the presumptive SAN. Overexpression of Map3K7 in differentiating mouse embryoid bodies (EBs) drives myocardial differentiation toward a pacemaker-like fate. This includes activation of transcription factors (TFs) that mark the SAN, such as Tbx3, Tbx5 and Shox2. This suggests that TAK1 is upstream of the known SAN transcriptional program. We hypothesize that genetic manipulation of target TFs will direct SAN-like differentiation, alone or in synergy with Map3k7. To determine the optimal time frame for TF overexpression I made doxycycline inducible cell lines for the TFs Tbx3, Tbx5, Shox2, Tbx18, Islet1 and Map3k7. Several
phenotypic hallmarks of pacemaker cells will be examined, for example, fast beating rate, phase-4 diastolic depolarization, HCN4-mediated increase in If density, automaticity and marker expression. Recently, I tested an inducible Islet1 overexpression line (I4), during EB differentiation, using different doses of doxycycline (0, 20, 40, 100, 200, 500ng/ml). I assessed TurboRed expression (as an indicator of construct activation) and found a particular dose and time frame (500 ng/ml from day 2- day 16) that increased the percentage of cells with rapid beat rate (greater than 100 beats per minute at RT). Further analysis of markers and electrophysiology will be required to confirm SAN identity in these cells.

150 HIV Testing Attitudes and Behaviors At a Sports-based HIV Prevention Program in Mukuru Kwa Ruben, Nairobi, Kenya, Caroline J Vrana1, Danielle R Stevens1, Enouce Ndeche2, Jeffrey Korte1, 1Public Health Sciences, MUSC, 2Vijana Amani Pamoja.

Sports-based HIV prevention programs have shown overall strong evidence for positive effects on HIV-related knowledge, stigma, communication, self-efficacy, and risk behaviors. We collaborated with one such program, Vijana Amani Pamoja (VAP), to design and administer a voluntary, anonymous survey consisting of 23 questions on sociodemographics, HIV risk behaviors, HIV testing behaviors and attitudes, knowledge of HIV self-testing (HST), HIV status, and linkage and barriers to care. This tablet-based survey was made available to attendees of a VAP football tournament in Mukuru slum, Nairobi, in September 2016. Chi-squared and Cochran-Armitage trend tests (CA) were used to assess outcomes, and a p-value of <0.05 was considered significant. We received 494 responses to the survey. The majority of our sample were male (60.9%), Catholic (48.2%), and not married (77.94%), with median age of 18 years (range: 14-72). 7.5% of our sample self-reported as HIV positive. 47.8% had heard about HST, 72.3% expressed an interest in using HST, and 80.8% would be willing to hand out HST to friends and/or family in order to improve HIV testing rates. Older individuals were significantly more likely to have heard about HST (14-15 year olds: 40.4%, 16-18 year olds: 49.6%, 19-23 years: 47.2%, 24+: 63.1%; CA p-value=0.0026), and be interested in using HST (14-15 year olds: 61.3%, 16-18 year olds: 77.1%, 19-23 years: 77.1%, 24+: 85.6%; CA p-value=<0.0001). Respondents who tested at the tournament were significantly more likely to want to try HST than those who did not test at the tournament (78.1% versus 68.1%, respectively; chi-squared p-value: 0.029). These preliminary data suggest that this population is highly motivated to test for HIV and willing to use HST on themselves and as a tool to motivate others to test. This suggests a possible intervention aimed to increase testing rates of acquaintances of this highly motivated population. NIH UL1 TR001450, UL1 RR029882, UL1 TR000062; MUSC Center for Global Health

151 Diabetes and African American Women’s Health in South Carolina From 2009-2012, Elizabeth A Brown1, Amy Wahlquist2, Dana Burschell3, Carolyn Jenkins3; 1Health Professions, MUSC, 2Public Health Sciences, MUSC, 3College of Nursing, MUSC.

Background: Diabetes is a chronic illness that affects millions in the United States (U.S.) and often leads to poor cardiovascular health and death. African Americans (AA), women, and the elderly have a higher likelihood of developing diabetes. Objective: To compare differences in cardiovascular health and women’s health in AA women living with and without diabetes. Methods: Participants residing in Charleston and Georgetown counties in South Carolina (S.C.) were identified using an address-based sampling design. Self-report data were collected from 2009-2012 using the Centers for Disease Control and Prevention’s (CDC) Racial and Ethnic Approac

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152 Treating Post-Stroke Depression: Aerobic Exercise and Combined Aerobic Exercise and Transcranial Magnetic Stimulation, Catherine J VanDerwerker¹, Ryan Ross¹, Aaron Embry¹, Stacey Aaron¹, Brian Cence¹, Mark George⁵, Chris Gregory¹; ¹Health Sciences and Research, MUSC, ²Psychiatry and Behavioral Sciences, MUSC.

Introduction: Depression is the most frequently occurring neuropsychiatric disorder post-stroke. Treatment for post-stroke depression (PSD) is limited due to the ineffectiveness and often intolerance of antidepressants. Aerobic exercise (AE) and repetitive transcranial magnetic stimulation (rTMS) are established treatments for improving depressive symptoms in neurologically healthy individuals. The purpose of this study was to investigate the effects of AE and rTMS on depressive symptoms, functional mobility, and metabolic capacity. Methods: Six participants, 4 females (66.66%), 56.17±15.09 years old, and 49.00±19.59 months post-stroke, completed a 12-week AE program on a treadmill. AE was performed 3xs/week (40 min/session). Intensity was progressed from 40-50% of heart rate reserve (HRR) to 65-70% HRR by week 12. Two of the 6 participants, 1 female (50%), 61±4.24 year old and 49.00±21.92 months post-stroke, also completed rTMS 3xs/week (5,000 pulses at 120% of the motor threshold). Pre and post outcome measures included Patient Health Questionare-9 (PHQ-9) and Quick Inventory of Depressive Symptomology (QIDS) for depressive symptoms, 6-minute walk test (6MWT) for functional mobility, and peak oxygen consumption (VO2peak) for metabolic capacity. Results: Participants had mild to moderate depressive symptoms (PHQ-9 > 5). Among all participants, 83.33% (5/6) demonstrated improvements in PHQ-9 and 6MWT, 66.66% (4/6) improved QIDS scores, and 80% (4/5) improved VO2peak. Of those receiving dual treatment, 100% (2/2) improved PHQ-9 score and 6MWT, 50% (1/2) improved QIDS. Those that completed the dual program demonstrated a greater average change in both the PHQ-9 and 6MWT compared to AE. Conclusion: A small average improvement in depressive symptoms, walking endurance, and metabolic capacity following 12-weeks of aerobic exercise training was noted. Larger study is needed to explore AE only compared to AE plus rTMS as a treatment for PSD. The difference seen in the reported changes in depressive symptoms using PHQ-9 versus QIDS needs to be explored.

153 Left DLPFC TMS Modulates Striatal BOLD Signal in an Amplitude-dependent Manner: a Sham Controlled Interleaved TMS/BOLD Imaging Study, Logan T Dowdle¹, Truman R Brown², Mark S George¹, Colleen A Hanlon¹; ¹Psychiatry and Behavioral Sciences, MUSC, ²Radiology, MUSC.

Frontostriatal neural circuits are important areas of investigation in preclinical and clinical neuroscience. While preclinical researchers can modulate these circuits invasively, controlled and non-invasive clinical investigations are difficult. Our laboratory recently was able to differentially activate the frontostriatal circuits regulating executive and limbic processing with interleaved transcranial magnetic stimulation (TMS)/BOLD. Several important methodological issues need to be rigorously examined before this powerful technique can be used more widely. The goal of this study was to evaluate 2 aspects of TMS/BOLD imaging: 1) dose-response and 2) sham effects. Healthy adults (n=17) were recruited from the community. Experiment 1: Testing the hypothesis that increasing TMS stimulation at the DLPFC is positively correlated with the BOLD signal, 2 sessions of TMS/BOLD were collected with variable stimulation [90 to 120% of the motor threshold (rMT) (Dose Response condition, 40 pulses)]. Experiment 2: Testing the hypothesis that standard TMS-evoked signal is not merely a startle response, two sham stimulation sessions were performed in a sub-sample (n=14, Sham Controlled). Consistent with prior studies at 110% of rMT, DLPFC stimulation led to a significant increase in BOLD signal in the striatum, thalamus, insula, anterior cingulate cortex (ACC) and auditory cortices. In Experiment 1 (Dose Response), stimulator output was significantly correlated with the BOLD response in the bilateral striatum and anterior cingulate cortex. In Experiment 2 (Sham), real TMS led to significantly higher BOLD signal in the striatum and ACC versus Sham. There was no difference in the auditory cortex (control). These data demonstrate that there are amplitude-dependent effects of TMS on the striatal and cingulate BOLD signal. There was no relationship between amplitude and frontal cortical activation, potentially because of BOLD signal saturation. The ability of TMS to engage frontostrial loops by activating monosynaptic targets means it is a powerful tool for investigating circuit-specific neural responses. UL1 TR001450, T32 DA007288JM

154 Motor Cortical Stimulation Following Experimental TBI and Stroke Improves Motor Recovery, Serena-Kaye Kinley-Cooper, DeAnna Adkins; Neurosciences, MUSC.

Our previous studies demonstrated that recovery from an experimental traumatic brain injury (TBI) over the
motor cortex resulted in moderate to severe forelimb impairments. Unlike similarly placed and sized ischemic strokes, there is a reduction in injury related neuroplasticity. Further, skilled forelimb rehabilitative training (RT) alone fails to improve function and RT combined with optimized motor cortical stimulation (CS) results in only modest improvements in this model. Likely the differences are in part due to progression of the specific injury (TBI vs stroke) and the differences in severity of forelimb impairment between studies. Thus, to determine whether CS and RT effectiveness are related forelimb impairment we have induced moderate and severe ischemic strokes and compared motor recovery following different RT tasks, with or without CS. Preliminary results indicate that following strokes that produce severe forelimb impairments, neither RT task improved motor performance. Following moderate to severe stroke, CS combined with a highly skilled (challenging) and more moderately skilled RT task both improved motor function compared to a control, no RT group. Rats that receive CS along with the challenging RT, performed consistently better than animals that received the less challenging RT or noRT. Thus, these preliminary results indicate that the injury severity and quality or level of challenge of the RT may influence the level of recovery following ischemic stroke.

155 Decoding Visual Attentional and Perceptual Processes in the Hippocampus Using Electrocorticography, Zahraa Sabra¹, Jesse Breedlove¹, Leo Bonilha², Thomas Naselaris¹, ¹Neurosciences, MUSC, ²Neurology, MUSC.

Encoding of visual memory is heavily dependent on attentional state, and relies on neuronal activity within hippocampal cortices. Recent studies have implicated the hippocampus in the neuronal representation of both attention and perception during memory encoding. Here, we investigate whether visual attention and perception are differentially encoded in the hippocampus at different frequency bands using electrocorticography. Nine epileptic patients undergoing peri-operative monitoring using electrocorticography were consented to an experiment that involved viewing a stream of images featuring a face, building, or car. Subjects were instructed to attend to a specific category across 15 blocks, 30 images each. Local field potentials derived from hippocampal electrodes were filtered into different frequency bands. We then built a predictive “All-or-none” model that detects which contact points are visually responsive to perceived stimuli irrespective of its perceived/attended category at each frequency band. We compared the performance of this model to more elaborate predictive models that featured perceptual state, attentional state, or the combination of both states. By comparing the elaborate models to the “all-or-none” model, we found that attention is encoded in high gamma, and delta oscillations, whereas perception is encoded in the low frequency range delta to low beta. Interestingly, combined selectivity for attention and perception is encoded in both delta to low beta and high gamma bands. These findings reveal an important dimension of how brain encodes visual attention and perception, and support the hypothesis that visual attention is communicated across the brain at low frequencies, and dynamically sustained in reverberating local circuits in the high gamma band, whereas visual perception is mainly encoded at low frequencies compatible with long-range communication. This understanding of attentional and perceptual encoding in oscillation bands may shed light on how long term memory is encoded and introduces a potential biomarker for deficits in attention or memory encoding. NEI R01 EY023384

156 Functional Connectivity of the STN and PPN in Patients with Freezing of Gait, Daniel H Lench¹, Revuelta J Gonzalo², Hanlon A Hanlon¹, ¹Psychiatry and Behavioral Science, MUSC, ²Neurology, MUSC.

Introduction: Surgical targeting of the subthalamic nucleus (STN), and globus pallidus internus (GPI) for Deep Brain Stimulation (DBS) has been shown alleviate motor symptoms in Parkinson Disease (PD) patients. However, there is limited ability to treat symptoms involving freezing of gait. Recently, data suggests that the pedunculopontine nucleus (PPN) may serve as an effective target to reduce freezing. To understand the role of these targets in freezing behavior we investigated their functional connections to motor network regions among freezer and non-freezer patients. We hypothesized that functional connectivity between the PPN and motor network regions would be impaired among freezers. Methods: Resting state fMRI data was collected from 19 non-freezers and 14 freezers. BOLD time series were extracted via SPM 12’s marsbar toolbox from predetermined regions of interest (ROIs) including the left and right PPN, STN, pallidum, cerebellum, putamen, caudate, primary motor cortex, supplementary motor areas (SMA), and thalamus. Time course correlations were performed to determine a correlation coefficient between the STN, and all motor ROIs, as well as the PPN and motor ROIs. Using SPSS a 2 Way ANOVA (repeated measures) was used to compare ROI pair connectivity of the STN or PPN x group. Results: The left STN connectivity showed a significant effect of ROI pair (F(6,186)=12.530, p<.001) but no effect of ROI pair x group or group alone . Meanwhile left PPN connectivity showed a significant effect of ROI pair (F(6,186)=5.399, p<.001) and a significant main effect of group
(F(1,31)=7.799, p<.01) but no significant interaction of ROI pair x group. Conclusions: Preliminary results from the present study indicate that an increase in PPN connectivity within the motor network is associated with freezing of gait. **NIH P20GM109040, TL1 TR001451, UL1 TR001450**

**157 High-Fat Diet Induced Non-Alcoholic Steatohepatitis Impairs Liver Regeneration Post Partial Hepatectomy**, SM Touhidul Islam, Gabriel R Chedister, Julie H Lench, Arun P Palanisamy, Caroline Westwater, Michael Schmidt, Kenneth D Chavin; *Microbiology and Immunology, MUSC.*

Introduction: Although surgical resection of part of the liver (partial hepatectomy) is a well-recognized treatment option for many liver diseases, pre-existing pathological abnormalities originated from fat-rich diet mediated steatosis (fat accumulation) can alter the postoperative outcomes. Despite the well-established effect of obesity in steatosis in liver, little is known about the impact of high-fat diet on liver regeneration. In this study, we investigated the impact of both saturated and unsaturated fat-rich diet induced steatosis on liver regeneration in C57BL/6 mice. Methods: 8 week-old mice (n=16) were fed with low-fat control diet (CD, 13% fat), unsaturated fat-rich diet (UFD, 60% fat) or saturated fat-rich diet (SFD, 60% fat) for 16 weeks. Partial hepatectomy (PHx, approx. 70% resection) was carried out at 16 weeks and mice were continued on the same experimental diets. At day 2 (n=8) and at day 7 (n=8), the mice were injected with BrdU i.p., one hour prior to euthanization to analyze hepatic regeneration. Samples were collected from the resected and regenerated liver and examined for inflammation-indicative markers and histological analyses. Results: Mice fed SFD or UFD exhibited increased body and liver weights and showed higher NAFLD score, levels of inflammatory cytokines, neutrophil infiltration, and macrophage accumulation compared to mice fed CD. Increased hepatic inflammation in mice fed UFD or SFD resulted in decreased BrdU incorporation. Importantly, mice fed SFD showed similar level of steatosis, but higher hepatic inflammation and less regeneration compared to the mice fed UFD. Conclusion: Both SFD and UFD develop steatosis in mice resulting in decreased hepatic regeneration following partial hepatectomy, while SFD causes greater inflammation and lower regeneration compared to the UFD. This may be key to understand which post hepatectomy patients will decompensate.

**158 In Utero Exposure to Tobacco Smoke, Subsequent Cardiometabolic Risks and Metabolic Syndrome Among U.S. Adolescents**, Danielle Stevens¹, Caroline West², Angela Malek¹, Kelly Hunt¹; ¹*Public Health Sciences, MUSC,* ²*Medicine, MUSC.*

Maternal smoking during pregnancy increases the risk of adverse pregnancy outcomes. However, little is known regarding the relationship between in utero smoking exposure and offspring cardiometabolic risk. Therefore, we investigated the association between metabolic syndrome traits in adolescents and in utero smoke exposure. Participants included 6,727 adolescents aged 12-15 years in the 1999-2012 National Health and Nutrition Examination Survey (NHANES). Multivariate logistic regression was conducted to estimate ORs and 95% CIs for the association of smoking during pregnancy with adolescent metabolic syndrome and its components, and linear regression assessed the relation with age at menarche. Metabolic components examined were high waist circumference (>90th percentile), overweight (BMI ≥85th percentile) and obesity (BMI ≥95th percentile), low HDL (<40 mg/dL), high triglycerides (>110 mg/dL), high SBP (>90th percentile) and high fasting glucose (>100 mg/dL). Of adolescents exposed to smoke in utero (17%), the prevalence of metabolic syndrome was 9.78% compared to 5.83% in unexposed (p=0.049). After adjusting for adolescent and maternal age, and race-ethnicity, the exposure was associated with metabolic syndrome among males [OR=2.74 (1.28, 5.85)], and high waist circumference in male [OR=1.60 (1.10, 2.31)] and female [OR=1.54 (1.07, 2.24)] adolescents. High fasting glucose [OR=2.02 (1.05, 3.87)] and lower mean age at menarche were associated with the exposure among females (11.5 vs. 11.7 years, p=0.032). Further adjustment for SES and birthweight found that waist circumference among male [OR=1.50 (1.00, 2.22)] and female [OR=1.58 (1.07, 2.32)] adolescents, and overweight [OR=1.42 (1.00, 2.01)] and obesity [OR=1.90 (1.02, 3.53)] among females, were significantly associated with the exposure. In adolescence, offspring of mothers who smoked during pregnancy were at increased risk of metabolic syndrome and some of its components. Our study observed a long-term cardiometabolic impact of smoking during pregnancy in adolescents, and highlights the importance of maternal smoking cessation.

**159 Vagus Nerve Stimulation Decreases Inflammation and Increases BDNF in a Model of Parkinson’s Disease**, Ariana Q Farrand¹, Rebecca A Gregory², Kristi L Helke², Vanessa K Hinson³, Heather A...
Boger¹; ¹Neurosciences, MUSC, ²Comparative Medicine, MUSC, ³Neurology, MUSC.

Treatment strategies for Parkinson’s disease (PD) are purely symptomatic, and often have major side effects. Patients with PD have degeneration of noradrenergic neurons in the locus coeruleus (LC-NE neurons) prior to substantia nigra dopaminergic (SN-DA) loss. Vagus nerve stimulation (VNS) has been shown to upregulate firing of LC-NE neurons, and is thought to act by increasing BDNF in the LC and its targets, making it a potential PD therapeutic. In this study, we hypothesized that chronic VNS increases BDNF to attenuate behavioral deficits, neuronal dysfunction, and inflammation observed in PD. To model PD, we created a double-lesion in rats by administering the NE neurotoxin DSP-4, with administration of intrastratal DA toxin 6-OHDA one week later. During the intracranial surgery, a subset of rats also received vagus nerve cuffs to allow for VNS. Ten days post-6-OHDA, rats in the VNS group received stimulation at set parameters for two thirty minute sessions per day for ten days, measuring daily locomotor activity during the afternoon session. Immediately following the final stimulation session, rats were euthanized and bilateral SN and LC were dissected for immunohistochemical analysis of neuronal populations and inflammatory markers. Right frontal cortex and dorsal striatum were dissected for ELISA detection of BDNF. VNS significantly increased locomotor activity in lesioned rats, making activity comparable to saline controls. VNS also improved deficits of TH-positive neurons in both SN and LC in lesioned animals, and decreased inflammation in these regions. BDNF levels were increased in both frontal cortex and dorsal striatum, supporting the idea that BDNF is involved in driving these beneficial effects. Collectively, these data suggest that VNS may be beneficial to treat PD, both by reducing side effects associated with current drug therapies, as well as reducing stress associated with intracranial implants for deep brain stimulation. MUSC Barmore Foundation; NIH P20GM103542

160 Interleukin-like EMT Inducer ILEI Controls Metastatic Progression Through LIF-R/GP130 Receptor Signaling, Alec Woosley, Annamarie Dalton, Philip Howe; Biochemistry and Molecular Biology, MUSC.

During the epithelial-mesenchymal transition (EMT), cells undergo a switch from a polarized, epithelial state to a highly motile and more aggressive mesenchymal phenotype that is associated with cancer stem cells (CSC) and metastases. Our lab has identified a regulatory mechanism by which Transforming Growth Factor-β (TGFβ) induces EMT at the translational step of gene expression. An inhibitory complex consisting of heterogeneous nuclear ribonucleoprotein E1 (hnRNP-E1) and eukaryotic elongation factor 1α1 (eEF1α1) suppresses translational elongation through binding to the 3’UTR of several EMT-inducing genes. TGFβ stimulation promotes the release of this complex by Akt2-mediated phosphorylation of hnRNP-E1 at Ser43. Among the mRNAs controlled by this mechanism is the cytokine Interleukin-like EMT Inducer (ILEI), a secreted factor belonging to the FAM3 family. The biochemical mechanism of the ILEI pathway and identification of the ILEI receptor has remained elusive. The basis of this study aims to investigate the mechanism of the ILEI signaling pathway and its contribution to EMT and CSC formation. In order to identify potential ILEI binding partners, we utilized yeast two-hybrid screening and observed that ILEI interacts with the 190kD leukemia inhibitory factor receptor (LIF-R). LIF-R is cross-reactive with several cytokine ligands and forms a complex with glycoprotein 130 (GP130) and an array of other ligand-specific co-receptors during signal transduction. In order to investigate whether ILEI signals through the LIF-R/GP130 complex, we have isolated a pool of secreted ILEI protein from WM9 melanoma cells that is able to stimulate LIF-R phosphorylation and downstream STAT3 activation upon direct treatment. We also demonstrate that acquisition of stem-like properties associated with CSCs is effected when the ILEI/LIF-R/GP130 pathway is genetically modulated. Taken together, these studies will confirm the molecular mechanism of ILEI signaling, promoting future studies into the development of targeted drug therapies against TGFβ-mediated breast cancer metastasis. NIH RO1CA555536

161 Identifying the Role of VRK-1 in the DNA Damage Pathway. Maya F El-Sabban, Aye Mon, Paula Traktman; Biochemistry and Molecular Biology, MUSC.

Vaccinia related kinase 1 (VRK-1) is a nuclear serine/threonine kinase that is highly expressed in proliferative cells. VRK-1’s strongest identified substrate, Barrier-to-Autointegration Factor (BAF), is associated with a variety of nuclear functions. By interacting with DNA and chromatin as well as inner nuclear envelope proteins and lamins, it is involved in organizing the architecture of interphase chromatin and the nuclear envelope. It has also been reported to activate several transcription factors and proteins that contribute to the DNA damage response (DDR) response, including p53 and NBS. BAF has also been reported to interact with components of the DDR. Recent studies from the Lazo laboratory have demonstrated that VRK-1 depletion results in a dampened DNA damage response and hypersensitivity
to DNA damage agents. Of importance, VRK1 overexpression has been reported in a variety of cancers, and has was previously identified as part of a 19-gene signature correlated with a poor clinical outcome in patients with a subset of breast cancer. We considered the possibility that VRK1 overexpression might alter the efficacy of DNA damaging therapeutics and/or augment genomic instability, which in turn could lead to cancer progression and/or resistance to therapy. Therefore, we have initiated studies to monitor the impact of VRK1 overexpression on basal levels of DNA damage as well as the response to DNA damaging agents. Our preliminary studies indicate that VRK1 overexpression does not change the IC50 of doxorubicin or etoposide. To assess basal levels of DNA damage, we are using comet assays to monitor dsDNA breaks, immunofluorescence to monitor 53BP1-containing DDR foci, and immunoblot analysis to monitor the expression of the DDR-specific histone isoform, gamma-H2-AX.

162 The Role of DZIP1 and Primary Cilia in Valve Development and Disease, Katelynn A Toomer, Diana Fulmer, Lilong Guo, Amanda Johnson, Kathrine Williams, Chip Norris; Regenerative Medicine and Cell Biology, MUSC.

Cardiac valve disease is a major health burden. Mitral valve prolapse (MVP) is one of the most common forms of cardiac valve disease and affects ~2-3% of the human population. MVP can lead to secondary complications such as arrhythmias, heart failure, and sudden cardiac death and 1 in 10 patients will require valve surgery. There are no effective nonsurgical treatments for MVP and therapeutic efforts have been hindered by an incomplete understanding of its fundamental causes. One accessible source of such information may come from genetic studies of MVP. We previously reported familial and GWAS studies that identified genetic mutations and/or excellent candidate targets as causal to MVP. Pathway analyses suggested a common cellular and molecular thread between these studies and invoke the primary cilia as potential unifying mechanism. This discovery is further bolstered by our recent identification of a mutation in a cilia gene in a large family with MVP, DZIP1. Our data show genetic haploinsufficiency of primary cilia in cardiac valves leads to a non-syndromic mitral valve disease in mouse models whereas complete genetic ablation enhances mitral valve phenotype severity and generation of bicuspid aortic valve (BAV). We present, for the first time, a potential common cellular and molecular thread through which MVP and potentially BAV can arise. These studies define the primary cilia as a critical, and previously unrecognized facet of cardiac valve development. Uncovering how valve disease genes regulate downstream signaling cascades will provide key mechanistic insights into MVP and potentially BAV pathogenesis at a cellular and molecular level. AHA Predoctoral Fellowship

163 Molecular and Structural Maturation of the Nodes of Ranvier in Mouse Auditory Nerve Correlates with Hearing Onset, Clarisse H Panganiban¹, Yazhi Xing¹, Nancy Smythe¹, LaShardai Brown¹, Jeremy Barth², Hainan Lang¹; ¹Pathology, MUSC, ²Regenerative Medicine and Cell Biology, MUSC.

Background: Canonical nodal structures are essential for axonal conduction, but their roles in hearing onset and maintenance of auditory function remain to be elucidated. Mouse auditory nerve refines during early postnatal development, with hearing onset occurring around postnatal (P) days 10-12. Auditory brainstem responses (ABR) continue to improve beyond P14, reaching thresholds near those of adult mice. Contribution of auditory nerve input from normally developing hair cells (HCs) on nodal formation must also be considered. We examined relationships between molecular and structural maturation of nodes of Ranvier and hearing onset, as well as nodal formation in a model of hair cell dysfunction. Methods: Microarray analysis was performed on RNAs from auditory nerves of P0, 3, 7, 10, 14, and 21 CBA/CaJ mice. Nodal function-related genes were assembled via AmiGO 2 and evaluated with dChip. Nodal structures were examined via immunohistochemistry and electron microscopy. ABRs were conducted in postnatal and young-adult mice. Additionally, homozygous Diminuendo mice having underdeveloped HCs were used to evaluate ablated auditory input on nodal formation. Results: Node-related genes exhibited temporal expression patterns during development, distinguishing nodal segment identities and complementing hearing onset. By P10, paranodal and nodal structural proteins, were fully assembled. At P14, nodes have robust expression of Nav1.6, a marker of mature nodes, which correlate with improvement of ABR threshold. As mice approach the age of hearing onset, axonal node lengths become more compact and variability of lengths decrease. Also, heminodes cluster precisely at the habenula perforata throughout the apical to basal turns of the cochlea. Ultrastructural examinations revealed terminal myelin loops are not completely organized until P14. With Diminuendo mice, heminodal clusters at the habenula perforata appeared disorganized and immature compared to wild-type at P14. Conclusions: Molecular and structural maturation of the nodes, characterized by compaction in length, fully-formed paranodes, and Nav1.6 presence, may contribute to hearing onset and improvement of ABR
Introduction: Re-establishing vasculature after a myocardial infarction (MI) may help to spare non-regenerative myocardium and subsequent cardiac function. Wisp-1-a secreted matricellular protein that regulates collagen secretion and angiogenesis in certain cancers-promotes cell survival in cardiac myocytes in vitro. However, the potential role Wisp-1 plays post-MI, has not been evaluated. Histone deacetylase inhibitors (HDACi) attenuate adverse effects of an MI in small animal models but it is unclear which genes and or targets contribute to this benefit. Our preliminary data shows that Wisp-1 is upregulated 15-fold in response to MI injury compared to sham-operated mice. However, Wisp-1 is upregulated 45-fold in mice that are subjected to an MI injury and treated with the HDAC inhibitor, suberanilohydroxamic acid (SAHA). Therefore, we hypothesized that HDACi mediated upregulation of Wisp-1 contributes to beneficial angiogenesis, post-MI. Methods: To test this we subjected age and sex matched mice to ligation of the L.A.D. coronary artery or sham operation. Mice were injected daily with either DMSO/vehicle, or the HDAC inhibitor, SAHA. Seven days post-MI, mice were euthanized and their heart tissue was assessed for the expression of Wisp-1 and microvasculature. We also assessed the impact of recombinant WISP-1 treatment and RNAi technologies on isolated human coronary artery endothelial cells (HCAECs). Results: We observed that HDACi mediated upregulation of Wisp-1 is specifically found at the border zone of infarction and is proximal to increased microvasculature. In vitro studies show that recombinant WISP-1 protein promotes the expression of pro-angiogenic genotypic and phenotypic characteristics in HCAECs. Lastly, shRNA-targeted suppression of endogenous Wisp-1 functionally reduces endothelial cell network branching in vitro. Conclusion: Therapeutic interventions after a heart attack can greatly impact the extent of infarct injury, cell survival and overall prognosis. Our studies shown here identify a novel pro-angiogenic target, Wisp-1, that may be useful in post-MI treatment modalities. VA Merit BX002327; NIH T32 HL007260

164 Investigation of Cdc34 Molecular Interaction with Ubiquitin Conjugation Enzyme Partners, Katelyn Williams, Zongyang Lyu, Shaun Olsen; Biochemistry and Molecular Biology, MUSC.

Cdc34 is a key regulator in cell cycle progression at the G1 to S phase checkpoint. It acts as an E2 ubiquitin conjugating enzyme that is first charged with ubiquitin by E1 enzyme and then functions with the SCF E3 enzymes to modify other cell cycle proteins with ubiquitin for targeted degradation by the proteasome. In years since its discovery, Cdc34 dysregulation has been implicated in several types of cancer. Many downstream targets of Cdc34 are cyclin-dependent kinase inhibitors such as p27 and p40 that are critically important for cancer progression. Together, these findings have led to investigations of Cdc34 as a target for cancer therapeutics but a more directed approach, such as specifically targeting Cdc34 interactions with its enzyme partners is needed. However, a detailed structural understanding for molecular recognition of Cdc34 by its E1 partner, Uba1, and E3 ligase partners is not available. Further, regulation of Cdc34 is not completely understood. Previous studies have shown phosphorylative regulation of Cdc34, and we are interested in investigating the effects of phosphorylation on these structural interactions. Thus, in these studies, we aim to identify key residues in the molecular recognition of Cdc34 by its enzyme partners and examine the effects of Cdc34 phosphorylation on these structural interactions by utilizing x-ray crystallographical, biochemical, and genetic approaches.

165 Oncogene Targets on the 8p11-p12 Amplicon in Breast Cancer, Alexandria C Rutkovsky, Stephen P Ethier; Pathology, MUSC.

Abstract not available.

166 Histone Deacetylase Inhibition Targets Wisp-1, a Novel Cardiac Angiogenesis Regulator, Within Post-MI Myocardium, Lillianne H Wright, Daniel Herr, Symone Brown, Harinath Kasiganesan, Donald Menick; †Cardiology, MUSC, ‡SURP, MUSC.

Objectives: While medicine generally focuses on managing patients for a single disease, a common...
characteristic of patients seen at the Veterans Health Administration (VHA) is a high number of comorbidities (i.e., multimorbidity). As managing each disease separately has been shown to be inefficient, costly and inconvenient, there is movement towards holistic patient management. To provide a more complete understanding of multimorbidity in the VHA, this study examines the magnitude of and disparities within multimorbidity by location of residence and race/ethnicity. Methods: Three national cohorts were created using ICD9 codes and lab values from VA administrative databases for Veterans with chronic kidney disease (CKD) (n=2,190,564), traumatic brain injury (TBI) (n=167,954) and diabetes mellitus (DM) (n=1,263,906). Multimorbidity was measured using three commonly used measures, which were compared by race/ethnicity and location of residence using negative binomial regression to estimate the unadjusted and adjusted association between multimorbidity count and covariates. Results: The CKD cohort had a mean age of 74.5, 80.9% non-Hispanic white (NHW), and 64.4% urban residence. TBI had a mean age of 49.7, 76.4% NHW, and 70% urban. The DM cohort had a mean age of 66.9, 63.8% NHW, and 70.9% urban. For Veterans with CKD, rates of multimorbidity in non-Hispanic blacks (NHB) were 1.16 times higher in urban areas and 1.10 times higher in rural areas compared to NHW. Diabetes and TBI were similar with rates for NHB 1.05 higher in urban areas and 0.97 lower in rural areas for both diseases. Conclusion: Multimorbidity rates vary for traditionally disadvantaged groups including non-Hispanic blacks and rural Veterans across three major chronic illnesses. Given the impact of multimorbidity on mortality and health outcomes, these variations suggest that Veterans needs could be better addressed through the development of policies and guidelines that provide a culturally tailored approach to chronic disease clusters. Charleston Health Equity and Rural Outreach Innovation Center (HEROIC), Ralph H. Johnson VA Medical Center

169 Probing the Contractility of Capillary Pericytes in Vivo with Optogenetics, David A Hartmann, Roger Ian Grant, Andy Y Shih; Neurosciences, MUSC.

The cerebrovasculature modulates its resistance to flow in order to match blood supply with the high metabolic demand of the brain. While it is accepted that arterioles ensheathed by vascular smooth muscle cells are capable of modulating blood flow resistance, it is debated whether capillaries lined with pericytes also regulate blood flow. In an attempt to clarify the capacity for pericycle-lined capillaries to regulate blood flow, we examined the contractile ability of cerebral pericytes ~5-9 branch points beyond the penetrating arteriole, which constitutes the middle of the capillary bed. To do this, we generated a transgenic mouse expressing channelrhodopsin-2 in all mural cells (smooth muscle cells and pericytes), and imaged vascular dynamics through an acute skull-removed cranial window using two-photon wavelengths that excite channelrhodopsin-2 primarily in the plane of focus during real-time image collection. In mice lightly anesthetized with isoflurane, we observed a ~10% reduction in capillary diameter

168 Benefits of Acute Aerobic Exercise on Neuroplastic Potential in Depression, Ryan E Ross 1, Mark S George 2, Michael E Saladin 1, Chris M Gregory 1; 1Health Sciences and Research, MUSC, 2Psychiatry and Behavioral Sciences, MUSC.

Introduction/Rationale: Depression affects millions of Americans and is a leading contributor to disability and mortality in the United States. Evidence indicates that neuroplasticity is impaired in those with depression and successful treatment for depression appears to reestablish neuroplastic potential. Aerobic exercise (AE) has well-established antidepressant effects and has been shown to modulate neuroplasticity in non-depressed subjects. As a precursor to studies in depressed subjects, this project aimed to examine [1] the influence of AE and [2] exercise intensity on neuroplasticity in non-depressed subjects. Methods: Twelve non-depressed subjects (8 female; 35.4 ± 8.3 years old) completed three experimental sessions that included assessment of corticospinal excitability (CE), AE (15 minutes) and paired associative stimulation (PAS) to determine neuroplastic potential. CE was assessed via transcranial magnetic stimulation and surface electromyography of the abductor pollicis brevis muscle before and after exercise, and for one hour after PAS. AE was performed on a stationary cycle ergometer at low intensity (LO), 35% heart rate reserve (HRR); high intensity (HI), 70% HRR; or a non-exercise control condition (CON). The primary outcome was change in peak-to-peak motor evoked potential amplitude relative to baseline assessment. Results: Mean post-PAS CE was increased 23.7% and 11.0% in the HI and LO conditions, respectively. The HI condition had greatest influence immediately and 15 minutes post-PAS while the LO condition had greatest influence 15 to 45 minutes post-PAS. The CON condition had minimal impact on post-PAS CE. Conclusions: Higher exercise intensity appears to have a greater influence on CE. Interestingly, these effects appear to produce a rapid increase in CE while low intensity exercise results in a gradual, prolonged increase in CE. Modulation of CE via exercise in depression has yet to be established but may underlie the anti-depressant effects of AE. Work examining the influence of AE on CE in depression is currently in progress. NIH P20 GM109040, UL1 TR001450
from baseline. We only observed diameter changes when using 800 nm two-photon excitation, a stimulation protocol previously used by Hill, et al. (Neuron 87, 2015). The same capillaries exhibited no diameter changes when imaged with 900 nm two-photon excitation, thus making artifacts due to movement of the animal, breathing or heart-beat less likely a contributor to the observed changes. Critically, we did not observe the same extent of capillary constriction using an equivalent stimulation protocol on littermates lacking channelrhodopsin-2 in murine cells. This indicates that channelrhodopsin-2 excitation is the most likely cause of capillary constriction, rather than laser-induced vessel damage. We also find that red blood cell flow through capillaries is significantly affected by pericyte constriction. Although these are not physiological conditions (i.e. anesthetized with optogenetic stimulation), this work suggests that pericytes deep in the capillary bed are capable of modulating lumen diameter and blood flow. NIH T32GM087116, UL1TR001450, TL1TR001451, F30NS096868, R21NS096997; AHA 14GRNT20480366

170 Macrophage-mediated Elimination of Excessive Glial Cells Contributes to Auditory Nerve Refinement in the Postnatal Mouse Cochlea, LaShardai N Brown¹, Yazhi Xing¹, Jeremy L Barth², Clarisse H Panganiban¹, Nancy M Smythe¹, Mary C Bridges³, Hainan Lang¹, ¹Pathology, MUSC, ²Regenerative Medicine and Cell Biology, MUSC, ³Graduate Studies, MUSC.

Spiral ganglion neurons (SGNs) are the conduits for the transmission of auditory information from the hair cells to the brain. During development of the mouse cochlea, SGNs extend an abundance of nerve fiber connections to hair cells. Both SGNs and their auditory nerve fibers become ensheathed by myelinating or non-myelinating glial cells. Immature neural circuits are refined by elimination of excessive nerve and glial cells, however it remains undetermined how glial cell numbers are regulated during this auditory nerve refinement process. In other neural systems extra synapses and axonal branches are eliminated by macrophage phagocytosis. Our study determines the extent to which macrophages eliminate excessive glial cells during auditory nerve refinement, contributing to the maturation of auditory function. CBA/CaJ mice were used at postnatal day (P)0 - 21. Neuron-glia-macrophage interactions were investigated using 3D confocal imaging and transmission electron microscopy. Transcriptomic Analyses were used to identify key molecules that regulate macrophage activation and auditory nerve refinement. Mice with a diphtheria toxin (DT) receptor on CD11b, a surface integrin on the membranes of active macrophages, were used to selectively eliminate macrophages during nerve refinement. Auditory nerve function of DT-treated mice was measured by auditory brainstem response (ABR). Macrophage numbers peaked around P7, concurrent with the decrease of glial cells and auditory nerve refinement. Confocal imagery and ultrastructural examinations revealed that macrophages engulf nerve fibers and glial cells during nerve refinement. Diminishing macrophage activity with DT treatment in CD11bDTR mice resulted in a significant increase in glial cells in the auditory nerve, supporting the hypothesis that macrophages eliminate excessive glia during development. Additionally, physiological tests revealed elevated ABR wave I thresholds in DT-treated CD11bDTR mice compared to control mice. Our data demonstrate a novel role for macrophages in the formation of proper neural circuits and the maturation of auditory function during development. Glenn/AFAR Scholarship, NIH T32 DC014435, R01 DC7506, P50 DC00422, GM103342, GM103499, R25 GM072643

171 In-Silico Design and Synthesis of Novel, Potent, Amine Oxidase Family Inhibitors (LSD1 and SMOX) As Efficacious Agents in Pancreatic Cancer, Steven L Holshouser, Patrick Woster; MUSC.

Epigenetic changes via post-translational modification of histones regulate transcriptional activity in normal tissues. Chromatin-remodeling histone modifications are reversible, and commonly dysregulated in cancer, as well as a variety of other multiple diseases, making them attractive targets for therapeutic intervention. The chromatin remodeling amine oxidase lysine-specific demethylase 1 (LSD1) been identified as a key epigenetic modulator, and has been targeted for antitumor therapeutics to treat breast, prostate, lung and potentially pancreatic cancers. Data from our laboratory has shown that LSD1 is over expressed by 2-5 fold in various pancreatic cell lines, when compared to normal epithelial cells. The homologous amine oxidase spermine oxidase (SMOX), has been implicated in gastric cancer. Amine oxidase inhibitors have therapeutic potential to treat a multitude of cancers as well as other diseases where their levels are elevated. Previous data has demonstrated that in relevant models of human colon and gastric cancer, induction of the polyamine catabolic enzyme SMOX caused by Helicobacter pylori infection/inflammation results in the production of H2O2 and depletion of the naturally occurring, radical scavenging compound spermine. These conditions promote the induction of DNA damage, and result in tumorigenesis. These data indicate that the DNA damage induced by ROS leads to recruitment of transcriptional repressor complexes to specific genes and can result in epigenetic
transcriptional silencing. This suggests a putative molecular pathway in which infection/inflammation-induced SMOX activity is directly linked to carcinogenesis, and defines SMOX as an attractive target for chemoprevention. Through analytical QSAR, molecular modeling and SAR, a focused library of small molecule LSD1 and SMOX dual inhibitors have been identified that possess improved specificity and efficacy toward reducing cancer.

172 The Role of Pericytes in HIV-Associated Emphysema, Sarah E Stephenson, Carole L Wilson, Lindsey M Felton, Lynn M Schnapp; Medicine, MUSC.

Abstract not available.

173 Chronic Cocaine Self-Administration Impairs the Ability of Dopamine to Enhance Neuronal Excitability By Inhibition of Kv7/KCNQ Channels, Priyodarshan Goswamee, Jeffrey Parrilla-Carrero, William Buchta, Peter W Kalivas, Arthur C Riegel; Neurosciences, MUSC.

Glutamatergic pyramidal cells in the dorsomedial prefrontal cortex (PFC) receives dopaminergic inputs from the ventral tegmental area (VTA) and innervates to nucleus accumbens (ACB). This neuro-circuitry is central to motivation and reward processes, but dysregulated during addiction. Studies conducted in an extinction-reinstatement model of cocaine self-administration (SA), exposure to drug-paired cues following extinction training, have been shown to precipitate relapse of drug-seeking behavior in rats via dopamine-dependent activation of the PFC to ACB pathway. However, the molecular and physiological changes that occur during this neuroadaptation are unclear. In the present study, we investigated these cocaine-SA induced changes utilizing electrophysiological approaches in combination with the above-mentioned behavioral model of cocaine-SA. Current clamp recordings performed 24 hours after conclusion of the cocaine-SA regimen illustrated a global reduction in the intrinsic inhibition of the PFC cells as measured by spike frequency adaptation (or accommodation), that persisted in a sub-population of cells even after a period of 14 days of extinction. Interestingly, this loss of accommodation had a strong correlation with neuronal activation probed in a separate group of c-fos GFP transgenic rats. Exogenous application of dopamine resulted in increase in firing frequency (and loss of accommodation) in control rats (yoked saline and/or yoked cocaine). In contrast, in tissue obtained from cocaine-SA animals, effect of dopamine appeared to be occluded, presumably through superactivation of the mesocortical dopamine circuit. Parallel whole-cell voltage clamp recordings revealed that the dopamine-dependent modulation of KCNQ channel activity was impaired in cells that had lost accommodation. In addition, pharmacological stabilization of KCNQ by retigabine showed significant reduction in cue-induced reinstatement. Taken together, our results indicated a role for the inhibitory KCNQ channel that may underlie this enduring neuroadaptation and has the potential to be exploited as a therapeutic target to treat cocaine addiction. *Authors contributed equally NIH R01D8033342, P50DA015369, T32DA007288

174 Measurement of Self-Reported Alcohol Use: Are Two Well-Validated Instruments Comparable?, Kristen B Johnson¹, Therese Killeen², Bernadette P Marriott³, ¹Gastroenterology, MUSC, ²Psychiatry and Behavioral Sciences, MUSC, ³Gastroenterology, MUSC.

Background: In 2013 NIAAA estimated 70.7% of adults drank alcohol in the prior year while 7% of adults had an alcohol use disorder (NIAAA 2015). From a dietary perspective, alcoholic beverages impact energy intake and diet quality, thus accurate estimate of alcohol intake is important. Objective: The purpose of this analysis is to systematically compare two well-validated instruments to measure alcohol intake. One-day 24-hour recall using the USDA's Automated Multiple Pass Method (AMPM) and the Timeline Followback (TLFB), which is a well-validated tool used by psychiatrists to evaluate substance use, will be compared using baseline data from participants enrolled in a randomized placebo-controlled trial in which both tools are routinely administered. Materials and Methods: On corresponding days, alcohol (grams) was assessed by the AMPM and number of drinks was estimated by the TLFB. Estimated number of drinks was multiplied by 14 to determine alcohol intake (grams) per NIAAA definition of a standard drink. Both tools were administered in-person by trained interviewers. Results: More participants reported alcohol intake on the AMPM (34.9%) vs. the TLFB (22.7%; p < 0.001). Significance: Preliminary analysis indicate some differences in the self-report of alcohol intake, and that participants may be more likely to self-report alcohol intake as part of a dietary assessment vs. a substance abuse assessment due to stigma surrounding alcohol intake. Additional analysis to compare self-reported alcohol consumption on these two instruments are planned. DoD W81XWH-13-20015
175 Inhibition of Histone H3 Lysine 9 Dimethylation Protects From Noise-induced Hearing Loss, Xiong Hao, Long Haishan, Zhu Yuanping, Hill Kayla, Sha Suhua; *Pathology and Laboratory Medicine*

Introduction: Post-translational modification of histones alters their interaction with DNA and nuclear proteins, influencing gene expression and cell fate. In this study, we investigated the protective effect of inhibition of histone H3 lysine 9 dimethylation (H3K9me2) against noise-induced hearing loss in adult CBA/J mice. Methods: CBA/J male mice at the age of 12 weeks were exposed to an octave band noise with a frequency spectrum from 8–16 kHz for 2 hours at 103 dB sound pressure level with or without BIX-01294 treatment. Hearing threshold shifts were monitored by auditory brainstem response (ABR). Alteration of H3K9me2 expression in the cochlea was evaluated by immunohistochemistry. The numbers of hair cells and inner ear synaptic ribbons after noise exposure were also counted. Results: H3K9me2 was increased in the nuclei of outer hair cells and marginal cells 1 hour after exposure to a traumatic noise paradigm known to induce permanent threshold shifts. G9a, a major histone methyltransferase responsible for H3K9me2, was increased in the inner hair cells, outer hair cells, spiral ganglion cells, and marginal cells examined 1 hour after the noise exposure. Inhibition of G9a with its specific inhibitor BIX-01294 significantly attenuated the noise-induced increase of H3K9me2 in the outer hair cells and reduced the noise-induced loss of outer hair cells and inner hair cell synaptic ribbons, ABR wave I amplitude, and subsequent noise-induced hearing loss. Conclusions: These findings suggest that methylation of histone H3 at lysine 9 is involved in the pathogenesis of noise-induced hearing loss. Pharmacological targeting of histone methylation may afford a strategy for protection against noise-induced hearing loss and cochlear synaptopathy. *NIH R01DC009222*

176 Sporadic Fundic Gland Polyps and Level of Gastric Acid Suppression, Mohamed H Khalaf, Andrew S Brock, Donald O Castell; *Gastroenterology, MUSC*

Background: Fundic gland polyps (FGP's) are a common endoscopic finding and are known to be associated with PPI use. It is not known if their prevalence is affected by gastric pH levels. Goals: to assess whether there is a correlation between FGP's and gastric pH levels as identified on 24 hour ambulatory impedance pH studies in patients on PPI therapy. Study: We performed a review of 402 consecutive patients who take at least once daily PPI and underwent EGD with combined impedance pH (Imp-pH) studies in the same setting (time and place) between January 2010 and December 2014. Patients were classified into 2 groups based on the presence or absence of biopsy-confirmed FGP's during endoscopy. Results: 30/402 (7%) of patients had FGP's. There was no significant difference in gastric pH levels between the FGP's and the non-polyp group (p= 0.74). Also, there was no significant difference in the percentage of patients with FGP between those on once vs twice daily PPI dosing regimens (P=0.30), however, there was a weak association of FGP's with PPI duration (P=0.01). Conclusions: The mechanism by which PPI's cause FGP's may not be directly related to acid suppression as we found no correlation between gastric pH and the presence of FGP's.

177 Structural Studies of Penicillin Binding Protein 2 (PBP2) Form Neisseria Gonorrhoeae, Avinash Singh1, Alisa J Powell1, Joshua Tomberg2, Robert A Nicholas2, Christopher Davies1; 1*Biochemistry and Molecular Biology, MUSC*, 2Pharmacology, University of North Carolina.

Worldwide growing antibiotic resistance in Neisseria gonorrhoeae, the causative agent of gonorrhea, against currently used extended spectrum cephalosporins (ESCs) has become a major threat to human health. N. gonorrhoeae has been declared as a superbug by the World Health Organization in 2012 and the CDC has updated its classification of the pathogen to one of “urgent threat” in 2013. In order to develop new counter measures against the resistant strains of N. gonorrhoeae, a better understanding of its resistance mechanism at the molecular level is needed. Among the mechanisms N. gonorrhoeae utilizes to generate antibiotic resistance, the most important is mutations in penA, which encodes penicillin binding protein (PBP2). PBP2 is an essential transpeptidase that catalyzes peptide crosslinking during the latter stages of peptidoglycan synthesis. In order to understand the resistance mechanism, we have examined PBP2 from the β-lactam sensitive strain of N. gonorrhoeae FA19 (wild type) and the cephalosporin-resistant strain H041. Compared with PBP2 from FA19, the rate of acylation for cefixime decreases by >12,000 fold in PBP2 from H041. This decrease in acylation rate confers resistance against ESCs., PBP2 from the resistant strain H041 contains 61 mutations, compared to wild type, of which 8 have been found to be the most critical for resistance. We have solved the crystal structures of PBP2 from FA19 and H041. PBP2 from H041 shows significant structural differences when compared to PBP2 from FA19. These structural changes are mainly confined near the active site region and appear to increase rigidity in the protein. This suggests that ligand binding in PBP2 from H041 is constrained and hinders
the formation of a productive acyl-enzyme intermediate with cephalosporins. We plan to test this hypothesis by solving crystal structures of PBP2 in complex with cephalosporins and with peptide substrate. *NIH R01GM066861*

178 The Effects of Lung Cancer Screening Decision Intervention on Patient Knowledge, Intentions to Screen and Decisional Satisfaction, Emerald Banas, Chanita Hughes Halbert, Lin Dai, Nichole Tanner; *Pulmonary/Critical Care, MUSC.*

The largest RCT of lung cancer screening among high-risk individuals with low-dose CT-scan resulted in a 20% mortality reduction. However, there were potential harms and these have led to the inclusion of shared decision-making as a component of screening. Decision aids (DA) have been shown to facilitate knowledge about the disease, its benefits and risks. This study aimed to refine a shared decision-making intervention and assess improvement in baseline knowledge, intentions to screen, and decision satisfaction. 68 qualified participants were identified from primary-care clinics at MUSC. A baseline questionnaire was completed to assess socio-demographics, levels of knowledge and lung cancer screening intentions. A DA consisting of a printed brochure and an interactive web-based program was delivered with explanatory counseling. A one month post-intervention telephone survey was then conducted to assess levels of knowledge on lung cancer risk, screening benefits and harms, screening intentions and satisfaction with decisions. The average age was 65 years old (55-75), 32 (47%) were men, 32 (47%) current smokers, and average pack year history was 50 (18-123). The calculated individual risk for developing lung cancer was high (5%, 0.4 – 15.4%) however, 31% still perceived a low personal risk. Improving survival (51.5%), acquiring information about lung cancer control (69.7%) and improvement of quality of medical care (90.0%) were some of the benefits. Risks included a high false positive rate (72.0%) that would lead to testing and invasive procedures (63.2%). 48.5% thought they would definitely get screened for lung cancer which increased to 76.5% after the intervention. Participant satisfaction with their decision was high (98.5%) and was consistent with their values (97%). Furthermore, 97% expect to carry out their decision. The shared decision-making intervention utilized in this study is an effective tool to increase knowledge on the benefits and harms of screening, improve decisional intent and overall satisfaction. *HCC ACS IRG*

179 Independent Correlates of Chronic Kidney Disease Awareness Among Adults with Type 2 Diabetes, Ndidiamaaka O Obadan1, Rebekah Walker2, Leonard Egede2; 1*Nephrology, MUSC, 2*General Internal Medicine, RHJ VAMC.*

Background: Chronic Kidney Disease (CKD) is a silent and asymptomatic disease until advanced stages. It poses a significant public health problem as progression of disease is associated with increased cardiovascular mortality, as well as increased healthcare utilization and cost. Awareness of CKD is an important consideration given evidence indicating higher risk for poor outcomes without early nephrology referrals, detection, and management. The aim of this study was to investigate the correlation between CKD diagnosis and awareness, and understand factors influencing CKD awareness. Methods: 345 adults with type 2 diabetes were recruited from MUSC and Ralph H Johnson VA. After consent was obtained, participants completed a self-administered survey that included demographic measures, self-care behaviors, and comorbidities. Biologic measures were taken from the medical record. Diagnosis of CKD was defined by eGFR =<59 ml/min for more than 3 months estimated by the Modification of Diet in Renal Disease (MDRD) equation. Awareness of CKD was defined by a positive response to either or both questions ‘has a doctor, nurse or other health professional ever told you that you have a kidney disease and have you ever had kidney failure that required dialysis or a kidney transplant’? Proportions of those diagnosed and those aware of CKD were compared. Stepwise logistic regressions models were used to examine the association between CKD awareness, diagnosis and certain clinical, socio-demographic variables. Results: Of 345 patients sampled, 31% had CKD based on eGFR levels; however, only 63% of those diagnosed with CKD reported awareness. Forward stepwise regression showed that non-Hispanic blacks (OR=3.49, p=0.04), those with a college education (OR=8.02, p=0.01), history of myocardial infarction (OR=10.12, p=0.002) or hypertension (OR=23.25, p=0.02), and those with Medicare, VA insurance, or no insurance (OR=8.08, 8.72, 101.47, respectively, p=0.01) were significantly more likely to be aware of CKD. Those with a history of stroke or depression (OR=0.21, 0.28, respectively, p=0.03, p=0.04) were significantly less likely to be aware of CKD. Conclusion: Self-reported awareness of CKD is lower than expected when compared to diagnosis based on stage 3 or higher CKD. Factors associated with awareness include socio-economic factors (race, educational status) and a history of medical comorbidities, including cardiovascular disease. Targeted strategies to increase CKD
awareness may lead to improved health outcomes and should be developed. NIH T35DK007431

180 Medial Prefrontal Cortex Theta Burst Stimulation Dampens the Striatal Response to Cocaine Cues in Individuals with High Baseline Striatal Drug Cue Reactivity, Tonisha Kearney-Ramos¹, Logan Dowdle¹, Oliver Mithoefer², William Devries², Mark George², Colleen Hanlon¹; ¹Neurosciences & Psychiatry, MUSC, ²Psychiatry, MUSC.

BACKGROUND: One of the strongest predictors of cocaine relapse is drug cue-induced craving, which is associated with elevated activity in reward-motivation brain regions, including the medial prefrontal cortex (mPFC) and striatum. Continuous theta burst brain stimulation (cTBS) can be used to attenuate baseline mPFC and striatal activity in cocaine users. However, the ability to use cTBS to attenuate mPFC and striatal activity when this circuit is typically engaged, such as during cocaine cue exposure, is not yet known.

METHODS: Nineteen chronic cocaine users performed the cocaine cue-induced craving fMRI task before and after receiving mPFC cTBS. Independent component analysis (ICA) was applied to the fMRI data to identify functional networks based on temporal coherence of activity across brain regions. ICA revealed a striatum network comprised of bilateral caudate, putamen and nucleus accumbens. Functional engagement of striatum network before and after treatment was determined through general linear modeling (GLM) of the network timecourse to task design (i.e. drug vs. neutral cue exposure). RESULTS: GLM revealed a bimodal neural response to cTBS. Individuals with elevated pretreatment striatum engagement exhibited attenuated post-treatment activity (t(9) = -3.76; pFDR ≤ .005), and individuals with suppressed (or negative) pretreatment engagement exhibited enhanced post-treatment activity (t(8) = 4.01; pFDR ≤ .005). Moreover, baseline striatal engagement was strongly inversely related to the change in striatal engagement after cTBS treatment (rho = -.79; pFDR < .001; R² = .58).

CONCLUSIONS: These data suggest that individuals with greatest baseline striatal reactivity to drug cues may "benefit" most from mPFC cTBS. Neural network engagement patterns during drug cue exposure tasks are sensitive predictors of response to cTBS treatment, and can be used to refine treatment selection and monitor outcomes. However, continued research is needed to best characterize predictors and correlates of cTBS treatment response in cocaine and other substance use disorders. NIH R01DA036617, P50DA015369, P50AA010761, T32DA00728823

181 Circuit-Specific Neuroadaptations in Glutamate Inhibition in VTA Dopaminergic Neuron After the Predator Odor Stress, Jeffrey Parrilla-Carrero, Priyodarshan Goswamee, Greer McKendrick, Meredith Anderson, Arthur Riegel; Neurosciences, MUSC.

Corticotropin-releasing factor (CRF) coordinates the physiological and behavioral response to stress. Activation of CRF signaling in the ventral tegmental area (VTA) contributes to the reinforcing effects of drugs of abuse. Although stress may potentiate signaling at VTA ionotropic glutamate receptors, its actions on metabotropic glutamate receptors (mGluRs) that reduce dopamine neuron stimulation via the recruitment of the small-conductance calcium-activated potassium channels (Isk) remains unknown. Here we investigate how TMT-predator stress impacts mGluR/Isk inhibition in dopamine cells in the VTA to the accumbens core and VTA to accumbens shell pathways. To label these pathways, rats received microinjections of fluorescent retrograde microspheres into either the core or shell 3-weeks prior the exposure to the predator odor stressor TMT (1%) or vehicle (ETOH). Isk inhibition was then measured in bead containing cells using whole-cell patch clamp electrophysiology, in response to synaptic stimulation or flash photolysis to uncage intracellular calcium (NP-EGTA) in brain slices prepared 2 or 24 hrs after TMT exposure. In tissue from control animals, we observed a stronger Isk (larger amplitude and slower decay kinetics) in VTA/²Core than VTA/²shell projecting dopamine neurons. In contrast the relative strength of AMPA-EPSCs was comparable in both populations. In VTA/²Core cells, TMT(24hr) exposure reduced the maximal Isk without altering CRF or forskolin facilitation of Sk inhibition. Whereas in VTA/²shell cells, the same treatment potentiated the maximal Isk and simultaneously occluded the CRF and forskolin facilitation. In VTA/²shell cells, the CRF-R1 antagonist CP1545 potentiated Sk channel currents in control but not TMT(24hr) tissue. Lastly, both populations of cells displayed apamin sensitive spontaneous miniature outward currents (SMOCs) following TMT(24hrs) treatment, further corroborating an action of stress on glutamate inhibition. Thus, TMT produces circuit specific changes in glutamate inhibition in the VTA dopamine cells that would be expected to facilitate VTA dopamine output during reward-predictive cues. NIH R01DA033342, P50DA015369, T32 DA007288

Davud Asemani, Anjan Motamarry, Dieter Haemmerich; Pediatrics, MUSC.

Introduction: Thermo-Sensitive Liposomes (TSL) are a promising type of nanoparticles for localized drug delivery. TSL typically release the contained drug at mild hyperthermic temperatures (40-42 °C). Combined with localized hyperthermia, we aim to use TSL for drug (Doxorubicin) delivery to cancerous patients as targeted chemotherapy. Methods: To improve the cell killing as well as minimize the toxic effects, it is required to know the accurate kinetics of TSL drug release. Here, we propose a novel hardware setup to precisely measure the kinetics of drug release by TSL in vitro with sub-second accuracy, whereas current methods can just provide with the temporal resolution of ~8 – 10 seconds. Fluorescence imaging is here used to monitor the drug release owing to the inherent fluorescence of anthracycline (Doxorubicin). Results: In the proposed method, a single fluorescence image is required without any timing constraint owing to the transformation of time to location variable. All the previous researches nevertheless required many fluorescent images and were constrained to the agility of equipment. By fitting exponential models, we demonstrated that the time constants of drug release at temperatures of 39.5, 40.5 and 41.5°C are about 6.09, 2.06 and 1.03 seconds, respectively. Conclusion: Our initial tests show that the developed system is able for the in vitro evaluation of TSL formulations. The proposed system may be used for optimizing the drug delivery systems based on TSL, characterizing the associated release kinetics, as well as evaluating the hyperthermia profiles of different temperatures. Finally, the results are not dependent on the agility of the fluorescence imaging. NIH R01CA181664

183 Transplanted Bone Marrow Hematopoietic Stem Cell-derived Cells Home to the Bones and Impart Clinical Benefits in a Mouse Model of Osteogenesis Imperfecta. InHong Kang, Uday Baliga, Meenal Mehrotra; Pathology and Laboratory Medicine, MUSC.

Osteogenesis imperfecta (OI), an autosomal dominant disorder caused by mutation in type I collagen, is most common hereditary bone disease. At present there is no cure. Many strategies are being tested involving stem cells. Previously we have shown that transplantation of bone marrow (BM) cells highly enriched for hematopoietic stem cells (HSCs) ameliorate bone defects seen in OI mice and that HSC transplantation leads to replacement of affected osteoblasts with normal cells leading to correction of collagen defects. In order to establish relative contribution of HSC-derived cells versus stromal cells, we used the BM cells from a unique transgenic model (VavR), in which HSC-derived cells are GFP+ while stromal cells are RFP+, as donor for transplantation into irradiated OI mice (B6C3Fe a/a-Col1a2om/J). Three months after transplantation, numerous GFP+ cells can be demonstrated in paraffin sections of tibia which were alkaline phosphatase and osteocalcin positive, indicating that they are osteoblasts, while no RFP+ cells could be appreciated. These GFP+ cells are also positive for Col1α2, which is collagen chain deficient in OI mice. In vitro culture confirms presence of GFP+ cells in calvaria, femur, tibia as well as BM-derived osteoblasts from VavR BM transplanted OI mice. No RFP+ cells could be seen. Flow cytometry data confirms that GFP+ cells expressed osteocalcin which is a marker for osteoblasts. Also, these cells expressed CD45 which is a marker for hematopoietic cells, indicating that these GFP+ osteoblasts have a hematopoietic origin. Micro-CT analysis of tibia demonstrates increase in trabecular number, thickness and density with decrease in trabecular spacing in VavR BM transplanted OI mice. These data indicate that HSC-derived cells engraft into bones of OI mice after transplantation, differentiate into osteoblasts and bring about clinical improvements. These findings are significant as they can be applied to long-term studies to enhance bone healing in OI. NIH 1K01AR059097, 1R01AR066094; MUSC Pathology and Lab Medicine

184 Mitochondrial Calcium Uniporter Knockout Protects From Noise-Induced Cochlear Synaptopathy. Yuanping Zhu, Zhiqi Liu, Su-hua Sha; Pathology, MUSC.

Abstract not available.

185 Identification of Genes Driving Malignant Peripheral Nerve Sheath Tumor Cell Proliferation and Survival Using Lentiviral ShRNA Screens. Amanda M Prechtl1, Zachary Kratche1, Stephen Guest1, Elizabeth Garrett-Mayer2, Steven Carroll1; 1Pathology, MUSC, 2Public Health, MUSC.

Abstract not available.

186 Analysis of the Genomic Response to Auditory Nerve Injury in an Adult Mouse Model. Ryan Boerner1, Hainan Lang2, Judy R Dubno1, Mary C Bridges2, Yazhi Xing2, Jeremy Barth3; 1Otolaryngology, MUSC,
Without external intervention, the loss of spiral ganglion neurons secondary to aging, genetic mutations, or cochlear injury is irreversible, and ultimately leads to sensorineural hearing loss. A subset of glial cells in the adult animal auditory nerve has been previously demonstrated to express characteristics of neural stem/progenitor cells following acute injury. MicroRNAs (miRNAs) are important regulators of cellular proliferation. We hypothesize that certain miRNAs coordinate the transition of mature glial cells to a regenerative state in the acutely injured auditory nerve. Adult mice were subjected to round window application of ouabain, a cardiac glycoside that selectively degenerates type I spiral ganglion neurons. Microarray analyses were conducted on auditory nerve preparations from POD3 ouabain-treated mice targeting differentially expressed miRNAs and mRNAs. RNAs differentially expressed were analyzed using Ingenuity Pathway Analysis (IPA) software to identify mRNA targets, highest-ranking canonical pathways, and predicted interaction networks. Quantitative RT-PCR in situ hybridization studies were performed on miRNA candidates with significant fold changes and predicted involvement with neurogenesis pathways. IPA analysis resulted in 22 miRNAs targeting 294 experimentally observed mRNAs. Of the 22 miRNAs identified, miR-124 targeted 129 of the observed mRNAs and miR-34a targeted 14 of the observed mRNAs. Cellular development and cellular growth and proliferation ranked among the most significant functions of miR-34a and miR-124. Significant downregulation of miR-34a and miR-124 on POD3 following acute injury with ouabain was validated using qRT-PCR. In situ hybridization localized miR-34a and miR-124 to glial and neuronal cells within Rosenthal’s canal. Numerous miRNAs and their putative mRNA targets are differentially expressed following acute auditory nerve injury. These molecules are linked to cellular development and proliferation. Further validation with gain/loss of function assays will continue to illuminate how these miRNAs constitute the genomic response to acute auditory nerve injury. NIH R01DC012058, P50DC00422, P30GM103342, P20GM103499

187 Effects of IL-6 and Estradiol on Dermal Fibrosis in Systemic Sclerosis, DeAnna Baker Frost, Carol Feghali-Bostwick; Rheumatology, MUSC.

Background: Systemic Sclerosis (SSc) is a disease characterized by increased synthesis of extracellular matrix components in organs, including skin, resulting in morbidity. Available treatments are ineffective. Additionally, SSc patients have a female predominance that increases during child-bearing years, with increased levels of IL-6 in circulation and dermal fibroblast milieu. Estradiol (E2) has pro-fibrotic activity, with post-menopausal, SSc patients having increased circulating levels compared to age and gender-matched controls. Aromatase is an enzyme active in extragonadal tissues, including the skin, responsible for the aromatization of androgens into estrogens. In activated fibroblasts, IL-6 activates aromatase through the transcription factor STAT3. Based on the elevated IL-6 secretion by SSc dermal fibroblasts, and increased E2 levels in SSc patients, we hypothesize a positive feedback between IL-6 and E2 leading to increased aromatase activity in SSc. Methods: Primary adult dermal fibroblasts from healthy control and SSc patients and control donor skin samples were stimulated with IL-6 and its soluble receptor, sIL-6R, (IL-6/IL-6R) for 30 minutes to 48 hours. Transcript levels of aromatase were measured using qRT-PCR. Aromatase activity was measured using an ELISA-based testosterone conversion assay we optimized. Results: IL-6/IL-6R-stimulated healthy donor dermal fibroblasts had increased aromatase mRNA compared to SSc dermal fibroblasts. Yet, SSc dermal fibroblasts had increased aromatase activity after stimulation with IL-6/IL-6R compared to healthy control dermal fibroblasts. Estradiol-stimulated healthy control dermal fibroblasts had significantly higher IL-6 mRNA levels after 1 hour, which returned to baseline after 6 hours. Estradiol-stimulated healthy control skin cultured ex vivo had significantly elevated IL-6 mRNA after 24 hours, which returned to baseline after 48 hours. Yet, aromatase mRNA and activity were significantly elevated after 48 hours of IL-6/IL-6R stimulation, that was blocked with aromatase inhibition. Conclusion: Our findings implicate IL-6/IL-6R and increased aromatase activity leading to conversion of testosterone into pro-fibrotic E2 in the pathogenesis of SSc.

188 C3a Receptor Agonist Evoked Spike-like Calcium Amplitude and Mitochondrial Dysfunction in Oxidatively-stressed RPE Cells, Masaaki Ishii, Bärbel Rohrer; Ophthalmology, MUSC.

Introduction: Activation of the alternative pathway of the innate complement system contributes to damage of retinal pigment epithelial (RPE) cells in age-related macular degeneration (AMD). In this pathway, the C3 convertase is cleaved into membrane-bound C3b and C3a. C3a has been shown to trigger increases in intracellular calcium (Ca2+) upon binding to C3a receptors in T-cells. However, the effects of C3a on the Ca2+ levels have yet to be studied. In addition, production of reactive oxygen species (ROS) released...
from mitochondria is thought to represent a risk factor for dry AMD. Here we investigated mitochondrial homeostasis by testing Ca2+ responses triggered by C3a receptor activation in RPE cells. Methods: ARPE-19 cells were cultured for 14 days on glass-bottom culture dishes to establish well-connected monolayers. Cells were incubated with C3 agonist (260 µM) or H2O2 (0.5 mM), and fluorescent imaging was used to measure mitochondrial membrane potential (Tetramethylrhodamine), Ca2+ (Fluor8) and cell death (Topro-3). For data acquisition, the UltraView Vox live imaging system controlled through Volocity software (Perkin Elmer) was used. Results: Oxidative stress 0.5 mM H2O2 caused a rapid elevation in intracellular Ca2+, followed by a return to a plateau higher than the initial level. Importantly, 0.5 mM H2O2 did not trigger cell death. C3a agonist treatment evoked a gradual Ca2+ response peaking at 400 seconds, while no effect was observed on mitochondrial membrane potential. Surprisingly, when C3a was applied to H2O2-treated cells, Ca2+ levels dramatically increased 500-700 seconds post stimulation, followed by a drop in mitochondrial membrane potential. The rise in intracellular calcium is generated by IP3 receptor-mediated release of Ca2+ from the ER. Conclusion: C3a receptor activation with the endogenous Ca3 receptor agonist evoked a Ca2+ spike-like response and mitochondrial dysfunction in oxidatively stressed RPE cells. Hence, a dual hit is required to generate a pathological response. NIH R01EY019320

189 Utilization of Bioengineered Immunotherapeutic Nanoparticles in Solid Organ Transplantation, Kunal J Patel1, Peng Zhu1, Ann-Marie Broome2, Suraj Dixit2, Carl Atkinson3, Nadig N Satish1, 1Surgery, MUSC, 2Biomedical Imaging, MUSC, 3Microbiology and Immunology, MUSC.

Abstract not available.

190 Iliac Artery Aneurysm Producing Direct Inguinal Hernia As Presenting Sign for Hemoperitoneum, Ashley W Cross, Ellen Riemer; Pathology, MUSC.

The diagnosis of an irreducible inguinal hernia is typically a straightforward one; however, in rare instances, it can mimic different pathologies. We report a unique case of an 83-year-old man with a past medical history of end stage renal disease, hypertension, congestive heart failure, and a previously repaired right iliac aneurysm. Following a routine colonoscopy, he reported extreme fatigue and melena. Two days after the procedure, he presented to the emergency department with hypotension, dizziness, and a non-reducible right inguinal hernia on physical exam. His clinical presentation was most consistent with sepsis and a strangulated inguinal hernia; however, emergent surgical intervention was not pursued due to hemodynamic instability. After two episodes of sustained ventricular tachycardia, he became asystolic and expired. A subsequent post mortem examination of the decedent was performed at the Medical University of South Carolina. Two liters of bloody fluid and blood clot were identified within the abdomen. Examination of the inguinal hernia revealed a previously repaired right iliac aneurysm protruding through the lower abdominal musculature, medial to the inferior epigastric vessels. This is the first reported case of an iliac aneurysm producing a direct inguinal hernia.

191 Increased Cytokine Expression of Mesangial Cells Through Altered Glycosphingolipid Catabolism in Lupus Nephritis, Kamala Sundararaj, Peggi Angel, Richard Drake, Tamara Nowling; Medicine, MUSC.

Previously we demonstrated that glycosphingolipid (GSL) levels and neuraminidase (NEU) activity are altered in the kidneys and/or urine of lupus mice and human patients with nephritis compared to their non-nephritic counterparts and healthy controls. We also showed that sterol regulatory element-binding protein (SREBP)-1 expression is increased in the kidneys of nephritic lupus mice. Altered GSL levels were observed in the glomerular region. We hypothesize that NEU-mediated GSL catabolism is regulated by SREBP-1 and contributes to the production of cytokines by mesangial cells (MC) that leads to renal inflammation in lupus nephritis. We now show co-localization of GSL lactosylceramide (LacCer) with MCs and increased expression of IL-6, IFNγ and other cytokines following addition of LacCer to cultured MCs. Primary MCs from pre-nephritic lupus mice stimulated with heat aggregated IgG (a mimic of immune complexes), LPS, or lupus serum showed elevated GSL levels, IL-6 production, MCP-1 expression and/or Neu1 expression. We now demonstrate that SREBP-1c expression is significantly upregulated in the kidney prior to overt nephritis compared to healthy controls. Over-expressing SREBP-1c in a MC line upregulated Neu1 promoter activity by two-fold, increased endogenous NEU1 expression and increased LacCer levels. Moreover, over-expressing either NEU1 or SREBP-1c significantly increased IL-6 production. Together these results suggest that MC activation leads to increased cytokine expression in part through NEU-mediated GSL catabolism regulated by SREBP-1c in lupus nephritis.
CD26high T Cells Are a Unique CD4+ T Cell Subset with Superior Antitumor Activity, Michelle Nelson, Stefanie Bailey, Jacob Bowers, Kinga Majchrzak, Megan Wyatt, Logan Huff, Chrystal Paulos; Microbiology and Immunology, MUSC.

Abstract not available.

Enhancing the Oncolytic Potential of Myxoma Virus in Combination with Interleukin-17, Eric Bartee; Microbiology and Immunology, MUSC.

Abstract not available.

Posttraumatic Stress Disorder and Amygdala Reactivity to Fearful Faces, Margaret A Warner, Megan Moran Santa Maria; Psychiatry, MUSC.

Posttraumatic stress disorder (PTSD) debilitates adults and children alike. Flashbacks, bad dreams, and frightening thoughts are just a few re-occurring symptoms that PTSD sufferers experience. Exposure to childhood trauma increases the risk for developing PTSD, but not everyone exposed to trauma will develop the disorder. Past studies have indicated that hyperactivity in the amygdala underscores PTSD symptoms. Research about oxytocin, an anxiolytic peptide, has shown a decrease in amygdala responding when the hormone is administered. Individuals with PTSD exhibit increased activity in the amygdala when shown images of fearful faces compared to individuals without PTSD. The focus of the present study was to analyze the impact of intranasal oxytocin on amygdala reactivity to fearful faces between: participants with PTSD related to childhood trauma (n=19) and a resilient control group (free of current major Axis-I diagnoses) with a history of childhood trauma (n=19). Using a double-blind placebo controlled cross-over design, participants self-administered 24 IU of OT or matching placebo prior to two fMRI session. During the fMRI sessions, participants completed an implicit facial affect recognition task. The percent signal change between fearful faces and rest was calculated and compared with scores from the childhood trauma questionnaire (CTQ) using a simple linear regression. Analyses of the PTSD group showed: 10.2% of the variance in the emotional abuse domain can be accounted for by the model (p=.212), 1.9% of the variance in the physical abuse domain (p=.599), 10.8% of the variance in the sexual abuse domain (p=.198), 32.5% of the variance in the emotional neglect domain (p=.017), and 47.5% of the variance in the physical neglect domain (p=.003). Analyses of the resilient control group indicated: 15.9% of the variance in the emotional abuse domain can be accounted for by the model (p=.141), 8.8% of the variance in the physical abuse domain (p=.282), 18.4% of the variance in the sexual abuse domain (p=.110), 26.5% of the variance in the emotional neglect domain (p=.05), and 1.4% of the variance in the physical neglect domain (p=.677). We found that for individuals with PTSD, emotional and physical neglect scores from the CTQ are good predictors of amygdala reactivity to fearful faces. In our resilient control group we found that emotional neglect scores from the CTQ were also a good predictor of amygdala reactivity to fearful faces.

Three-Dimensional Reconstructions of Extracellular Matrix Remodeling and Lineage-Traced Cells Give Insight Into Early Outflow Tract Development, Joshua J Mifflin¹, Nic E Alcala², Loren E Dupuis¹, Marcus T Ellison¹, Kittrell Rice¹, Christi B Kern¹; ¹Regenerative Medicine and Cell Biology, MUSC, ²CofC.

Abstract not available.

FZD5 and SFRP2 Interaction Activates NFATc3 Signaling and Angiogenesis in Endothelial Cells, Ingrid V Bonilla¹, Yuri K Peterson², Patrick Nasarre¹, Jennifer Samples³, Eleanor Hilliard¹, Thomas A Morinelli⁴, Betsy Hill⁵, Nancy K DeMore¹; ¹Surgery, MUSC, ²Drug Discovery and Biomedical Sciences, MUSC, ³Surgery, UNC Chapel Hill, ⁴Bioinformatics, UNC Chapel Hill.

Abstract not available.

The Role of IFN-γ During Combinational Therapy with IL-15/IL-15Rα Complexes and Anti-PD-1 MAb in a Preclinical Tumor Model, Luis E Cardenas, Marzena Swiderska-syn, Samantha Suriano, Kristina Andrijauskaite, John Wrangle, Mark Rubinstein; Surgery, MUSC.

Abstract not available.
198 Nanoscale Bead-Based Antigen-Specific Enrichment and In Vitro Stimulation Results in Rapid CD8+ T Cell Expansion, Carl S Haupt1, Lillian Neal2, Jonathan Schneck3, Chrystal Paulos2, Juan Varela4; 1Medicine, MUSC, 2Microbiology and Immunology, MUSC, 3Pathology, Johns Hopkins University, 4Medicine, HCC, MUSC.

Background: Broad application of adoptive cell transfer of tumor-specific T cells for the treatment of cancer has been limited. This is mainly due to the high cost and labor-intensive methods required to successfully generate autologous antigen-specific T cells. Here, we report on the application of a recently described novel nanoparticle-based method for expansion of tumor-specific T cells from normal human donors. Methods: MART1-specific T cells were generated using artificial antigen presenting cells (aAPCs) from normal human donors as previously described[1]. We studied whether antigen presentation was more effective using a dimer or tetramer of HLA-A2-MART1 on aAPCs. MART1 specific cells were expanded for up to 21 days. Cultures were evaluated for antigen specificity, total cell expansion and polyfunctionality. Results: Depending on the antigen presentation method, percentages of MART1-specific T cells were at most 1.03%, 17.5%, 70% and 70.7% on days 0, 7, 14 and 21, respectively. Total MART1-specific cells were at most 42, 14,788, 665,054 and 1,142,907 on days 0, 7, 14 and 21, respectively. Fold changes were up to 186 on day 7, 9207 on day 14 and 5921 on day 21. In addition, analysis of the of the polyfunctionality (IL-2, IFN-gamma and TNF-alpha expression) of MART1-specific T cells on days 14 or 21 showed high polyfunctionality with up to 47.6% of the MART1 specific T cells in the cultures expressing all 3 markers listed above. Conclusions: Our aAPC T cell expansion platform is a simple and streamlined approach for the rapid expansion of human tumor-specific T cells. Here we show that by using this method we were able to generate large numbers of highly specific, high quality MART1 T cells. In addition, these cells were highly polyfunctional. [1]Perica K, et al. Enrichment and expansion with nanoscale artificial antigen presenting cells for adoptive immunotherapy. ACS Nano. 9(7):6861-71. (2015). ACS Institutional Research Grant, K12 Paul Calabresi Program.

199 Characterization of Circuit-specific Responses of Mesolimbic Dopamine Neuron Projections to Stress, Greer E McKendrick, Meredith E Andersen, Jeffrey Parrilla-Carrero, Priyodarshan Goswamee, Arthur Riegel; Neurosciences, MUSC.

Abstract not available.

200 Chronic Exposure to Cocaine and Heroin Does Not Alter Goal-directed Food Seeking, Korey Smith, Jacqueline M Barker, Jamie Peters; Neurosciences, MUSC.

Dependency on psychoactive drugs is a global health concern, mainly due to susceptibility of relapse after abstaining from drug use. Research suggests addiction begins as voluntary (goal-directed) reward-seeking that develops into a habitual state after chronic drug abuse. It is unknown whether this effect is specific to drug-seeking behavior, or if it extends to other types of reward-seeking (e.g. for food). The primary objective of the current study was to investigate if food-seeking behavior becomes habitual after exposure to chronic drugs of abuse. Rats were trained to press a taking lever for a food pellet on a fixed ratio 1 (FR1) reinforcement schedule. After achieving food acquisition on the taking lever, they were introduced to a seeking lever on a progressive random interval (RI) reinforcement schedule to access the taking lever. Cocaine (15 mg/kg, i.p.) and heroin groups (2 mg/kg, s.c.) received daily (5d/week for 2 weeks) injections 4 hours following onset of behavioral training. Half of the rats received saline injections (i.p. or s.c.) as a control. Once rats completed the seeking-taking training they were devalued by extinguishing the taking lever, followed by a seeking test. We hypothesized that cocaine and heroin rats would exhibit habitual behavior on the seeking test (e.g. more seeking lever presses) after devaluation compared to control rats. A 2-way ANOVA over the seeking test (5-min bins) indicated significant main effects of group (p<.05) and time (p<.01), and a significant interaction (p<.05). Dunnett’s post-hoc comparisons to the devalued control group indicated that saline rats remained goal-directed (p<.01), but suggest they may be less goal-directed than drug groups (p<.05). Contrary to our hypothesis, this study suggests that food-seeking behavior is not more susceptible to becoming habitual after chronic exposure to cocaine and heroin. Future studies will examine heroin-seeking behavior in a self-administration model of relapse. NIH R25GM113278

201 Effect of Passive Movement and Functional Electrical Stimulation Within Brain Computer Interface Neuromodulation Targeting Tibialis Anterior, Anna Charlotte Lundgaard1, Michael Voigt1, Ning Jiang2, Kim Dremstrup1, Aiko K Thompson3, Dario Farina4, Natalie Mrachacz-Kersting1; 1Center for Sensory-Motor Interaction, Aalborg University, 2Systems Design Engineering, University of
and the non- (Y12) by substituting the phosphomimetic glutamic acid p130Cas demonstrated that the mutation of tyrosine apoptosis. Previous work on the NEDD9 paralog, secretion and invadopodia formations as well as induce NEDD9 was shown to inhibit cell proliferation, MMP formation and cell invasion. siRNA knockdown of matrix metalloproteinase (MMP) secretion, invadopod to proteins involved in the invasive process, leading to laboratory has shown that NEDD9 signals downstream neck squamous cell carcinoma (HNSCC). Our downregulated 9 (NEDD9) plays a central role in regulating cell invasion and metastasis in melanoma, breast cancer, glioblastoma, lung cancer and head and neck squamous cell carcinoma (HNSCC). Our laboratory has shown that NEDD9 signals downstream to proteins involved in the invasive process, leading to matrix metalloproteinase (MMP) secretion, invadopodia formation and cell invasion. siRNA knockdown of NEDD9 was shown to inhibit cell proliferation, MMP-9 secretion and invadopodia formations as well as induce apoptosis. Previous work on the NEDD9 paralog, p130Cas demonstrated that the mutation of tyrosine 12 (Y12) by substituting the phosphomimetic glutamic acid - Y12E reduced focal adhesion kinase (FAK) binding and the non-phosphorylatable phenylalanine mutation Y12F stabilized focal adhesions and inhibited cell migration. We wished to test the hypothesis that mutation of Y12 in the NEDD9 SH3 domain would alter the expression of Rab1, Rab6, Rab8 and MMP-14. The HNSCC cell line SCC9, (from the ATCC) was initially isolated from a tumor on a patient's tongue. SCC9 cells were stably transfected with empty vector (EV) as a control, wild-type NEDD9 and Y12E and Y12F mutants. Immunoblot analysis was used to measure the expression levels of Rab1, Rab6, Rab8 and MT1-MMP (MMP-14) proteins in each cell line in the presence and absence of serum. We observed a significant (p<0.05) increase in Rab6 levels in Y12ENEDD9 expressing cells, and in Rab8 levels in Y12FNEDD9 expressing cells. Both Y12 expressing mutant cell lines expressed elevated MMP-14 levels compared to EV. In conclusion, Y12E and Y12F mutation of NEDD9 lead to up-regulation of Rab6, Rab8 and MMP-14 expression, contributing to the invasive pathway of metastatic cancer. We further speculate that wild type NEDD9 may serve to both positively and negatively regulate these pathways. NCI R25CA193088

Ischemic stroke results in the initiation of neuro-inflammatory cascades that exacerbate injury, promote neuronal loss, and inhibit recovery. The complement system, a component of the innate immune response, serves as an early damage recognition system capable of self-amplification and activation of multiple inflammatory pathways. Binding of natural IgM antibodies that recognize ischemic cells leads to complement activation and propagation of secondary injury after stroke. We investigated a novel approach of site-targeted complement inhibition after stroke using a fusion protein consisting of the antigen recognition fragment of B4 IgM mAb (B4scFv) and the complement inhibitor Crry. B4scFv recognizes modified annexin (humans and mice), while Crry blocks all pathways of complement activation. We used the fusion construct, B4svFv-Crry, as a tool to investigate the role of complement-microglial interaction in promoting neuronal loss after stroke, and as a therapeutic agent to improve recovery using a murine model of 60 min transient middle cerebral artery occlusion. We show that intravenously administered B4scFv-Crry targets specifically to the ischemic brain after stroke and inhibits IgM binding and complement activation with a tissue half-life of 35 hrs. A single dose of B4scFv-Crry administered up to 24 hrs. after ischemia significantly
growth and increase in survival of the C3aR/C5aR (EO771), there was a significant decrease in tumor and survival. However, in a breast cancer model C3aR/C5aR deficiency had no effect on tumor growth subcutaneous mouse cancer models. In two T-cell investigations the effect of C3a and C5a in different genotypes. Plasma VDBP concentrations were measured by C3d and IgM deposition and microgliosis. Acute B4scFv-Crry treatment blocked the propagation of the inflammatory response in the chronic phase, explaining the observed cognitive and motor recovery. These data indicate that B4scFv-targeted complement inhibition has translational potential for inhibiting inflammatory neurodegenerative cascades after stroke. NIH 1P20GM109040; VA Merit Awards 1I01RX001141, 1BX001218; AHA 15PRE25250009

206 Novel Injury-site Targeting Strategies for Modulating Innate and Adaptive Immunity At the Site of Transplant Rejection, David G Weatherford¹, Xiaofeng Yang², Melissa Scheiber¹, Stephen Tomlinson², Biology, CofC, Microbiology and Immunology, MUSC.

Abstract not available.

207 Modulation of the Antitumor Immune Response By Complement Anaphylatoxins, Ashton E Getchell¹, Colleen E Quaas², Andrea Whitfield³, Andrew Ellis⁴, Mario Fugal⁵, Kenneth Vanek⁶, Melissa Scheiber⁷, Stephen Tomlinson², Biology, CofC, Microbiology and Immunology, MUSC, Pediatrics, MUSC, Radiation Oncology, MUSC.

The complement system, comprised of about 50 soluble and cell surface proteins, is a vital component of both innate and adaptive immune responses. Complement activation leads to the generation of pro-inflammatory anaphylatoxins, C3a and C5a, which have been shown to promote growth of some tumors after binding to their receptors on immune cells. Using double C3a/C5a receptor (R) deficient mice, we investigated the effect of C3a and C5a in different subcutaneous mouse cancer models. In two T-cell lymphoma models (EL4 and RMA), we found C3aR/C5aR deficiency had no effect on tumor growth and survival. However, in a breast cancer model (EO771), there was a significant decrease in tumor growth and increase in survival of the C3aR/C5aR deficient mice compared to wild type. These data suggest that the effect of C3a and C5a is tumor type specific. We extended our studies to include radiation therapy (RT), a standard of care. We found that localized RT of EL4 tumors in wild type mice was minimally effective, but that RT of tumors in C3aR/C5aR deficient mice resulted in tumor eradication and long-term survival. Furthermore, surviving mice did not grow tumors when rechallenged with EL4, indicating development of an anti-tumor immune response. To determine the therapeutic relevance of this finding, we investigated the use of C3aR and C5aR antagonists in EL4 tumor-bearing WT mice, with and without RT. Mice receiving C3aR and C5aR antagonists during RT had significantly reduced EL4 tumor growth and increased survival compared to mice receiving RT alone. Receptor antagonists alone had no effect on tumor growth. Future studies are necessary to determine how anti-tumor immunity is modulated in this therapeutic model. NIH R01 CA158179

208 Individual Variability in Brain Response to Drug Cues Predicts RTMS Treatment Efficacy, Shaoni Dasgupta¹, Norvel W Brown², Tonisha E Kearney-Ramos², Logan T Dowdle², Oliver Mitthefer², William Devries², Mark S Geoge², Colleen A Hanlon², Academic Magnet High School, Psychiatry and Behavioral Sciences, MUSC.

Abstract not available.

209 The Effects of VDBP Genotypes on Circulating 25(OH)D, Serum VDBP Levels and Vitamin D Supplementation Responses, Sean K Brady¹, Danforth Newton², Judith Shary², John Baatz², Nina Forestieri², Renee Washington², Carol Wagner², Health Science, Clemson, Neonatology, MUSC.

Introduction: Americans are deficient in vitamin D, which is most problematic for pregnant mothers, because vitamin D plays a major role in the development of the fetus and is associated with greater birth weights and fewer adverse outcomes. There are different genotypes for the Vitamin D binding protein (VDBP), which appear to be linked to 25(OH)D concentrations in the blood. Methods: DNA samples from pregnant women participating in the Kellogg Vitamin D Project were amplified and cut using PCR and restriction enzymes, respectively, and then Invitrogen 4-12% TBE gels were used to identify VDBP genotypes. Plasma VDBP concentrations were
present study seeks to elucidate the effects of this TRPV1 receptors within the NAc shell. Thus, the demonstrated high density of co-localization of CB1 and TRPV1 receptors in mice has not been well studied. However, preclinical investigations have demonstrated that endocannabinoids can modulate emotional responses. In addition, immunocytochemistry in mice has demonstrated high density of co-localized CB1 and TRPV1 receptors within the NAc shell. Thus, the present study seeks to elucidate the effects of this receptor interaction within the NAc shell on anxiety states. To this end, we hypothesized that blocking TRPV1 and the fatty acid amide hydrolase (FAAH) within the NAc shell would elicit an anxiolytic response in rats. In the present experiment, male Sprague Dawley rats were implanted with bilateral brain cannula aimed at the NAc shell. Following recovery from surgery, rats received pre-treatment of microinfusions (0, 0.125, 0.5 nmol/0.4 µl) of N-arachidonoyl-serotonin (AA-S-HT), a dual blocker of FAAH and TRPV1, within the NAc shell. After treatment, rats were tested in an elevated plus maze paradigm for a period of 5 minutes. Behavioral parameters measured were: time spent in open arms, time spent in closed arms, rearing, flatback and grooming. At the end of the experiment, rats were euthanized and their brains collected for histological and western blot analysis. Results showed that the pre-treatment with both doses of the antagonist significantly increased the time spent in the open arms when compared to vehicle injections (p < 0.0001 for both doses). Significant differences were also found in time spent in closed arms following antagonist treatment (p < 0.001 for the two highest doses). In addition, western blot analysis revealed CB1 downregulation.

To our knowledge, the functional role of the co-localization of the cannabinoid type-1 (CB1) and the transient receptor potential vanilloid type-1 (TRPV1) receptors within the Nucleus Accumbens shell (NAc shell) has not been well studied. However, preclinical investigations have demonstrated that endocannabinoids can modulate emotional responses. In addition, immunocytochemistry in mice has demonstrated high density of co-localized CB1 and TRPV1 receptors within the NAc shell. Thus, the present study seeks to elucidate the effects of this receptor interaction within the NAc shell on anxiety states. To this end, we hypothesized that blocking TRPV1 and the fatty acid amide hydrolase (FAAH) within the NAc shell would elicit an anxiolytic response in rats. In the present experiment, male Sprague Dawley rats were implanted with bilateral brain cannula aimed at the NAc shell. Following recovery from surgery, rats received pre-treatment of microinfusions (0, 0.125, 0.5 nmol/0.4 µl) of N-arachidonoyl-serotonin (AA-S-HT), a dual blocker of FAAH and TRPV1, within the NAc shell. After treatment, rats were tested in an elevated plus maze paradigm for a period of 5 minutes. Behavioral parameters measured were: time spent in open arms, time spent in closed arms, rearing, flatback and grooming. At the end of the experiment, rats were euthanized and their brains collected for histological and western blot analysis. Results showed that the pre-treatment with both doses of the antagonist significantly increased the time spent in the open arms when compared to vehicle injections (p < 0.0001 for both doses). Significant differences were also found in time spent in closed arms following antagonist treatment (p < 0.001 for the two highest doses). In addition, western blot analysis revealed CB1 downregulation. The present findings suggest that the endocannabinoid system modulates anxiety within the NAc shell, giving this area a more important role in the regulation of anxiety than previously recognized. It also suggests that the co-localization of CB1 and TRPV1 receptors within the NAc shell may be key for this modulation to work. Furthermore, the NAc shell may serve as a target for experiments aiming to elucidate anxiety problems that come with different psychiatric disorders and to better understand the impact of marijuana use in the brain.

210 The Effect of ADAMTS5 Mediated Proteoglycan Cleavage on Temporomandibular Joint Development, Emmaline Schafer1, Christine Kern2, Alexandra Rogers2, 1Clemson University, 2Regenerative Medicine and Cell Biology, MUSC.

Abstract not available.

211 Modulation of the Endocannabinoid System Within the Nucleus Accumbens Shell Elicits Anxyolitic-like Effects in Rats, Thibaut R Pardo-Garcia1, Nadira R Yusif2, Guillermo A Yudowski3, Carmen S Maldonado-Vlaar4, 1Neuroscience, MUSC, 2Neuroscience, Brown University, 3Anatomy & Neurobiology, University of Puerto Rico School of Medicine, 4Biology, University of Puerto Rico Rio Piedras campus.

To our knowledge, the functional role of the co-localization of the cannabinoid type-1 (CB1) and the transient receptor potential vanilloid type-1 (TRPV1) receptors within the Nucleus Accumbens shell (NAc shell) has not been well studied. However, preclinical investigations have demonstrated that endocannabinoids can modulate emotional responses. In addition, immunocytochemistry in mice has demonstrated high density of co-localized CB1 and TRPV1 receptors within the NAc shell. Thus, the present study seeks to elucidate the effects of this receptor interaction within the NAc shell on anxiety states. To this end, we hypothesized that blocking TRPV1 and the fatty acid amide hydrolase (FAAH) within the NAc shell would elicit an anxiolytic response in rats. In the present experiment, male Sprague Dawley rats were implanted with bilateral brain cannula aimed at the NAc shell. Following recovery from surgery, rats received pre-treatment of microinfusions (0, 0.125, 0.5 nmol/0.4 µl) of N-arachidonoyl-serotonin (AA-S-HT), a dual blocker of FAAH and TRPV1, within the NAc shell. After treatment, rats were tested in an elevated plus maze paradigm for a period of 5 minutes. Behavioral parameters measured were: time spent in open arms, time spent in closed arms, rearing, flatback and grooming. At the end of the experiment, rats were euthanized and their brains collected for histological and western blot analysis. Results showed that the pre-treatment with both doses of the antagonist significantly increased the time spent in the open arms when compared to vehicle injections (p < 0.0001 for both doses). Significant differences were also found in time spent in closed arms following antagonist treatment (p < 0.001 for the two highest doses). In addition, western blot analysis revealed CB1 downregulation. The present findings suggest that the endocannabinoid system modulates anxiety within the NAc shell, giving this area a more important role in the regulation of anxiety than previously recognized. It also suggests that the co-localization of CB1 and TRPV1 receptors within the NAc shell may be key for this modulation to work. Furthermore, the NAc shell may serve as a target for experiments aiming to elucidate anxiety problems that come with different psychiatric disorders and to better understand the impact of marijuana use in the brain.

212 Enhanced Membrane Type-1 Matrix Metalloproteinase Endosomal Recycling in Fibroblasts During Thoracic Aortic Aneurysm Development, Elizabeth K Nadeau1, Adam W Akerman1, Robert E Stroud1, Rupak Mukherjee2, John S Ikonomidis1, Jeffrey A Jones2, 1Surgery, MUSC, 2Ralph H. Johnson VA.

Background: Membrane type-1 matrix metalloproteinase (MT1-MMP) is a type-1 transmembrane protein that is elevated and plays a direct role in development of thoracic aortic aneurysms (TAA). Internalization of transmembrane proteins is regulated by interactions with adaptor proteins such as caveolin-1, and localization is regulated by the endosomal recycling/trafficking system. The Rabs are a family of GTPases, of which Rab5, Rab7, and Rab11 play critical roles in endosomal trafficking. Specifically, Rab5 is involved in inward trafficking, Rab11 directs endosomes outward, and Rab7 facilitates lysosomal
interactions. While aberrant expression of Rab GTPases has been implicated in pathological conditions, the effect of TAA formation on Rab-mediated MT1-MMP trafficking/localization remains unclear. Therefore, this study tested the hypothesis that MT1-MMP endosomal recycling system is altered in TAA fibroblasts. Methods and Results: The abundance of Rab5 and Rab11 was increased in aortas from mice 4-weeks following TAA induction, compared to un-operated control mice (Rab5: 180\pm21% vs. 100\pm8%; Rab11: 200\pm21 vs. 100\pm21%, respectively). No change in Rab7 abundance was observed. In aortic fibroblasts isolated from control and 4-wk TAA mice, MT1-MMP co-localized with Rab5 or Rab11, while co-localization with MT1-MMP was minimal in the control fibroblasts. Caveolin-1 co-immunoprecipitated with MT1-MMP in aortic fibroblasts. When control and 4-wk TAA fibroblasts were transfected with green fluorescent protein (GFP) tagged MT1-MMP, MT1-MMP-GFP localized primarily at the plasma membrane in control fibroblasts and was almost entirely localized to endosomal vesicles within TAA fibroblasts. Conclusion: These data suggest that MT1-MMP endosomal recycling is enhanced in TAA fibroblasts, which may play a prominent role in regulating the multiple functions of MT1-MMP during TAA formation. Therefore, therapeutic strategies that target MT1-MMP abundance and not cellular function may hold relevance as a means to attenuate aortic dilatation during TAA formation and progression. NIH R01 HL102121; VA I01 BX000904; VA I21 RX001707

213 The Molecular Implications of Lifestyle Associated Metabolites (AGEs) to Prostate Cancer Disparity. Narges Anbardar\(^1\), Danzell Smith\(^1\), Dion Foster\(^1\), Lourdes M Nogueira\(^1\), Laura Spruill\(^1\), Marbella E Ford\(^2\), Victoria J Findlay\(^1\), David P Turner\(^1\);
\(^1\)Pathology and Laboratory Medicine, MUSC, \(^2\)Public Health Science, MUSC.

It is clear that lifestyle factors known to increase cancer risk such as limited financial resources, lack of exercise, obesity and poor diet, are often more prevalent in African American communities. These lifestyle factors can have molecular effects on the biologic make up of tumors, altering cell signaling events and gene expression profiles which may promote its earlier development or progression to more metastatic disease. Advanced glycation end-product (AGE’s), are reactive metabolites produced endogenously as a result of glucose uptake. Studies show that as we get older AGEs accumulate in our tissues and organs to promote various chronic disease phenotypes. AGE pathogenic effects are mediated by modification of protein function, genetic fidelity, stress responses and cellular signaling pathways. Significantly lifestyle factors such as a sedentary lifestyle, obesity and an unhealthy diet are external influences that increase AGE build-up in the body. Previous research studies support the conception that AGE metabolites have direct connection to biological consequence of the socioeconomic and enviromental factors that cause cancer health disparity. In our lab we have studied AGE levels in clinical specimens of prostate cancer and identified race specific, tumor-dependent pattern of accumulation. Pathogenic consequence of AGE accumulation and a series of studies have highlighted the tumor-associated immune response as a serious pathway contributing to cancer disparity. Using primary tumor cells from prostate cancer patients, we found out that AGE’s released into the extracellular matrix can recapitulate the tumor associated immune response observed in race specific prostate tumor tissues. AGE’s may represent a novel biologic mechanism contributing to cancer disparity and may represent a new paradigm to explaining the increased cancer incidence and mortality figures observed within disparity populations. NIH R21CA170440

214 Demographic Factors Associated with Age of Primary Repair of Cleft Palate in the United States. Carly M Atwood\(^1\), Darrell Wright\(^1\), Shauna A Nguyen\(^1\), Krishna G Patel\(^1\), Ronald J Teufel\(^2\), David R White\(^1\);
\(^1\)ENT, MUSC, \(^2\)Pediatrics, MUSC.

The 2012 Kids’ Inpatient Database (KID) was queried using the International Classification of Disease Ninth Revision (ICD-9) procedure code for Correction of Cleft Palate (27.62). An inclusion criterion of age <3 years was used to isolate children undergoing primary repair. Targeted variables included patient race, region, location, expected primary payer, median household income by zip code, and sex. Statistical analyses were performed using chi-square test of homogeneity. Post hoc analysis involved pairwise comparison using z-test of two proportions with Bonferroni correction. A total of 2902 patients under 3 years of age underwent palatoplasty with 53.2% performed during year of life (YOL) 1, 35.7% in YOL2, and 11.1% in YOL3. Significant differences in timing of surgery were found within the categories of race and region. Patients identified as Asian or Pacific Islander were less likely (31.9%, p<0.001) to have repair during YOL1 compared to patients identified as White (55.6%), Black (52.2%), Hispanic (52.6%) or Other (52.8%). Additionally, Asian or Pacific Islanders were more likely to have the repair done during YOL3 (22.7%, p<0.001) compared to their White (8.8%), Black (6.5%), or Other (10.7%) counterparts. Patients in the Midwest region of the US are less likely (46.7%) to have repair during YOL1 compared to those in the Northeast (59.4%), and South (54.7%, p<0.001). More patients undergo repairs in
YOL3 in the South (21.1%) compared to the Northeast (4.4%), Midwest (9.0%), and West (6.2%, p<0.001). In summary, children living in the Midwest region of the US are less likely to have primary cleft palate repair during the first year of life compared to children in all other regions. Children identified as Asian or Pacific Islander, and children who are from the Southern region of the US are more likely to undergo repair in the third year of life compared to their peers.

215 Cell Cycle Regulation of an Nkx2–5 Target Gene, Balakrishnan Pillai1, Kim Sutton2, John Brooker2, Kyu-Ho Lee2; 1COM, MUSC, 2Pediatrics, MUSC.

The homeobox protein Nkx2–5 is a crucial transcription factor expressed in the early development of the cardiovascular system, and approximately 4% of congenital heart disease has been associated with missense mutations in Nkx2–5. Specifically, Nkx2–5 is involved in the proliferation of second heart field progenitor cells that give rise to the outflow tract, atrial septal region, and right ventricle. Based on its effect on second heart field progenitor proliferation, we hypothesized that downstream targets of Nkx2–5 may be involved in regulating cell cycle passage. CCDC117 is a downstream target of Nkx2–5, and has been shown to interact with CIA2B, and is thus implicated in the insertion of Fe–S clusters into DNA replication and repair machinery. By virtue of its interaction with the CIA targeting complex, we hypothesized that CCDC117 plays a key role in cell cycle progression. Furthermore, siRNA knockdown of CCDC117 has been shown to significantly impede cell cycle progression in HeLa cells. Since many other cell cycle control factors exhibit phase dependent expression profiles, we set out to elucidate the variation in CCDC117 expression levels between phases of the cell cycle. We quantified changes in CCDC117 expression levels in HeLa cells between G1 and S phases. HeLa cells were arrested in G1 and S phases, and CCDC117 levels were obtained and standardized to α–tubulin. The relative CCDC117 expression level in G1 was significantly higher than CCDC117 expression in S phase (p =0.035). This decrease in CDCC117 expression may indicate that its functional interactions with the CIA targeting complex may occur during G1. Future studies should quantify CCDC117 levels in G2 and M phases, as further fluctuations in CCDC117 expression may occur during these phases.

216 Extracapsular Dissection Vs. Superficial Parotidectomy of Benign Parotid Lesions: Surgical Outcomes and Cost-Effective Analysis, Masanari G Kato, Evren Erkul, Shaun A Nguyen, Marion B Gillespie; Otolaryngology-Head and Neck Surgery, MUSC.

BACKGROUND: Extracapsular dissection (ECD) and superficial parotidectomy (SP) are widely accepted surgical options for benign parotid tumors. Clinical outcomes comparing the two techniques have been extensively studied while associated costs have not been reported in literature to date. OBJECTIVE: To compare surgical outcomes and cost-effectiveness of ECD with SP. STUDY DESIGN: A retrospective chart review and cost-effectiveness analysis. METHODS: Adult patients who underwent parotidectomies for benign parotid lesions at a tertiary care institution from August 2012 to November 2015 were evaluated. Lesion features consisting of size, location, and pathology, and surgical outcomes including procedure time, hospital stay, and postoperative complications were assessed. Lastly, charges (US$) of surgeon, anesthesia, operating room (OR), and hospital, for ECD and SP were compared. RESULTS: In total, 46 parotidectomies consisting of 26 ECDs and 20 SPs met criteria. Lesion features were similar between both groups with the majority being pleomorphic adenoma. Procedure time (83.5 ± 36.8 vs. 139.0 ± 48.7; p<0.001) and hospital stay (0.5 ± 0.8 vs. 1.3 ± 1.6; p=0.014) were significantly shorter for ECD compared to SP. Furthermore, anesthesia (mean difference -1469.67; 95% CI, -2064.43 to -874.90; p=0.001), OR (mean difference -5819.61; 95% CI, -9182.46 to -2456.76; p=0.001), and total hospital charges (mean difference -11717.66; 95% CI, -18226.94 to -5208.37; p=0.001) were significantly less for ECD while remaining charges, including surgeon, showed no difference. Finally, facial nerve weakness, ear numbness, and other relevant postoperative complications were nonsignificant in occurrence between each group. CONCLUSION: When treating benign parotid lesions, ECD is a shorter, less costly, and equally safe alternative to traditional SP.

217 Focal Adhesion Formation and Actin Polymerization Are Reduced in Aortic Smooth Muscle Cells with Aging, Andrew R Leggett1, Elizabeth K Nadeau2, Jason B Wheeler2, Adam W Akerman2, Robert E Stroud2, John S Ikonomidis2, Jeffrey A Jones2; 1Medicine, MUSC, 2Cardiothoracic Surgery, MUSC.

BACKGROUND: Extracapsular dissection (ECD) and superficial parotidectomy (SP) are widely accepted surgical options for benign parotid tumors. Clinical outcomes comparing the two techniques have been extensively studied while associated costs have not been reported in literature to date. OBJECTIVE: To compare surgical outcomes and cost-effectiveness of ECD with SP. STUDY DESIGN: A retrospective chart review and cost-effectiveness analysis. METHODS: Adult patients who underwent parotidectomies for benign parotid lesions at a tertiary care institution from August 2012 to November 2015 were evaluated. Lesion features consisting of size, location, and pathology, and surgical outcomes including procedure time, hospital stay, and postoperative complications were assessed. Lastly, charges (US$) of surgeon, anesthesia, operating room (OR), and hospital, for ECD and SP were compared. RESULTS: In total, 46 parotidectomies consisting of 26 ECDs and 20 SPs met criteria. Lesion features were similar between both groups with the majority being pleomorphic adenoma. Procedure time (83.5 ± 36.8 vs. 139.0 ± 48.7; p<0.001) and hospital stay (0.5 ± 0.8 vs. 1.3 ± 1.6; p=0.014) were significantly shorter for ECD compared to SP. Furthermore, anesthesia (mean difference -1469.67; 95% CI, -2064.43 to -874.90; p=0.001), OR (mean difference -5819.61; 95% CI, -9182.46 to -2456.76; p=0.001), and total hospital charges (mean difference -11717.66; 95% CI, -18226.94 to -5208.37; p=0.001) were significantly less for ECD while remaining charges, including surgeon, showed no difference. Finally, facial nerve weakness, ear numbness, and other relevant postoperative complications were nonsignificant in occurrence between each group. CONCLUSION: When treating benign parotid lesions, ECD is a shorter, less costly, and equally safe alternative to traditional SP.
Background: Aging alters thoracic aortic structure and mechanics, inducing changes that adversely affect aortic function and cardiovascular disease risk. Previous data demonstrating an age-dependent reduction in aortic contractility and smooth muscle cell (AoSMC) contraction, suggest that aging may impair aortic wall homeostasis. However, the mechanisms involved are not well understood. Cellular adhesion is mediated through integrins, which aggregate scaffolding proteins, such as vinculin and focal adhesion kinase (FAK), at attachment sites to the extracellular matrix (ECM). Mature focal adhesions integrate the cytoskeleton with the (ECM), providing a mechanism to sense environmental changes and respond by altering cellular signaling and function. Therefore, we hypothesized that aging results in a reduction in integrin abundance, focal adhesion formation, and actin polymerization in AoSMCs.

Methods/Results: Primary AoSMCs isolated by explant outgrowth from young (6 month, n=12) and old (21 month, n=11) mice were used for all experiments and results were expressed as % change relative to young (100%). Confocal microscopy of AoSMCs stained for vinculin and phalloidin demonstrated reduced focal adhesion formation. Immunoblotting showed a reduction in integrin beta3, integrin alphaV, and phospho-FAK abundance with age (54.5±9.9%, 84.3±8.1, and 63.3±11.5). Immunoprecipitation of vinculin showed an age-dependent reduction in association with integrin beta3 (60.6±9.1%). Moreover, F (filamentous) actin abundance was reduced in the old AoSMC when compared to the young (6751±887 vs. 10556±1433 integrated optical densities); while total G (globular) actin remained unchanged. Conclusion: Focal adhesion formation and actin polymerization are reduced with age in AoSMCs. Furthermore, the decreased abundance of integrin beta 3 with age may be responsible for reduced focal adhesion formation, changes in polymerized actin, and represent a potential mechanism for reduced contractility with age. Ralph H. Johnson VA Medical Center

218 The Role of Cilia in Valve Development and Mitral Valve Prolapse, Neal K Peterson1, Katelynn Toomer2, Russell Norris2; 1MUSC, 2Cell Biol. and Reg. Med.

Mitral Valve Prolapse (MVP) is the most common cardiac valve disease, affecting one in 40 people. Patients with MVP are more susceptible to arrhythmias, heart failure, and sudden cardiac death. Besides surgery, there is no effective therapy for MVP due to a lack of understanding of its pathogenesis. Recent GWAS studies conducted by our lab and collaborators have shown that genes involved with primary cilia are involved in the pathogenesis and development of MVP. Additionally, a mutation in cilia gene DZIP1 was discovered in a large family with MVP. Our data show genetic haploinsufficiency of primary cilia in cardiac valves leads to a non-syndromic mitral valve disease in mouse models whereas complete genetic ablation enhances mitral valve phenotype severity. Identifying the crucial role of cilia in the development of nonsyndromic MVP represents a new paradigm in understanding the etiological basis of MVP and cardiac valve diseases, and will help inform future treatment options. MUSC Summer Health Professionals Research Program

219 The Impact of Sugar Derived Metabolites (AGEs) on Pubertal Mammary Gland Development. Bradley A Krisanits1, Lourdes M Nogueira1, Kenyatta L Walker2, Victoria J Findlay1, David P Turner3; 1Pathology and Laboratory Medicine, MUSC, 2South Carolina State University, 3Pathology and Laboratory Medicine. MUSC.

The mammary gland is one of few organs that develop postnatally. The formation of terminal end buds (TEBs) and branching drives epithelial cell invasion into the mammary fat pad during puberty. The interaction between mammary epithelial and stromal cells is crucial for the proper postnatal development of the mammary ductal tree. Interestingly, processes important in development are often deregulated during breast cancer tumorigenesis. Thus, understanding the complex signaling networks, as well as the interactions between the different cell types during development, will be vital for elucidating the mechanisms underlying breast cancer risk. The non-enzymatic glycosylation of sugar moieties to biological macromolecules such as protein and DNA produces reactive metabolites known as advanced glycation end-products (AGEs). AGE consumption has consistently increased over the last 50 years due to an increase of sugar laden and processed foods that are high in AGEs. AGEs signal through the receptor for advanced glycation end products (RAGE) resulting in pro-inflammatory and pro-oxidant effects, which can lead to complications associated with diseases including diabetes, Alzheimer’s, heart disease and cancer. Our lab has shown that AGEs modulate estrogen receptor α (ERα) phosphorylation, a key receptor in the regulation of mammary gland development and breast cancer. To study the effects of AGE consumption on normal mammary gland development, mice were fed a diet high in AGEs during puberty. We observed a significant disruption of normal mammary gland development including an increase in ductal branching and a delay in ductal extension in mice fed a high AGE diet compared to controls. We also observed altered TEB morphology, including increases in TEB number and size, as well as increased recruitment of immune cells. Taken together
these data suggest that the increased consumption of AGEs during puberty alters normal breast development and is a potential risk factor for the future development of breast cancer.

**220 GPA-EDA: An Interactive and Dynamic Visualization Toolkit for the Exploratory Analysis of Genetic Studies**, Emma C Kortemeier¹, Kelly Hunt², Paula Ramos³, Hang Kim⁴, Dongjun Chung¹; ¹Biostatistics, MUSC, ²Epidemiology, MUSC, ³Rheumatology, MUSC, ⁴Statistics, UC.

Rationale: As of this year, genome-wide association studies (GWAS) have identified over 20,000 single nucleotide polymorphisms (SNPs) associated with at least one disease or trait. Such achievements have provided various clinical and medical benefits with novel biomarkers and therapeutic targets. Recently, there has been accumulating evidence suggesting that different complex traits share common risk basis, a phenomenon known as pleiotropy. For example, 17% of genes reported in the GWAS Catalog are associated with more than one phenotype. Thus, a better understanding of pleiotropy can potentially be clinically beneficial as it may facilitate understanding of the common etiology of diseases and help improve therapies. However, effective interrogation of pleiotropic architecture still remains challenging, and it often requires employment of complicated statistical models. Methods: In order to address these challenges, we are developing GPA-EDA, an interactive and dynamic visualization toolkit for exploratory analysis of genetic studies. Specifically, GPA-EDA maps phenotypes onto two-dimensional space based on the genetic relationship among these phenotypes. In addition, GPA-EDA provides remarkable flexibility in modifying visualization to help improve user interpretations. Results: The application of GPA-EDA to GWAS datasets for 12 unique phenotypes indicates that clinically related phenotypes form clusters in the phenotype map generated by GPA-EDA. In addition, the visualization produced by GPA-EDA provides interesting hypotheses for relationships among groups of phenotypes, which require further investigation and in turn can be useful for the design of future genetic studies. Conclusion: We expect that GPA-EDA will be a powerful and flexible off-the-shelf tool to elucidate the genetic relationship among phenotypes, which can contribute to the development and improvement of diagnoses and therapeutics for various diseases.

**221 The Relationship Between Physical Activity and Vitamin D Levels in Postpartum Women**, Jordan Hall, Nina Forestieri, Judith Shary, Myla Ebeling, Carol L Wagner; Neonatology, MUSC.

Objective: Investigate the relationship between vitamin D levels and physical activity in postpartum women. It was hypothesized that based on the relationship between vitamin D and physical activity found in other populations, greater physical activity levels in postpartum woman will be associated with greater serum vitamin D levels. Methods: A post hoc analysis of 286 women with self reported physical activity data from the America on the Move survey, and measured circulating serum 25(OH)D as an indicator of vitamin D status at baseline (4-6 weeks postpartum), month 4, and month 7. Results: 36% at visit 1, 49 % at visit 4, and 53% of women at visit 7 were meeting the national recommendation of 150 minutes of moderate activity per week. Significant differences were seen in physical activity by race (P=0.043). Caucasians were more likely to meet the standard recommendation than African Americans or Hispanics. Using multiple regression models to examine associations between duration of physical activity and 25(OH)D concentration, controlling for race, treatment, sun exposure, BMI, feeding type, and METs it was found that at visit 1 (baseline), exercising for at least 2.5 hrs/wk was associated with an increase in 25(OH)D of 3.68 ng/mL (p=.02). This held true for activity levels up to 7 hours. At visit 4, exercising for at least 1.5 hrs/wk was associated with an increase in 25(OH)D of 4.86 ng/mL (p=.03). By visit 7, no amount of physical activity was significantly associated with maternal 25(OH)D. Conclusion: Postpartum physical activity levels differ across race/ethnicity. Consistency with existing data was seen at visits 1 and 4 showing increased physical activity was associated with greater serum vitamin D levels. No definitive conclusions can be drawn regarding precise levels of physical activity influencing vitamin D levels in postpartum women. Additional research is needed because of the inconsistency seen at visit 7. Student Health Professions; NIH 5R01HD043921, RR01070, MUSC Pediatrics; SCTR

**222 Complement Factor C3a Induces Mitochondrial Dysfunction in Candida Glabrata**, William E Linder, Silvia Vaena, Caroline Westwater; Oral Health Sciences, MUSC.

Abstract not available.
223 Immune Responses to Pneumococcal Vaccines in an HIV+ Aging Population, Megan AH Willner¹, Megan Bickford², Myra Happe², Maj Westerink³; ¹COM, MUSC, ²CGS, MUSC, ³Infectious Disease, MUSC.

Due to immunological distortions, both older adults and HIV+ individuals suffer disproportionally from Streptococcus pneumoniae infections in the forms of bacteremia and community acquired pneumonia (CAP). Although highly active anti-retroviral therapy (HAART) has improved immune responses in HIV+ individuals, and vaccinations against S. pneumoniae are the standard of care, the burden of invasive pneumococcal disease (IPD) remains high in HIV+ and aging individuals. Previous studies describe the immune response of the polysaccharide conjugate vaccine (PCV) and purified polysaccharide vaccine (PPV) in older adults and HIV+ individuals, but not the effectiveness of immunization with PCV/PPV in aging HIV+ patients. This study examines the immune responses to pneumococcal vaccination in eight groups divided according to HIV status, age (21-40 and 50-65), CD4+ count (< or > 200 cells/ml) and assigned to PPV only or PCV/PPV treatments in order to better understand whether vaccination with PPV alone is as effective as vaccination with PCV/PPV. Antibody titers were analyzed using enzyme-linked immunosorbent assay (ELISA) and opsonophagocytic assays (OPA). We found that among the three serotypes analyzed, PPS 7F and 19A had significant increases in antibody titers from pre- to post-immunization in the PPV only HIV+ 50-65 y/o CD4+200 treatment group as well as the PCV/PPV HIV+ 50-65 y/o CD4+>200 group (p<0.05 and p<0.01, respectively). There was however no significant difference between vaccination regimens. In HIV+ older adults with high CD4+ counts, serotype 19A showed a significant increase in post-vaccination titers in the PCV/PPV HIV+ 50-65 y/o CD4+>200 group when compared to post-vaccination PPV only HIV+ 50-65 y/o CD4+>200 group, indicating a significant difference between the regimens. Therefore, this study suggests that treatment with PPV alone is equally as effective as treatment with PCV and PPV in older HIV+ patients with a CD4+ count above 200 cells/ml with regards to serotype 7F. MUSC Summer Health Professions

224 Targeted Complement Inhibition Reduces Chronic Neuroinflammation and Improves Outcomes After Murine Traumatic Brain Injury, Shannon Weber¹, Ali Alawieh¹, Farris Langley², Steve Tomlinson³; ¹COM, MUSC, ²CofC, ³Microbiology and Immunology, MUSC.

Abstract not available.

225 Impact of Vitamin D Deficiency on Sinonasal Inflammation and Tissue Remodeling in a Murine Model of Atopic Chronic Sinusitis, Elliott D Mappus¹, Carl Atkinson², Jennifer K Mulligan¹; ¹Otolaryngology, MUSC, ²Microbiology and Immunology, MUSC.

Chronic rhinosinusitis (CRS) is a broad umbrella term for inflammation of the nose and paranasal sinuses lasting at least 12 weeks. Recent studies have shown that CRS affects up to 15% of the US of the general population and has a negative impact on quality of life exceeding that of other chronic conditions including heart failure, chronic obstructive pulmonary disease, or back pain. Vitamin D (VD3) is an anti-inflammatory agent that is implicated in multiple airway diseases. VD3 deficiency is highly prevalent in CRS patients as well as the general US Population. Furthermore, VD3 deficiency correlates with worse CRS clinical presentation than the non-deficient counterparts; however, the mechanism of disease exacerbation is unknown. The goal of this study was to understand the impact of VD3 deficiency on sinonasal inflammation and tissue remodeling in a murine model of atopic CRS. Murine CRS was achieved using an intraperitoneal injection of Aspergillus fumigatus (Af) followed by intranasal delivery of Af three times per week for four weeks. VD3 deficiency was established by a VD3 deficient diet started 4 weeks prior to entry into the atopic CRS model. Examined histological markers included a semi-quantitative inflammatory score, epithelial thickening, and goblet cell hyperplasia. VD3 deficiency alone had no impact on any measured metrics compared to controls. Both VD3 deficient + Af-CRS and Af-CRS groups showed increased semi-quantitative inflammatory scores, increased epithelial thickness, and decreased goblet cells in the posterior nasal cavity compared to controls. No significant differences were seen between VD3 deficient + Af-CRS and Af-CRS mice suggesting the dietary deficiency did not exacerbate murine Af-CRS. NIH R01HL091944, T32 DC014435, KL2TR001452, UL1TR001450

226 Effects of Apolipoprotein E on Left Ventricular Geometry and Function, Andrew P Hill¹, Hesham El-Shewy², Sarah Garrett², Miram Jaffa², Jeffre A Jones², Jaffa A Ayad¹, Rupak Mukherjee¹; ¹Cardiothoracic Surgery, MUSC, ²Endocrinology, MUSC.

Background A major risk factor for cardiovascular disease, the leading cause of death in the United
States, is dysregulation of cholesterol metabolism that is regulated partially by apolipoprotein E (ApoE) and mediated by growth factors such as connective tissue growth factor (CTGF). Although ApoE has been studied in various disease states, the effects of ApoE deficiency on left ventricular (LV) geometry and function remain to be determined. Accordingly, the goal of this project was to characterize serial changes in LV geometry and function in ApoE deficient (ApoE KO) and in corresponding age- and strain-matched wild type (C57BL/6; WT) controls. Methods/Results Monthly echocardiography (VisualSonics) for 6 months was performed in WT (n=12) and ApoE KO (n=16) mice starting at 2 months of age to measure LV end-diastolic volume (EDV), wall thickness at end-diastole (PWTd), ejection fraction (LVEF), and mass (LVMass). There were no differences in age-matched body weights between the WT and ApoE KO mice. EDV was similar between the WT and ApoE KO mice at 2 months of age (52.77 ± 2.03 µL and 58.66 ± 1.92 µL, respectively, p=NS), but higher in the ApoE KO mice beginning at four months (p<0.05). PWTd (0.88±0.03 vs 0.79±0.02 mm, p<0.05) and LVMass (94.2±5.4 vs 76.4 ±3.0 mg, p<0.05) were higher in the ApoE KO mice compared to WT beginning at two months. LVEF was similar between groups at 2 months of age (61.3±2.0% and 58.8±1.5%, p=NS) and remained similar at subsequent time points (p=NS). Conclusion Therefore, ApoE deficiency is associated with LV hypertrophy with no change in LV pump function through 8 months of age, suggesting an effect of ApoE on growth factors. These findings form the basis to examine the role of ApoE in modulating levels of growth factors, such as CTGF, and its effect on LV geometry and function with superimposed pathology, such as diabetes. VA SPIRE; MUSC Summer Health Professions Research Program; NIH 5T35DK007431

227 Perioperative Psoas: Lumbar Vertebral Index As a Predictor of Mid-Term Outcomes From Lower Extremity Revascularization, Emily S Nyers¹, Thomas E Brothers², ¹COM, MUSC, ²Surgery, MUSC.

Accurate and convenient methods for assessing a patient’s risk of postoperative morbidity and mortality represent important tools in clinical decision-making. While some aspects of patient fitness for surgery can be easily quantified, measurement of patient frailty is often difficult or time-consuming. Previous research in the context of multiple types of major surgical procedures has reported psoas:L4 vertebral index (PLVI) to be a useful predictor of postoperative morbidity and mortality. This retrospective cohort study tested the hypothesis that PLVI can predict amputation-free survival (AFS) in patients undergoing open or endovascular lower extremity revascularization. The records of all patients with preoperative computed tomography arteriography prior to revascularization over a recent six-year period were reviewed for demographic information and outcomes. Using embedded software the cross-sectional area of the bilateral psoas muscles and vertebral body at the L4 level were measured and used to calculate the PLVI. Univariate, multivariate logistic regression, and Cox proportional hazard analyses were performed for the primary outcome of AFS. Cox proportional hazard analysis identified age (HR 1.07 [1.01-1.14] P = .026), congestive heart failure (HR 4.7 [1.29-16.9] P = .019), and dyslipidemia (HR 0.34 [.12-.99] P = .049) as independent predictors of loss of AFS, while TPVR was not (HR 2.6 [.83-8.39] P = .099). Kaplan-Meier life table analysis demonstrated no significant differences in survival between the highest and lowest TPVR cohorts of patients. In conclusion, TPVR did not predict AFS after intervention for peripheral arterial occlusive disease. This is contrary to prior reports regarding the ability of TPVR to predict perioperative and mid-term survival after abdominal aortic aneurism repair and other major abdominal surgery. This work was supported in part by the Ralph H. Johnson Department of Veterans Affairs Medical Center. MUSC Summer Health Professions

228 Prevention of Pediatric Hospital Acquired Harms, Sarah G Keaveny¹, Elizabeth H Mack²; ¹COM, MUSC, ²Pediatrics, MUSC.

Hospital Acquired Harms are far too common in hospitals across the country. They are associated with high direct costs and high attributable mortality, for example a pediatric Central Line Associated Blood Stream Infection (CLABSI) is associated with a $35,000 direct cost and an attributable mortality of 10-20%. There have been multiple hospital and nationwide initiatives to reduce and prevent these harms, but arguably the most notable among Children’s Hospitals is Solutions for Patient Safety (SPS). SPS is an organization dedicated to preventing hospital acquired harms, and it aims to do so through implementation of evidence based prevention bundles to guide care of pediatric patients and maintenance of important devices such as ventilators, foley catheters, and central lines. My work this summer revolved around the implementation and auditing of prevention bundles across the Children’s Hospital for Ventilator Associated Pneumonia (VAP), Catheter Associated Urinary Tract Infections (CAUTI), Central Line Associated Blood Stream Infection (CLABSI), and Pressure Injuries (PI). Audits were completed in the Pediatric Intensive Care Unit (PICU), Neonatal Intensive Care Unit (NICU), Pediatric Cardiology Intensive Care Unit (PCIUC), as
well as 7A, 7B, 7C, 7E, and 8D. The bundles were ultimately evaluated for All or None compliance, where all elements must be complete in order to be considered compliant. All unit All or None compliance for June was 3% for VAP, 6% for CAUTI, and 0% for CLABSI and compliance for July was 8% for VAP, 0% for CAUTI, CLABSI, and PI. Although overall bundle compliance was found to be very low, this process allowed us to identify both real and perceived barriers to the successful implementation of the bundles. Identifying and overcoming these barriers as well as engaging all members of the health care team will put us in a better place to prevent harms and better protect our patients. NIH 5T35DK007431

229 Fast Brain MRI Sequence for All Pediatric Indications: Outcomes and Limitations, Avni Patel, Maria Vittoria Spampinato, Gustavo Cervantes, Milad Yazdani, Ramin Eskandari; COM, MUSC.

Introduction: Fast brain magnetic resonance imaging (fbMRI) is any rapid sequence MRI not requiring sedation, typically utilized for pediatric hydrocephalus. There is no radiation exposure and anesthesia/sedation compared with computer tomography (CT) and routine brain MRI, respectively. Limitations include decreased resolution/sensitivity for some intracranial pathologies. This study examines the utility of fbMRI for non-hydrocephalic pediatric indications and compares image quality and reliability to CT and routine MRI. Methods: Pediatric patients (<18 y/o) who underwent fbMRI from September 2014 -January 2016 were reviewed. Of the 437 patients, hydrocephalic patients were excluded. 94 patients with 110 fbMRIs (3 plane, T2-weighted HASTE) were included. 23 patients had comparison studies (CT or routine MRI), fbMRI was rated on quality and abnormal findings by 2 blinded neuroradiologists. Results: fbMRI diagnosed 122 conditions for 94 patients with 110 exams, the majority of which were macrocephaly or trauma-related. 7 fbMRIs (6%) prompted follow-up study. 26 diagnoses were made for 23 patients with comparison studies. The majority of pathologies not observed by fbMRI were hemorrhage-related traumatic injuries. Conclusion: fbMRI diagnosed multiple pathologies clinically significant correlation. Compared with CT, this fbMRI is less sensitive for depiction of acute blood products. However, fbMRI is a comparable alternative to head CT with improved brain resolution and no radiation exposure. As an alternative to conventional MRI, fbMRI affords clinically important data to make management decisions without risk of anesthesia/sedation complications. MUSC Summer Health Professions

230 Mechanical Tension Induces Exosome Secretion of MiR-133a in Thoracic Aortic Fibroblasts, Walker M Blanding, Adam W Akerman, Robert E Stroud, John S Ikonomidis, Jeffrey A Jones; 1 COM, MUSC, 2 CGS, MUSC, 3 Surgery, MUSC.

INTRODUCTION: MicroRNA-133a (miR133a) is a small non-coding RNA, and the loss of this microRNA is known to be associated with multiple cardiovascular pathologies, such as thoracic aortic aneurysm (TAA). This laboratory has previously reported an inverse relationship between aortic diameter and the abundance of miR-133a in human TAA specimens. According to the Law of Laplace, wall tension increases with aortic diameter. Understanding the mechanisms regulating miR-133a abundance may have therapeutic relevance. Therefore, the present study examined the role of three general mechanisms capable of regulating cellular abundance of mature microRNAs in aortic fibroblasts and smooth muscle cells under conditions of elevated tension. The mechanisms studied include: 1) primary microRNA expression, 2) microRNA degradation by specific exoribonucleases (XRN1, XRN2, Exosc4), and 3) mature microRNA cellular secretion in exosomes. METHODS/RESULTS: Isolated primary aortic cell lines (fibroblasts (FB) and smooth muscle cells (SMC)) were exposed to biaxial cyclic stretch for 3 hr. FB miR133a was reduced (62.8±8.3%; p<0.05 vs. unstretched control (100%)), while SMC miR133a abundance remained unchanged. Alterations in transcription of miR133a were assessed through measurement of primary miR133a levels by RT-PCR. Alterations in the expression of microRNA-specific exoribonucleases XRN1, XRN2, and Exosc4 was determined by RT-PCR and found to be unchanged. Secreted exosomes were collected from the media of fibroblasts exposed to biaxial cyclic stretch and quantitated by acetylcholinesterase activity assay. In FB conditioned media, a 27.4±4.3%, p<0.05 increase in secreted exosomes was detected compared to static controls. Furthermore, increased miR133a abundance was detected in these exosomes collected from the conditioned media of fibroblasts exposed to increased mechanical tension. CONCLUSION: Results demonstrate that increased tension alone results in the loss of miR-133a through exosome secretion in aortic fibroblasts. Thus, this study identified a novel mechanism through which mature miR-133a abundance may be regulated in aortic fibroblasts. American Association of Thoracic Surgery Graham Foundation; NIH R01 HL102121; VA IO1 BX000904
INTRODUCTION: Typical length of stay (LOS) following primary total joint arthroplasty (TJA) continues to decrease and is outpatient in some cases. While reduced LOS lowers initial costs, the effect on readmission risk and total cost is less certain. We hypothesize that there exists an optimal risk-adjusted LOS following TJA that minimizes duration of index hospitalization, risk for early readmission, and total cost. METHODS: Data was extracted from the South Carolina Department of Revenue and Fiscal Affairs Office. Data included all patients who underwent primary total hip or knee arthroplasty in South Carolina from 2000-2015 (n=172738). Data for readmissions within 90 days were included. Elixhauser (EH) and Charlson Comorbidity Indices (CCI) were calculated. Costs were assigned to index and readmission stays using previous institutional time-driven activity-based cost analysis. RESULTS: Sicker patients (EH≥4) had longer LOS than healthier patients (4.003 vs 3.448, p<0.001). Independent of EH, patients who were ultimately readmitted had longer index LOS than those never readmitted (4.292 vs 3.570, p<0.001). For healthier patients (EH<3), each additional inpatient day increased readmission risk. For sicker patients (EH≥4), staying 2 days vs. 1 was protective against readmission risk. Higher index costs among sicker patients appeared driven by longer LOS rather than higher cost of resource utilization. Over the last 15 years, the total cost of TJA has nearly doubled and average cost per inpatient day has tripled, but the rate of readmission remains essentially unchanged. CONCLUSIONS: For most patients, increased LOS was associated with increased rate of readmission following primary TJA. Patients with significant comorbidities benefited from staying two days, but otherwise were also more likely to be readmitted as LOS increased. Despite a 300% increase in daily cost associated with TJA, readmission rate has remained unchanged over the last 15 years. More attention directed towards improving the value of perioperative TJA care is warranted.
Hazelwood1, Kent E Armeson2, Elizabeth G Hill2, Heather Shaw Bonilha1, Bonnie J Martin-Harris3, 1Health Sciences & Research, CHP, MUSC, 2Public Health Sciences, COM, MUSC, 3Communication Sciences & Disorders, Northwestern University.

Purpose: To identify which swallowing tasks given during a modified barium swallow study (MBSS) contributed to the worst performance using the standardized Modified Barium Swallow Impairment Profile (MBSImP™©) approach. We aimed to: 1) determine which swallowing tasks were most likely to contribute to the worst performance for each physiologic component, and 2) determine if all swallowing tasks had equal probabilities of contributing to the worst performance for each physiologic component. Method: A secondary data analysis of a prospective collection of adult MBSSs was conducted. The probability that each swallowing task resulted in the derived MBSImP Overall Impression (OI) (worst) scores was estimated. The range of probabilities across swallowing tasks for each physiologic component was calculated to discern if one swallowing task had sufficiently higher probability of contributing to the worst performance. Results: Large-volume, thin liquid swallowing tasks had the highest probabilities of contributing to the OI score for physiologic components responsible for oral containment and airway protection. The cookie swallowing task was most likely to contribute to the OI score for physiologic components responsible for oral clearance. Several swallowing tasks had nearly equal probabilities (≤ 0.20) of contributing to the OI score for the majority of the physiologic components. Conclusion: A MBSS is a commonly used instrumental examination for the assessment of oropharyngeal dysphagia that uses videofluoroscopic imaging to detail the nature and severity of swallowing impairment and to identify physiologic targets of swallowing treatments. This study found that no one swallowing task had a sufficiently high probability of contributing to the identification of the extreme score for each physiologic component. Omission of swallowing tasks during a MBSS will likely fail to capture the most severe impairment for the physiologic components critical for safe and efficient swallowing. The use of standardized, well-tested protocols during MBSSs is supported by these results. NIH K23DC005764, 1K24DC12801, T32DC0014435; Bracco Diagnostics, Inc.

Jenkins5, 1COM, MUSC, 2Occupational Therapy, MUSC, 3Public Health Sciences, MUSC, 4Radiology, MUSC, 5Pediatrics, MUSC.

Background: Preterm birth is a major risk factor for motor development delays. There is a need for a quick screening test that can be administered at discharge from the neonatal intensive care unit to assess preterm infants’ risk for motor deficit. The objective of this study was to determine the relationship of neuroimaging indices in white matter and basal ganglia with the Specific Test of Early Infant Motor Performance (STEP), a novel early motor assessment, and standardized tests of motor performance. Methods: Retrospective analysis of 22 preterm infants with outcome measures of STEP, standardized Test of Infant Motor Performance (TIMP) at term and 3 months corrected gestational age (CGA), and Diffusion Kurtosis Imaging (DKI) and Magnetic Resonance Spectroscopy (MRS) at term CGA. DKI was subsequently analyzed for fractional anisotropy (FA) using voxelwise statistical comparisons between high and low performing groups in the white matter tracts. MRS metabolites were analyzed in the frontal white matter and basal ganglia, and generalized linear models with gestational age at scan and birth were created to assess relationships. Results: Fractional anisotropy (FA) values were significantly different in the corpus callosum, left internal capsule, and left inferior fronto-occipital fasciculus between high and low performing infants. This signifies greater white matter tract integrity in infants with better motor skills. Additionally, healthy neuronal metabolite N-acetylaspartate (NAA/Cho, NAA/Cr) in the white matter and basal ganglia positively predicted STEP and TIMP scores. Conclusion: STEP risk categorization accounts for differences in DKI FA values in the white matter. Additionally, NAA ratios in the white matter and basal ganglia predicted higher STEP and TIMP scores. In the future, these relationships need to be validated in a novel cohort. NIH UL1 TR000062

235 Validation of the Specific Test of Early Infant Motor Performance (STEP) with Neuroimaging, Laurel Gower1, Patty Coker-Bolt2, Viswanathan Ramakrishnan3, Hunter Moss4, Truman Brown4, Dorothea Jenkins5, 1COM, MUSC, 2Occupational Therapy, MUSC, 3Public Health Sciences, MUSC, 4Radiology, MUSC, 5Pediatrics, MUSC.

Prominence of screws within a joint is an uncommon, but known, issue with fracture fixation. It is best to identify offending screw tips prior to conclusion of surgery. The purpose of this study is to evaluate the

236 Optimal Radiographic Views for Predicting Intra-articular Screw Penetration After Proximal Humeral Locking Plate Implantation, Thomas Kelly1, William R Barfield2, Langdon A Hartsoc2, Russell Chapin3, Kristoff Reid2, Zilan Lin2, Lucy Dimarco3, Shane K Woolf2, 1COM, MUSC, 2Department of Orthopaedics, MUSC, 3Department of Radiology, MUSC.
Shoulder pain and no prior intervention. Records from 500 consecutive patients were reviewed. Mean age was 55 years (14-85 years) and 83% were right hand dominant. The dominant side was affected in 50% of patients. Half of this cohort went on to have a shoulder surgery, which was primarily rotator cuff or instability repair. A documented existing cervical spine condition was noted in 7% of all patients, and 4% had already undergone a neck surgery. A new neck condition was diagnosed and worked up in 6% of patients. In total, 7% of all patients were referred to a neck/spine specialist with a symptomatic new or existing neck problem, and most of this group were treated nonoperatively. Only 1% of the initial cohort ultimately had a neck surgery. History of a neurocompressive complaint in the affected arm, not involving the shoulder or neck, was noted in 4% of patients and an additional 6% were diagnosed and subject to a workup for a newly identified arm issue. Out of all patients, 6% were referred to a hand specialist and surgery was ultimately performed in 3%. In a sports medicine clinic setting, index evaluation of primary shoulder complaints can be expected to coexist with neck or arm issues in 11% of cases. This was more frequent than we anticipated. Further, 12% of new patients warranted further workup of upper limb or neck pathology within a year of the initial evaluation for shoulder pain. A procedure on the neck or wrist/hand was ultimately performed in 4% of all patients in this cohort who initially presented with a complaint of shoulder pain. This data provides a reminder to clinicians that concurrent pathology in the upper extremity is actually relatively common. The treating physician may also use this information to counsel patients about potential need for a different evaluation pathway to establish an accurate diagnosis and treatment approach.

Concurrent neck and shoulder pathology is thought to be relatively infrequent. However, recognition of neck or arm issues in the context of a shoulder pain evaluation is essential to accurate diagnosis and effective treatment. The objective of this study was to assess the prevalence and the annual incidence of neck or arm pathology in a consecutive cohort of patients presenting to a sports medicine clinic with an initial chief complaint of shoulder pain. Our hypothesis was that concurrent neck and shoulder pathology is encountered in <5% of such patients and is infrequently identified within a year of the initial encounter. IRB approval was obtained for a retrospective study of clinical records of patients who presented to an orthopaedic sports medicine clinic in a university health system with the chief complaint of shoulder pain and no prior shoulder assessment or intervention. Records from 500 consecutive patients were reviewed. Mean age was 55 years (14-85 years) and 83% were right hand dominant. The dominant side was affected in 50% of patients. Half of this cohort went on to have a shoulder surgery, which was primarily rotator cuff or instability repair. A documented existing cervical spine condition was noted in 7% of all patients, and 4% had already undergone a neck surgery. A new neck condition was diagnosed and worked up in 6% of patients. In total, 7% of all patients were referred to a neck/spine specialist with a symptomatic new or existing neck problem, and most of this group were treated nonoperatively. Only 1% of the initial cohort ultimately had a neck surgery. History of a neurocompressive complaint in the affected arm, not involving the shoulder or neck, was noted in 4% of patients and an additional 6% were diagnosed and subject to a workup for a newly identified arm issue. Out of all patients, 6% were referred to a hand specialist and surgery was ultimately performed in 3%. In a sports medicine clinic setting, index evaluation of primary shoulder complaints can be expected to coexist with neck or arm issues in 11% of cases. This was more frequent than we anticipated. Further, 12% of new patients warranted further workup of upper limb or neck pathology within a year of the initial evaluation for shoulder pain. A procedure on the neck or wrist/hand was ultimately performed in 4% of all patients in this cohort who initially presented with a complaint of shoulder pain. This data provides a reminder to clinicians that concurrent pathology in the upper extremity is actually relatively common. The treating physician may also use this information to counsel patients about potential need for a different evaluation pathway to establish an accurate diagnosis and treatment approach.
Biomechanical Strength in a Rat Femur

Irradiation: Delayed Acquisition of Fracture Healing

By External Beam Irradiation for Local Tumor Control.

A unique bilateral femur fracture model was utilized in thirty-six (36) male Sprague-Dawley (SD) rats in order to concurrently study both bone healing pathways in the same animal. One side was repaired with an intramedullary (IM) nail (healing via EO) while the other side was rigidly fixed with plate and screws (healing via IO). On postoperative day 3, the rats in one cohort (n=18) underwent radiation treatment (250 kVp, 13 mA; 8 Gy delivered dose). Animals were euthanized at predetermined time points 3 and 6 months postoperatively and their femora were immediately harvested and subjected to biomechanical testing. Statistical analysis was conducted through paired comparisons testing. Control femurs not subjected to radiation and repaired with IM nails exhibited greater yield strength (138.7%; p=0.0099) than plated femurs at 3 months, with no significant difference in stiffness. Conversely, in the radiated animals both yield strength (48.4%; p=0.0012) and stiffness (87.2%; p<0.0001) were selectively and significantly reduced in the nailed compared with plated femurs at 3 months. In all specimen comparisons, radiation preferentially impaired EO more than IO, and more adversely affected yield strength than stiffness. Our results demonstrate a differential effect of radiation on the acquisition of biomechanical strength of bone after healing through the two separate pathways of fracture repair. We observed a substantial radiation inhibition of EO, or secondary bone healing, as induced by IM nail fixation. Compression plate fixation may offer a more reliable and durable alternative to IM nailing for repair and healing of malignant pathologic fractures that require external beam irradiation for local tumor control.

239 Outcomes in Presumed GERD
Patients with Negative Reflux Studies and Negative Manometry, Logan Roof1, Mohamed Khalaf2, Donald Castell2; 1COM, MUSC, 2Gastroenterology, MUSC.

Many patients are referred to our esophageal laboratory for presumed GERD who have not responded to a PPI. It is unclear what role negative reflux and motility studies play in guiding referring physicians' subsequent treatment plans. Our goal is to investigate whether negative impedance-pH and esophageal manometry studies (EVAL) will guide treatment decisions in these patients. From January 2015 through June 2016, 589 patients had ambulatory impedance-pH studies conducted at MUSC. 323 of these were negative (54%). Of these, MUSC staff referred 209 patients. 68 of the 209 (33%) also had normal esophageal manometry studies. Eight of these 68 patients were excluded due to lack of follow-up documented in our electronic medical record and we excluded 5 patients who underwent EVAL solely for pre-lung transplant evaluation. We reviewed the charts of the remaining 55 patients to determine the treatment plan outlined during the follow-up office visit with the referring provider based on the report of a normal EVAL at MUSC. Although the majority of referring providers excluded the diagnosis of GERD after negative EVAL (58%), most providers continued PPI therapy (70%) and some actually initiated a PPI in those not on therapy (27%). Up to 62% of physicians may be unable to adequately interpret the results of reflux testing and patients may be inappropriately kept on PPI therapy. These findings are notable in light of concerns regarding the risks of long-term PPI therapy.

240 Selective Inhibition of Endochondral Fracture Healing By External Beam Irradiation: Delayed Acquisition of Biomechanical Strength in a Rat Femur

Fracture Model, Zilan X Lin1, Yongren Wu1, E Lex Hanna1, Robert Holmes1, Raymond Boaz2, Daniel G McDonald3, William R Barfield1, Vincent D Pellegrini1; 1Orthopaedics, MUSC, 2Public Health Science, MUSC, 3Radiation Oncology, MUSC.

While external beam irradiation has become a widely accepted method of treating metastatic malignant lesions that compromise the structural integrity of the skeleton, its inhibitory effects on fracture healing remain poorly understood. The purpose of this study was to investigate the differential effects of radiation on the two pathways of fracture healing, endochondral (EO) and intramembranous ossification (IO), in order to ascertain an optimal method of surgical repair for malignant pathologic fractures that require external beam irradiation for local tumor control. We conducted a study both bone healing pathways in the same animal. One side was repaired with an intramedullary (IM) nail (healing via EO) while the other side was rigidly fixed with plate and screws (healing via IO).
241 The Impact of Reported Depression on Disability Following Stroke, Scott D Hutchison1, Michelle L Woodbury1, Annie Simpson2,1Health Science & Research, MUSC, 2Healthcare Leadership and Management, MUSC.

PURPOSE: Approximately 33% of stroke survivors report feelings of Anxiety/Depression (AD). Studies have shown that disability leads to AD, however, few have explored how AD can lead to disability. The aim of this study was to predict disability a year post stroke based on self-reports of AD. We hypothesized that survivors reporting AD would have higher levels of disability. DESIGN: A retrospective analysis of existing data collected for a study by the Interventional Management of Stroke (IMS) III Investigators. METHOD: The following data were extracted: The Modified Rankin Scale (mRS) collected at 12 months post-stroke measured disability (dichotomized to different subjects who required daily assistance from those that did not). Item 5 from the EuroQol (EQ-5D) collected at 3, 6, 9 and 12 months measured subject-reported AD. Subjects were categorized into a group who reported AD at every time point (Persistent Report, n=175), a group that gave some reports (Intermittent Report, n=526) and a group that gave No Report (n=137). A predictive model using multiple logistic regression with reported adjusted odds ratios were generated. All were performed controlling for stroke severity (based on NIH Stroke Scale), intervention group, age and gender. RESULTS: Logistic regression: when compared to the No Report group, the Intermittent Report group, (β=1.75±.49 p=.0003) and the Persistent Report group (β=2.53±.58, p<.0001) demonstrated significantly greater need for daily assistance. Odds ratio analysis: when compared to the No Report group, the Intermittent Report group had 5.7 times (95% CI 2.20-14.89, p=.0003) higher, and the Persistent Report group had 12.6 times (95% CI 4.01-39.64, p<.0001) higher odds of needing daily assistance 1 year post-stroke. CONCLUSION: A survivor who persistently reports AD feelings throughout the first year post-stroke is statistically more likely to require physical assistance. Our results emphasize the importance of repeatedly screening for AD during the stroke rehabilitation process.

242 Geographic Variation in Pediatric Emergency Department Visits for Asthma in South Carolina From 1999-2015, Matthew Bozigar, John Pearce, Erik Svendsen; Public Health Sciences, MUSC.

Asthma is the leading chronic disease condition for children under the age of 18 years as well as the leading cause of emergency department (ED) visits for this sensitive population. Recent evidence suggests that asthma prevalence trends have plateaued after decades of increases, yet a significant public health concern remains as geographic variation highlights continued increases in certain regions (the American South) along with broadly increasing racial disparities. As such, it is an important disease to understand, especially among a population comprised of children that could benefit greatly from early health interventions to prevent or mitigate the effects of asthma, while simultaneously increasing their awareness of healthy habits and access to health care. Our goal is to examine the geographic distribution of asthma-related ED visits for children aged 5 to 19 years to locate if any areas in South Carolina have unexpectedly high visit rates. The driving hypothesis behind this work is that asthma-related ED visits in children will vary across South Carolina. To address, we analyzed a unique and complete dataset of all ED visits for asthma in South Carolina from 1999 to 2015. We define asthma-related visits using ICD-9 codes (493). Preliminary findings illustrate spatial variation in ED visit rates in the pediatric population, with low rates occurring in the upstate region, and high rates occurring along the Interstate 95 corridor. The latter region is characterized by a predominantly African-American population and low-socioeconomic status. As a result of this research, entities with public health components, such as the MUSC School-Based Telehealth Center, can be informed about and therefore target particular locations with the greatest asthma burden and, consequently, the greatest potential benefit from future interventions. This research highlights disparities in an important health outcome and its associated effects across and within a vulnerable population.

243 Age-related Changes in B Cells Impact Immune Responses to Pneumococcal Vaccination in Aging HIV+ Individuals, Myra Happe1, Jennifer Ohtola2, Megan Bickford1, Julie Westerink3; 1Microbiology and Immunology, MUSC, 2Medicine, UTMC, 3Medicine, MUSC.

Background: The introduction of combined antiretroviral therapy has increased longevity in HIV+ individuals resulting in a rapid growth of aging HIV+ population. The increasing lifespan of HIV+ persons represents new challenges combining the immune deficiencies of HIV with those of aging. This results in high susceptibility to Streptococcus pneumoniae and poor recall and novel vaccine antigen responses likely caused by poorly characterized perturbations in B cells. The goal of this project is to characterize specific B cell deficiencies in aging HIV+ individuals by studying B cell responses to highly pertinent vaccines, and to
define mechanisms underlying poor vaccine responses in this unique population. Methods: The HIV+ participants were recruited from the Medical University of South Carolina. The age distributions of the participants are 21-40 and 50-65 years of age (on cART with HIV viral loads<40); age matched healthy individuals served as control population. All participants receive pneumococcal vaccination. Blood samples were collected at five time points and are used for antibody titers, opsonophagocytic assay, flow cytometry and in vitro cell culture analysis. Results/Conclusions: Studies in our laboratory showed that serotype specific serum levels of IgG and IgM were significantly reduced for serotype 14, but not for serotype 23 in elderly HIV+ as compared to age-matched HIV- individuals post pneumococcal vaccination (p<0.05). We also compared OPA titers for serotype 14 and 23F and showed that elderly HIV+ individuals had significantly reduced post vaccination titers for serotype 23F only (p<0.05). We currently have a limited number of HIV+ participants in the 21-40 years old group and therefore unable to identify significant differences in serum levels and OPA titers between age groups. We postulate that aging HIV+ persons have reduced immune responses to pneumococcal vaccination as a result of an increase in inflammatory state and B cell defects which impact immune reponses to vaccines. NIH TL1 TR001451, UL1 TR001450

244 Examining the Relationship Between Semantic Performance and Inferior Longitudinal Fasciculus Integrity in Chronic Post-stroke Aphasia Using Advanced Diffusion MRI Techniques, Emilie McKinnon<sup>1</sup>, Russell Glenn<sup>2</sup>, Jens Jensen<sup>3</sup>, Joseph Helpern<sup>3</sup>, Julius Fridriksson<sup>4</sup>, Leonardo Bonilha<sup>1</sup>, <sup>1</sup>Neurology, MUSC, <sup>2</sup>Neuroscience, MUSC, <sup>3</sup>Radiology, MUSC, <sup>4</sup>Communication Sciences, USC.

Studying the impact white matter network integrity has on clinical performance enhances our understanding of fiber bundle functionality and could potentially help predict recovery from stroke. In this study, we determine the integrity of the ipsi- and contralateral inferior longitudinal fasciculus (ILF) using diffusional kurtosis MRI and show its relationship with semantic performance. Eight subjects (age = 52.0±7.2y; 62% male; MRI Time post-stroke = 50.25±29.8m) with chronic post-stroke aphasia received Intensive Language Action Therapy for a period of three weeks. Structural images (T1 & T2) and diffusional kurtosis images (DKI) (30 directions, b= [1000, 2000 s/mm<sup>2</sup>]) were acquired before and after treatment. The following image processing pipeline was implemented. First a probabilistic white matter (WM) mask was estimated from T1 images using the clinical toolbox in SPM8. Then conventional DKI tractography was performed using the fiber tracking toolbox in Diffusion Kurtosis Estimator using the WM mask as a seeding region. Lastly, we optimized the automated fiber quantification (AFQ) software to acquire along tract diffusion measurements resulting in 100 nodal mean kurtosis (MK), mean diffusivity (MD) and fractional anisotropy (FA) measurements along major tracts. Compared to the contralateral side, the ipsilateral ILF shows diffusion characteristics typical for damaged neuronal tissue: high MD, low FA, and low MK. The variability was also considerably larger at the ipsilateral side. Interestingly, minimal mean kurtosis correlated significantly with amount of semantic errors (R=−0.84, P<0.001). Additionally, a therapy related reduction in the number of semantic errors was associated with an increase in MK (R=−0.89, P<0.001). None of the correlations with FA and MD reached the significance level. Our results suggest that white matter damage ideally is characterized using MK and that lower MK relates to more semantic errors. Furthermore, therapy induces changes in the ILF’s microstructure that relates to a decrease in semantic errors. NIH T32DC0014435, T32GM008716, DC014021, DC011739, DC014664; The Litwin Foundation, AHA FDRN26030003

245 Chronic Post-stroke Aphasia Severity is Determined By Fragmentation of Residual White Matter Networks, Barbara K Marebwa<sup>1</sup>, Julius Fridriksson<sup>2</sup>, Grigori Yourganov<sup>3</sup>, Lynda Feenaughty<sup>1</sup>, Chris Rorden<sup>3</sup>, Leonardo Bonilha<sup>1</sup>; <sup>1</sup>Neurology, MUSC, <sup>2</sup>Communication Sciences and Disorders, USC, <sup>3</sup>Psychology, USC.

Many stroke survivors who suffer from acute aphasia in the acute period experience spontaneous recovery within the first six months post-stroke. About 20% sustain permanent and disabling language problems and the factors that drive incomplete recovery are not clear. It has been suggested that cortical dysfunction may occur in areas seemingly spared by the stroke due to changes to metabolism as well as loss of white matter connectivity and disruption of cortical and subcortical network integrity. We hypothesized that residual white matter connectivity could provide a personalized predictor of the severity of chronic aphasia. Using post-processing methods of diffusion tensor imaging optimized for lesioned brains, we reconstructed the individual structural whole-brain connectome from 90 right handed participants with a single left hemisphere ischemic or hemorrhagic stroke. All participants underwent language assessment using the Western Aphasia Battery that yields a global
measure of aphasia severity on a scale of 0-100 (WAB-AQ). Data analysis was performed on each subject’s individual connectome, a weighted adjacency matrix $M$ of size $189 \times 189$. We measured comprehensive white matter topological network organization using Newman’s modularity algorithm and calculated the probability of brain regions clustering together through a community affiliation index, which was used to determine the structural fragmentation of white matter networks in the left hemisphere relative to right hemisphere, expressed by a fragmentation index. Patients with greater post-stroke left hemisphere network fragmentation and higher modularity index had more severe chronic aphasia, controlling for the size of the stroke lesion. Modularity and fragmentation index significantly increased with aphasia severity ($r = -0.42$, $p < 0.00001$), and ($r = -0.43$, $p < 0.0001$) respectively. Even when the left hemisphere was relatively spared, patients with disorganized community structure had significantly worse aphasia. Our findings confirm that residual white matter integrity and disorganization of neuronal networks are important determinants of chronic aphasia severity. Furthermore, the assessment of residual connectome white matter organization through modularity provides a comprehensive and personalized measurement that may be used as a marker for clinical staging and aphasia treatment planning. *NIH DC014021*

**246 Laser Scanning Stereomicroscopy for Fast Volume Imaging with Two-photon Excitation and Scanned Bessel Beams**, Yang Li$^1$, Chen Xun$^1$, Yang Yanlong$^2$, Tong Ye$^1$; $^1$Clemson-MUSC Bioengineering Program, $^2$State Key Laboratory of Transient Optics and Photonics, Chinese Academy of Sciences.

Abstract not available.

**247 Impact of Selective Serotonin Reuptake Inhibitors (SSRIs) on Bone Health in the Veteran Population: 10 Year Clinical Outcomes**, Daniel L Brinton$^1$, Cory E Fominaya$^2$, Amanda C LaRue$^2$, Annie N Simpson$^3$; $^1$Health Sciences & Research, MUSC, $^2$Ralph H. Johnson VA Medical Center, $^3$Healthcare Leadership & Management, MUSC.

Background: Veterans are at increased risk for depression and anxiety, resulting in possibly being prescribed long-term SSRI therapy. Studies suggest that selective serotonin reuptake inhibitors (SSRIs) increase the risk of fracture and decrease bone mineral density. However, most studies have focused on the elderly and perimenopausal women over a short period. The aim of this study was to examine SSRIs’ impact on bone health, using hip fracture and development of osteoporosis as outcomes. Methods: We used Cox proportional-hazards survival models to test whether the risks of hip fracture or being diagnosed with osteoporosis varied based on SSRI exposure status. Using the Veterans Health Administration (VHA) data warehouse, we identified a total of 5,152,103 eligible Veterans nationwide (SSRI group, $n = 1,656,199$ patients; control group, $n = 3,495,904$ patients) who were active at the VHA between September 2002 and October 2004, following them for ten years. Results: A significant increase in the risk of either outcome occurring among patients on SSRIs versus those who were SSRI naïve was found. On average, individuals on SSRIs had a 1.84 times greater risk of hip fracture (Hazard Ratio [HR], 1.84; 95% CI, 1.77-1.91; $p<0.0001$) compared to Veterans not on SSRIs while controlling for other factors that may influence fracture risk. Likewise, patients on SSRIs had a 1.44 times greater risk of developing osteoporosis (HR, 1.44; 95% CI, 1.41-1.46; $p<0.0001$). The rate of hip fracture per 10,000 people increased from 15.7 to 31.1 for those on SSRIs compared with those in the control group; osteoporosis development rate per 10,000 people increased from 122.6 to 184.7. Conclusion: SSRI usage was associated with a greater risk of hip fracture and osteoporosis over a 10-year period in the Veteran population. Potential implications include the need for bone mineral degradation prophylaxis and periodic bone densitometry for longitudinal monitoring.

**248 Porphyromonas Gingivalis Modulates Antibacterial NADPH Oxidase 2, NOX2, in Primary Gingival Epithelial Cells**, JoAnn S Roberts$^1$, Kalina Atanasova$^2$, Ozlem Yilmaz$^1$; $^1$Oral Health Sciences, MUSC, $^2$Periodontology, UF.

Abstract not available.

**249 Sphingosine Kinase 1 in Mature Adipocytes Contributes to Adipogenesis Through Regulation of Glucocorticoid Signaling**, Johana M Lambert, Andrea K Anderson, Ashley Cowart; Biochemistry, MUSC.

Efficient lipid storage in adipocytes is important for prevention of metabolic pathologies associated with excess body weight. When adipogenesis is impaired, adipocytes undergo hypertrophy due to increased
patients with TNBC. One potential explanation for the metastatic disease, or increasing the overall survival of erlotinib) have shown to be unsuccessful in slowing How the fact that TNBC lacks these three common estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor-2 (HER2), markers that are common drug targets in breast cancer. Despite the fact that TNBC lacks these three common breast cancer markers, it over-expresses the epidermal growth factor receptor (EGFR) in 50-75% of its cases. The over-expression of EGFR in the majority of TNBC cases makes EGFR an obvious therapeutic target. However, EGFR inhibitors (e.g. cetuximab, gefitinib, erlotinib) have shown to be unsuccessful in slowing metastatic disease, or increasing the overall survival of patients with TNBC. One potential explanation for the difficulty in impairing EGFR signaling in TNBC is that the receptor is not being properly degraded, which is normally regulated by endocytosis. This defect in EGFR regulation likely sustains EGFR activation, thereby impeding effective targeted inhibition while leading to breast cancer progression. Our lab has identified Hormonally Up-regulated Neu-associated Kinase (HUNK), a protein kinase, which we can show to be up-regulated by EGFR signaling in TNBC. We have shown that HUNK expression maintains EGFR stability in TNBC cells, and that the down-regulation of HUNK deregulates that stability along with suppressing downstream EGFR signaling. In addition, we have been able to show that the down-regulation of HUNK decreases colony formation, mammosphere formation, and cell migration in EGFR+ TNBC. Our results suggest that HUNK is regulating EGFR turnover and stability, and that HUNK is regulating the metastatic potential of EGFR+ TNBC. NIH TL1 TR001451, UL1 TR001450; ACS IRG-97-219-14; Concern Foundation Conquer Now; NCI R01 CA187305

251 Investigating the Requirement of Hunk Kinase Activity on Autophagy Regulation, Joelle N Zambrano, Elizabeth S Yeh; Pharmacology, MUSC.

Dysregulated autophagy in HER2+ breast cancer (BC) cells is thought to be a primary mechanism of acquired resistance to HER2 inhibitors. We have previously shown that Hormonally-Up-regulated Neu-associated Kinase (Hunk) promotes HER2+ BC tumorigenesis, and have recently shown that Hunk inhibition impairs autophagy in HER2+ BC cells. Using a murine breast tumor-derived cell line MMTV-neu engineered with Hunk knockout, we have found that these cells exhibit impaired autophagy compared to parent MMTV-neu cells containing endogenous Hunk. We now aim to examine the role of Hunk kinase activity on autophagy regulation to determine if catalytic activity is necessary for the pro-autophagic functions of Hunk. Using LC3BII as an indicator of autophagy flux, we show that 293T cells overexpressing a kinase-inactive form of Hunk (K91M) also exhibit impaired autophagy when treated with a late stage autophagy inhibitor chloroquine (CQ), as compared to cells expressing wild-type (WT) Hunk. When these cells are co-transfected with WT or K91M Hunk along with an essential autophagy regulator Beclin-1, the kinase-inactive co-transfected cells continue to show reduced autophagy flux. This indicates that catalytically inactive Hunk is able to impair autophagy despite the presence of other positive regulators of autophagy. We also observe WT Hunk colocalization with LC3B positive puncta with CQ treatment, and are further investigating the lack of K91M colocalization in LC3B+ puncta in the presence of CQ. Because LC3B lipidation is an important event.

250 The Protein Kinase HUNK: A Novel Regulator in EGFR+ TNBC Growth and Metastasis, Carly B Williams, Melissa Abt, Elizabeth Yeh; Cell and Molecular Pharmacology & Experimental Therapeutics, MUSC.

Breast cancer is a disease that continues to evade intervention with many gaps still existing between its underlying mechanisms and treatment. Triple-Negative Breast Cancer (TNBC) is classified as a lethal and aggressive breast cancer subtype, and successful therapeutic strategies to treat this disease have yet to be found. TNBC represents 15-20% of all breast cancer cases and is characterized by the absence of the estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor-2 (HER2), markers that are common drug targets in breast cancer. Despite the fact that TNBC lacks these three common breast cancer markers, it over-expresses the epidermal growth factor receptor (EGFR) in 50-75% of its cases. The over-expression of EGFR in the majority of TNBC cases makes EGFR an obvious therapeutic target. However, EGFR inhibitors (e.g. cetuximab, gefitinib, erlotinib) have shown to be unsuccessful in slowing metastatic disease, or increasing the overall survival of patients with TNBC. One potential explanation for the
during autophagy, absence of colocalization with kinase-inactive Hunk implies the necessity for Hunk kinase activity to regulate autophagy. Most recently, we have found that only kinase-inactive Hunk, but not WT Hunk, colocalizes with the lysosomal marker LAMP1, indicating kinase-inactive Hunk may be alternatively regulated through the lysosome when it is unable to promote autophagy. Collectively, these data imply that Hunk kinase activity is required for autophagy. NCI R01CA187305; NIH GM072643

252 Kallistatin Reduces Vascular Senescence and Aging By Preventing MicroRNA-34a-Modulated ENOS and SIRT1 Expression, Youming Guo, Pengfei Li, Chao Lee, Chao Julie; Biochemistry and Molecular Biology, MUSC.

Kallistatin is an endogenous protein which protected against oxidative vascular injury in hypertensive rats, and enhanced the mobility and function of endothelial progenitor cells (EPCs). We aimed to determine the role and mechanism of kallistatin in vascular senescence and aging, using cultured EPCs, streptozotocin (STZ)-induced diabetic mice, and the nematode, Caenorhabditis elegans (C. elegans). Human kallistatin treatment significantly decreased TNF-α-induced EPC senescence, as indicated by reduced senescence-associated β-galactosidase activity and plasminogen activator inhibitor-1 expression, and elevated telomerase activity. Kallistatin blocked TNF-α-induced superoxide levels and NADPH oxidase activity, as well as JNK activation, p16INK4a and miR-21 synthesis. Moreover, kallistatin not only prevented TNF-α-mediated inhibition of eNOS, SIRT1 and catalase, but kallistatin alone also stimulated the synthesis of these antioxidant enzymes. Kallistatin inhibited miR-34a, leading to increased eNOS and SIRT1 synthesis and decreased cellular senescence in EPCs, as these effects were abolished by miR-34a overexpression. Kallistatin via interacting with cell surface tyrosine kinase, modulated miR-34a, eNOS and SIRT1 expression. Moreover, in STZ-induced diabetic mice, kallistatin injection attenuated aortic senescence, oxidative stress, miR-34a and miR-21 synthesis, associated with increased eNOS, SIRT1 and catalase levels. Furthermore, kallistatin enhanced the lifespan of wild-type C. elegans by inhibiting miR-34 and stimulating sir-2.1 (SIRT1) synthesis under heat or oxidative stress, as kallistatin’s protective effect was abolished in miR-34 or sir-2.1 mutant C. elegans. These in vitro and in vivo studies provide significant insights into the novel role and mechanisms of kallistatin in vascular senescence and aging by preventing miR-34a-mediated inhibition of eNOS and SIRT1 expression. NIH HL118516

253 Pharmacological Exposures Effect Cranial Suture Stem Cells, Emily L Durham1, R Nicole Howie2, Amanda LaRue3, James Cray2; Oral Health Sciences, MUSC, Oral Health Sciences, MUSC, Pathology, MUSC.

Craniosynostosis is a birth defect defined as the premature fusion of the suture(s) of the skull occurring in 1:1800-2500 births. The Centers for Disease Control and Prevention, National Birth Defects Study has published data suggesting that "environmental" exposures including maternal thyroid diseases, use of selective serotonin reuptake inhibitors (SSRIs) in pregnant mothers, and maternal nicotine use may exacerbate incidence and or severity of craniofacial anomalies including craniosynostosis. A proposed mechanism of craniosynostosis is the disruption of the balance of proliferation and differentiation of the osteogenic precursors in the perisutural area leading to bone overgrowth within cranial sutures. Recently, undifferentiated cells identified uniquely as Gli1+ or by traditional markers Cd44+ Sca1+ Cd45 - have been identified in craniofacial bones and sutures. Further, ablation of these undifferentiated cells has been correlated with fusion of the sutures (craniosynostosis). In order to determine if in utero pharmacological exposures deplete these multilineage cell populations, we exposed pregnant wild-type mice to levothyroxine, citalopram, and nicotine and investigated the presence of stem cell markers ex vivo via histology. Additionally, we exposed heterogeneous suture cells to clinically relevant doses levothyroxine, citalopram, and nicotine in vitro and assessed the presence of stem markers via qRT-PCR, flow cytometry, and trilineage differentiation. We were able to confirm a reduction in Gli1+ cells ex vivo in correlation with in utero teratogen exposure. Additionally, we confirmed a depletion of stem cell presence with age. Our in vitro analysis also confirmed a depletion of stem cell populations with teratogen exposure via flow cytometry and PCR. Investigating these newly defined cells and their relationship to suture maintenance will provide insight into future manipulation of these cells for therapeutic benefit as a means of decreasing the need for neurosurgical intervention in cases of craniosynostosis. NIH R03DE023350A, 1P01AG036675; Cleft Palate Foundation

254 Defining the Role of AGEs in Race Specific Tumor Immune Response in Prostate Cancer, Danzell Smith1, Dion Foster1, Victoria Findlay1, Lourdes Nogueira1, Laura Spruill1, Marvella Ford2, David Turner1; Pathology, MUSC, Public Health Science, MUSC.
A sedentary lifestyle, obesity and an unhealthy diet all contribute to health disparity, promote chronic inflammation, increase cancer risk and significantly contribute to the Advanced Glycation Endproduct (AGE) accumulation pool in our bodies. These reactive metabolites have been implicated in a number of diseases such as diabetes, neurodegenerative diseases, and cardiovascular disease although the role of AGES in cancer has not been clearly identified. These differences in accumulation levels can serve as a mechanistic explanation for the dramatic increases in disease progression and severity in African American (AA) populations. The immune response has recently come to the forefront as a biological mechanism and variations among tumors and tumor-associated immunological differences between AA and non-Hispanic whites (EA) have been implicated in cancer health disparity but the underlying mechanism driving the alteration in tumor associated immune response hasn’t been characterized. An examination of expression differences based upon tumor composition shows that cytokine signaling associated with an increased immune response was found to be a predominant pathway increased in AA prostate cancer patients. Based on links between metabolism, AGE accumulation, immune response and established cancer health disparity factors we hypothesize that race specific elevations in AGES alters tumor associated immune responses in prostate cancer. We performed a cytokine array to examine differences in cytokine expression between AA and EA prostate cancer cell lines in response to AGE treatment and observed that cytokines involved in inflammation were differentially upregulated in the AA cells treated with AGES. The concept suggesting that AGE metabolites may represent a biological consequence of cancer disparity is a novel approach to explaining the increased incidence and mortality figures observed within specific populations. Associating the mechanistic links between glycation and immune response may identify novel potential biomarkers and define a novel area of therapeutic potential. NIH R21CA170440

255 Adipocyte Sphingosine Kinase 1 (SK1) Modulates the Adipose Circadian Clock to Affect the Overall Metabolic Phenotype, Andrea K Anderson, Johana M Lambert, Ashley Cowart; Biochemistry and Molecular Biology, MUSC.

The prevalence of obesity has reached staggering proportions in the United States over recent years. It is clear that obese individuals have a higher risk of developing further pathologies, including diabetes, insulin resistance, hypertension, and sleep apnea. One of the principal organs involved in the signaling that may lead to these conditions is the adipose tissue. Adipose tissue, aside from its many functions which range from immunological to endocrine, is a potent energy gatekeeper for an organism’s daily biological demands. The adipocyte must coordinate in a timely manner the uptake (lipogenesis) and release (lipolysis) of free fatty acids, as well as secretion of adipokines. Indeed, circadian clock regulators are at the crux of this coordination. The core molecular circadian clock is composed of an autoregulatory transcriptional/translational feedback loop that oscillates on an approximately 24-hour period. These circadian clocks are cell-intrinsic and pervade virtually all cell types within an organism. Considering the circadian effects on circulating lipid, we thought this would be an interesting link to our lab’s area of expertise: sphingolipids. Sphingosine kinase 1 (SK1), which generates the bioactive lipid Sphingosine-1-Phosphate, has been previously shown in our lab to be transcriptionally regulated by free fatty acids. We generated a mouse with conditional SK1 deletion in the adipocyte, and we found that the core circadian clock machinery, especially brain and muscle arnt like protein 1 (BMAL1), is dysregulated compared to control both in vivo and in primary adipocytes in vitro. We also found loss of the coordination of lipogenesis and lipolysis in the adipocyte, which may contribute to global metabolic problems as glucose intolerance. Much of the known molecular clock dynamics are centered in transcriptional and translational paradigms; our data indicate that lipid signaling may also play a role in the regulation of adipocyte function through modulation of the circadian clock.

256 Elevated Serum Liver-type Fatty Acid Binding Protein Levels Are Associated with Poorer Survival in Acetaminophen-induced Acute Liver Failure, Jaime L Speiser¹, Constantine J Karvellas², Christopher F Rose³, Valerie Durkalski¹; ¹Public Health Sciences, MUSC, ²Hepatology and Critical Care Medicine, University of Alberta, ³Hepato-neuro Laboratory, University of Montreal.

Abstract not available.

257 Breaking the Spiral of Neurodegeneration After Stroke Using Transient and Local Inhibition of Complement Activation, Ali Alawieh¹, F E Langley², S Tomlinson¹; ¹Microbiology and Immunology, MUSC, ²Biology, CofC.
Ischemia leads to the cellular expression of damage-associated molecular patterns (DAMPs), and their recognition by natural IgM antibodies that activate complement and propagate inflammation. We isolated natural IgM monoclonal antibodies (nIgMs) from unmanipulated mice and identified nIgMs that specifically bind ischemic cells. One nIgM, B4IgM which recognizes annexin-IV, reconstituted cerebral ischemia reperfusion injury in otherwise protected antibody-deficient Rag1/-/- mice. Therefore, we developed a novel strategy of site-targeted complement inhibition by fusing a single chain antibody (scFv) derived from B4IgM to the complement inhibitor, Crry. The fusion construct, B4Crry, specifically targeted the ischemic brain when administered acutely after 60 min middle cerebral artery occlusion (MCAO), was retained at the target site with half-life of 34 h, and transiently inhibited complement activation. Administration of B4Crry for up to 24 h after ischemia inhibited IgM and complement deposition in the ischemic brain and provided sustained neuroprotection into the chronic phase, with significant reductions in cell death and tissue scarring, and significant improvements in gross motor deficits, forelimb asymmetry and cognitive performance. Following MCAO, we observed a sustained neuroinflammatory response manifesting as continuous IgM and complement deposition and robust M1 (pro-inflammatory)-type activation of microglia lasting beyond 15 days after reperfusion. However, acute administration of B4Crry after stroke interrupted the inflammatory neurodegenerative cycle and prevented complement-directed microglial phagocytosis of live penumbral neurons. This led to greater neuronal reserve and an anti-inflammatory environment for optimal recovery and regeneration. Finally, we demonstrated that B4Crry bound specifically to the ischemic core and penumbral of postmortem brain samples from patients who died from stroke, but not to the contralateral cortex. These data indicate a similar DAMP recognition system occurs in the brains of mouse and man, and that B4scFv-targeted complement inhibition has translational potential for inhibiting inflammatory neurodegenerative cascades after stroke in order to improve motor and cognitive outcomes.

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258 E-meditation: A Double-blind Study Exploring the Use of Transcranial Direct Current Stimulation (tDCS) to Potentially Enhance Mindfulness Meditation, Bashar Badran, Chris W Austelle, Nicole R Smith, Chloe E Glusman, Brett Froeliger, Eric L Garland, Mark S George, Baron E Short; Brain Stimulation Lab, MUSC.

In the past decade, Western medicine has seen increased interest in mindfulness-based interventions (MBIs) for the treatment of neuropsychiatric disorders. MBIs are associated with improvements in physical, mental, and social well-being, along with decreased feelings of stress, anxiety, depressive symptoms, rumination, and cognitive reactivity. We performed a pilot study using tDCS paired with guided mindfulness meditation to potentially reduce the learning curve of meditative sessions and enhance mindfulness. 15 healthy individuals (7 female, mean age = 28.2 y/o SD 6.8) were recruited for this double-blind, sham-controlled, crossover study. Following a screening visit, participants returned for 3 weekly meditation visits. Each 20min E-meditation visit consisted of one of three randomized stimulation conditions (sham, active 1mA, or 2mA; anode - EEG F8, cathode - left suprã orbital). Stimulation was synchronized with a guided mindfulness recording. Mood visual analog scales and mindfulness scales were conducted before and after each meditation visit. There were mathematical changes between stimulation conditions in mood VAS. The mood states closest to trending toward significance were “I feel sad,” “I feel excited,” “I feel restless,” and “I feel calm”. Mean ratings of calmness increased 2.5 fold in stimulation conditions compared to audio guidance alone. Of the five facets of the FFMQ, E-meditation only influenced Acting with Awareness and Observing facets. 1mA E-meditation showed a significant mean difference from baseline change in the Acting with Awareness facet as compared to sham (paired t-test, p=0.0175). 1mA E-meditation also proved to be the most effective in increasing the Observing facet. TMS scales remained unchanged between pre- and post-sessions. E-meditation is a novel approach to a centuries old tradition of meditation for psychological well-being. Additional longer-term (e.g. 8-weeks) trials of the effectiveness of E-Meditation are warranted. Furthermore, these preliminary findings suggest that E-meditation be further examined as an adjunctive treatment for neuropsychiatric disorders.

259 Recovery of MtDNA Stability Through New Mitochondrial Compounds, Tucker J Williamson1, Jennifer J Rahn2, James Chou1, Sherine SL Chan2; 1Drug Discovery and Biomedical Science, MUSC, 2Biology, College of William & Mary.

Abstract not available.

260 Novel Application of a Weighted Zero-Inflated Negative Binomial Model in Modeling Count Data From a Complex Survey, Lin Dai, Mulugeta Gebregziabher; Public Health Sciences, MUSC.
We demonstrate a novel application of a weighted zero-inflated negative binomial model to quantify regional variation in HIV-AIDS prevalence in sub-Saharan African countries. We use data from Demographic and Health survey (DHS) conducted in three countries (Ethiopia-2011, Kenya-2009 and Rwanda-2010). The outcome is an aggregate count of HIV cases in each census enumeration area (CEA) in the three sub-Saharan African countries. Data are characterized by excess zeros and heterogeneity due to clustering. We introduce a multilevel pseudo maximum likelihood method for weighted zero inflated outcome from complex survey. We compare several scale-weighting approaches to account for the complex survey design and clustering in a zero inflated negative binomial (ZINB) model, and provide marginalized rate ratio (RR) estimates from the best ZINB model.

261 Interpretation of Imaging Mass Spectrometry Data Using a Two-Part Zero-Inflated Process Convolution Model, Cameron S Miller¹, Benjamin Neely², Richard Drake³, Elizabeth Hill¹, ¹Public Health Sciences, MUSC, ²Chemical Sciences Division, National Institute of Standards and Technology, ³Cell and Molecular Pharmacology, MUSC.

Matrix-assisted laser desorption/ionization Fourier transform ion cyclotron resonance imaging mass spectrometry (IMS) technology allows researchers to measure the abundance of ionized fragments over a two-dimensional space. Despite advances in IMS technology, methods used to analyze such data have lagged. In particular, the variability in IMS data can be attributed to both spatial and random sources. Additionally, the frequency of masses with high proportions of zero peak intensity values is often quite large. To address these issues, we propose a log-linear regression model facilitating group-level comparisons of ionized fragment abundance, which further accounts for both the data’s spatial structure and zero-inflation via a two-part model. We evaluate our model using simulated data and compare performance to a naïve analysis using a two-sample t-test. We then use our approach to identify glycans significantly associated with stage 1 renal cell carcinoma (RCC) using IMS data obtained from tissue microarray RCC samples.

262 Utilization of Response Adaptive Randomization in a Clinical Trial with Time Trend Confounding, Yunyun Jiang, Wenle Zhao, Durkalski L Valerie; Public Health Science, MUSC.

With response adaptive randomization (RAR), the shift in patients’ response rate could induce uneven distribution of population characteristics between treatments. The use of traditional test statistics is no longer valid for inference making, and also has great potential to inflate type I error rate (false positive treatment discovery). This research aims to 1) explore influence of time trend in confirmatory Bayesian response adaptive trial with a binary outcome, and 2) tackle this issue by incorporating the time trend effect in a model-based randomization approach to make adjustment for the treatment effect at each allocation update. We anticipate that Bayesian hierarchical modeling will yield unbiased parameter estimation and control type I error rate after controlling for time trend confounding. NIH NINDS: SHINE U01 NS069498; NETT U01 NS059041

263 Cancer Promotion and Immune Tolerance Via Cancer Cell - Intrinsic Surface Expression of GARP, Alessandra Metelli¹, Bill Wu¹, Caroline W Fugle¹, Saleh Rachidi¹, Shaoli Sun², Jennifer Wu¹, Bei Liu¹, Zihai Li¹, ¹Microbiology and Immunology, MUSC, ²Pathology and Laboratory Medicine, MUSC.

The role of TGF-β in oncogenesis and immune evasion is well recognized. Membrane Latent TGF-β is expressed on the surface of regulatory T cells and platelets by binding its receptor Glycoprotein-A Repetitions Predominant Protein (GARP). Several lines of evidence suggest that GARP enhances the conversion of the membrane Latent TGF-β in its active form. We performed an immunohistochemistry evaluation of GARP expression in several human cancers, and correlation with disease stage and survival. GARP function in metastatic and non-metastatic breast cancer was evaluated by preclinical models. Finally we tested the therapeutic role of anti-GARP antibody using metastatic 4T1 breast cancer model. We report that GARP is aberrantly expressed by multiple human cancers, including colon, prostate, head and neck, and breast cancer, in addition to a well-characterized murine prostate cancer model. Importantly, expression of GARP inversely correlates with overall survival. We also identified soluble GARP in prostate cancer patients and observed that the concentration of soluble GARP is higher in cancer.
patients compared to healthy controls. Through genetic strategies, we found that GARP expression in multiple animal tumor models increases the bioavailability of active TGF-β, promoted regulatory T lymphocytes in tumor environment, favored the immune evasion of cancer cells, and contributed to the formation of secondary tumors. Finally, we tested a panel of anti-GARP antibodies, alone and in combination with cyclophosphamide, in a mouse model of mammary carcinoma and we found that they have significant anti-tumor activity especially by inhibiting the formation of lung metastasis. We conclude that GARP is expressed on several human cancers, and its expression correlates with poor prognosis. Mechanistically, GARP increases the availability of active TGF-β that promotes an immune tolerant tumor environment. Based on these observations, we propose GARP-TGF-β as a novel oncogenic axis that can be exploited for diagnosis, prognosis and treatment of cancer. NIH P01CA186866, R01AI070603

264 BRAF/MAPK Signaling Regulates ILEI, Which Contributes to the Low-MITF/invasive Melanoma Phenotype, Ken Noguchi, Annamarie Dalton, Buckley Mccall, Philip H Howe; Biochemistry and Molecular Biology, MUSC.

ILEI is a poorly characterized cytokine that is critical for the epithelial-to-mesenchymal transition (EMT). Based on our initial observation that ILEI expression increases during melanoma progression, we set out to use melanoma as a model to advance our understanding of ILEI. While melanomas do not undergo EMT, they undergo a similar phenomenon known as phenotype switching in which proliferative cells express high levels of the melanocyte lineage factor MITF and invasive cells express low MITF. We began our study by identifying an inverse correlation between ILEI and MITF in melanoma cell lines, and this lead to the following two questions: 1) Does ILEI regulate the invasive melanoma phenotype? 2) Does phenotype switching regulate ILEI expression? To address the first question, we used transcriptomic analysis and found that ILEI knockdown decreases invasion-related genes such as SOX9, IL6, and EGFR. We followed our gene expression findings with in vitro assays to show that ILEI knockdown attenuates invasion. To address the second question, we pharmacologically manipulated phenotype switching using BRAF/MAPK inhibitors and observed a decrease of ILEI expression at both the transcriptional and post-transcriptional level. In summary, BRAF/MAPK regulates the expression of the cytokine ILEI, which contributes to the invasive potential of low-MITF melanoma cells. NIH CA555536, CA154664, 1F30CA203269, GM08716; Abney Foundation

265 FTY720 Induces Necroptosis in Lung Cancer By Inducing Ceramide Signaling At the Plasma Membrane, Rose Nganga¹, Besim Ogretmen²; ¹Biochemistry and Molecular Biology, MUSC, ²Hollings Cancer Center, MUSC.

Sphingolipids, important signaling molecules in cells and have recently been explored as cancer therapy targets. FTY720 (Fingolimod, Gilenya) is an FDA approved sphingosine analogue drug used for the treatment of multiple sclerosis (MS). FTY720 is phosphorylated by sphingosine kinase 2 (SK2), to generate P- FTY720 to exert its immunosuppressive properties through binding to sphingosine -1 phosphate receptors (S1PRs). FTY720 also exhibits anti-cancer properties. Our previous studies indicated that one of the mechanism by which FTY720 induces cell death is through necroptosis. FTY720 directly binds to I2PP2A/SET (Inhibitor 2 of PP2A), consequently activating the tumor suppressor protein phosphatase 2A (PP2A). The activated PP2A then induces cell death by stimulating the activity of Receptor-Interacting Protein kinase-1 (RIPK1), involved in necroptosis signaling. Previous studies have also shown that ceramide also binds I2PP2A and activates PP2A. In addition, previous studies have shown that FTY720 can modulate sphingolipids metabolism in cells. However, little is known about the roles of FTY720 in ceramide signaling and regulation of necroptosis in lung cancer. We hereby seek to investigate the mechanisms of FTY720 in inducing necroptosis with regard to ceramide signaling. Preliminary data indicate that inhibitors of ceramide generation partially protect cells against FTY720-induced cell death. Interestingly, FTY720 and non-phosphorylated FTY720 analogues do not affect ceramide generation, but lead to the formation of specific ceramide-multi-protein complexes at the plasma membrane involved in plasma membrane disruption for necroptosis. Future mechanistic studies will help us understand the details of how these complexes are formed at the plasma membrane and how they regulate necroptosis in response to cellular stress invoked by FTY720 and other therapeutic agents. NIH R01CA088932, R01CA173687, DE016572, P30GM10339

266 Thoracic Aortic Wall Tension Regulates MicroRNA-133a Abundance, Adam W Akerman¹, Elizabeth K Nadeau¹, Robert E Stroud¹, Rupak Mukherjee², John S Ikonomidis¹, Jeffery A Jones²; ¹Surgery, MUSC, ²Ralph H. Johnson VAMC.
Background: Hypertension is a known risk factor for the development of thoracic aortic aneurysms (TAA); however, the molecular mechanisms involved in these processes remain poorly understood. MicroRNA-133a (miR133a) is a small non-coding RNA, which represses translation of multiple mRNAs. This laboratory has reported an inverse relationship between aortic diameter and miR133a abundance in aortic tissue from patients with TAA; as diameter increased, the abundance of miR133a decreased. Given that wall tension increases with increasing vessel diameter (Law of LaPlace), this study tested the hypothesis that elevated aortic wall tension is a mechanism driving the loss of miR-133a. Methods/Results: TAA was induced in wild type mice using an established murine model (0.5M CaCl2 application, 15 min). MiR133a abundance (QPCR) was reduced in TAA tissue (3-wk TAA, 42.1±8.6% p<0.05 vs mice without TAA (100%)). In two in vivo models of elevated wall tension (simulated hypertension): 1) ANGII (angiotensin II infusion; 1.44mg/kg/day), and 2) BPH2 (spontaneously hypertensive mice, The Jackson Laboratory, Stock #003005), miR133a levels were decreased compared to normotensive controls (ANGII: 53.0±4.3%; BPH2: 51.7±7.0%; p<0.05 vs normotensive control (100%)). Aortic rings from wild type mice were hung on parallel wires in an ex vivo tissue myograph at 0.7 g, then ANGII (100nM) was added to the tissue baths, which generated increased tension (1.21±0.15g) and resulted in reduced tissue miR133a abundance (46.0±12%; p<0.05 vs no AngII.). Furthermore, increased tension alone (1.5g, 3 hr) resulted in decreased tissue miR133a abundance (39.0±7.0%; p<0.05 vs 0.7 g tension). Conclusion: The significance of these unique findings is: tension alone was sufficient to decrease miR133a abundance in aortic tissue. These findings suggest changes in wall tension (hypertension) may be associated with pathological extracellular matrix remodeling, in part, through the loss of miR133a in thoracic aortic tissue. 

The periodontal ligament (PDL) is a fibrous connective tissue anchoring tooth into alveolar bone. Collagen type I is the main structural component of the PDL. High rates of extracellular matrix (ECM) turnover are characteristic of PDL tissue. Periodontal disease (PD) affects approximately 50% of the adult population (>35 years) in the United States. PD is marked by chronic inflammation of the periodontium leading to PDL degradation, alveolar bone loss, and eventual tooth loss. There are currently no accepted methodologies to regenerate collagenous PDL tissue. Thus PDL provides an excellent tissue milieu for investigating mechanisms of collagen processing and assembly during clinically relevant inflammatory states. SPARC, a collagen-
binding protein, has been identified as a key factor in collagen ECM deposition. We reported significantly less total collagen, thinner fibers, and reduced mechanical strength in SPARC-null PDL compared to wild type (WT) PDL. A key factor in incorporating and stabilization of mature collagen within the ECM is mediated through collagen cross-linking. Transglutaminases (TGs) are a family of extracellular proteins known to participate in collagen cross-linking activity. Previous data implicate SPARC as a critical regulator of TG activity on collagen I in homeostatic PDL. The mechanism by which cross-links influence ECM environment, collagen architecture and repair, during and following inflammatory injury is unknown. We hypothesize that increases in tissue TG (TG2) activity in response to injury diminishes collagen fiber content and mechanical strength in the PDL altering the structural environment of the ECM to affect host monocyte response. We will investigate our hypothesis to elucidate mechanistic roles of SPARC in inflammatory cell recruitment, collagen turnover in bone and PDL, and TG2-mediated cross-links. These studies will provide novel insight into the role of the ECM in the inflammatory response of periodontal disease. NIH T32DE017551, P30GM103331, F30DE023009

269 Multiple Statistical Approaches to Answer a Question Involving the Modified Rankin Scale: Which Approach is Best?, Colleen E Bauza, Renee Martin, Marvella E Ford, Sharon D Yeatts; Public Health Sciences, MUSC.

The modified Rankin Scale (mRS) (Rankin, 1957) is a clinician-reported measure of global disability that is widely used in evaluating recovery from stroke and as a primary end point in acute stroke randomized clinical trials (Banks & Marotta, 2007). The mRS is a 7-point ordinal scale that measures a subject’s degree of disability in the daily activities following a stroke (Bonita & Beaglehole, 1988). The analytic approach depends on whether interest lies in detecting changes across the full ordinal scale or on some dichotomous definition of good outcome. The objective of this study is to describe commonly used statistical methods to analyze the influence of antecedent obesity on functional disability, measured by the mRS, at 3 months following onset of an ischemic stroke in the Interventional Management of Stroke (IMS) III trial (Broderick et al., 2013), an international randomized clinical trial designed to compare two different approaches to recanalization. Of the 656 subjects randomized, 643 (98.0%) had mRS information at 3 months post randomization, and 168 (25.89%) were obese at baseline. The following statistical approaches will be used to describe the influence of pre-existing obesity on functional disability: binary logistic regression, contingency table methods, ordinal logistic regression, and the Wilcoxon Rank Sum test. The statistical assumptions and the interpretation of results should be considered when developing the statistical analysis plan.

270 The Role of the TGFbeta-GARP Axis in B Cell Function and Tolerance, Caroline W Fugle, Bill Wu, Bei Liu, Zihai Li; Microbiology & Immunology, MUSC.

Abstract not available.

271 CD26high T Cells Eradicate Large, Established Tumors in Multiple Cancer Models, Stefanie R Bailey, Michelle H Nelson, Jacob S Bowers, Megan M Wyatt, Lillian R Neal, Kinga Majchrzak, Chrystal M Paulos; Microbiology & Immunology, MUSC.

Adoptive T cell transfer (ACT) has been an impressive therapy for treating cancer patients, but can be inconsequential if the transferred cells are unable to engraft and persist. Although adoptive transfer of Th17 cells has exhibited enhanced anti-tumor activity and persistence in mouse models, their translation to the clinic is barred by a lack of FDA-approved cytokines needed to expand them. Consequently, we sought to determine if we could enrich and expand durable, human IL-17-producing T cells without the use of polarizing cytokines. Our lab has found that isolating human CD4+ T cells that express high levels of CD26—termed CD26high T cells—not only exhibit a Th17-like phenotype (CCR6, CD161), but also display the Th1 marker CXCR3, are polyfunctional (IL-17, IFN-gamma, IL-2, TNF-alpha, IL-22) and have heightened cytotoxicity (CD107A, Granzyme B) in vitro—all in the absence of polarizing cytokines. Of clinical significance, CD26high T cells displayed striking antitumor activity in NSG mice bearing large, established mesothelioma and pancreatic tumors to a greater extent than bulk CD4+ and CD26negative T cells. Importantly, CD26high T cells also exhibited increased engraftment and persistence in vivo despite their more differentiated phenotype (CD45RA-CCR7-CD45RO+) in vitro. We found that CD26high T cells express elevated levels of β-catenin and BCL-2, as well as decreased Caspase 3 cleavage, compared to their CD4+ and CD26negative counterparts. Furthermore, gene array analysis revealed that CD26high T cells also display heightened levels of the anti-apoptotic genes CEBPD and ATF5. Collectively, these findings reveal the highly cytotoxic and anti-apoptotic nature of CD26high T cells that could make them ideal for improving ACT in the clinic. NIH R01CA175061, RO1CA208514, F31 CA192787
272 Cooperative Therapeutic Anti-tumor Effect of IL-15 Agonist ALT-803 and Co-targeting Soluble NKG2D Ligand SMIC, Fahmin Basher¹, Emily Jeng², Hing Wong², Jennifer D Wu¹; ¹Microbiology and Immunology, MUSC, ²Altor Biosciences, Miramar, FL.

Shedding of the human NKG2D ligand MIC (MHC class I-chain-related molecule) from tumor cell surfaces correlates with progression of many epithelial cancers. Shedding-derived soluble MIC (sMIC) enables tumor immune escape through multiple immune suppressive mechanisms, such as disturbing natural killer (NK) cell homeostatic maintenance, impairing NKG2D expression on NK cells and effector T cells, and facilitating the expansion of arginase I+ myeloid suppressor cells. Our recent study has demonstrated that sMIC is an effective cancer therapeutic target. Whether targeting tumor-derived sMIC would enhance current active immunotherapy is not known. Here, we determined the in vivo therapeutic effect of an antibody co-targeting sMIC with the immunostimulatory IL-15 superagonist complex, ALT-803, using genetically engineered transplantable syngeneic sMIC+ tumor models. We demonstrate that combined therapy of a nonblocking antibody neutralizing sMIC and ALT-803 improved the survival of animals bearing sMIC+ tumors in comparison to monotherapy. We further demonstrate that the enhanced therapeutic effect with combined therapy is through concurrent augmentation of NK and CD8 T cell antitumor responses. In particular, expression of activation-induced surface molecules and increased functional potential by cytokine secretion are improved greatly by the administration of combined therapy. Depletion of NK cells abolished the cooperative therapeutic effect. Our findings suggest that administration of the sMIC-neutralizing antibody can enhance the anti-tumor effects of ALT-803. With ALT-803 currently in clinical trials to treat progressive solid tumors, the majority of which are sMIC+, our findings provide a rationale for co-targeting sMIC to enhance the therapeutic efficacy of ALT-803 or other IL-15 agonists.

274 WHSC1L1 and 8p11 Amplicon-mediated Estrogen-independent Activation of ER-alpha in Luminal B Breast Cancers, Jamie N Mills, Brittany Ivey, Steve Ether; Pathology, MUSC.

Eighty percent of breast cancers express estrogen receptor alpha (ER) and are classified as ER+, correlating with the luminal B molecular subtype of breast cancer. These tumors have overall good response to anti-estrogen therapies, however a subset of these patients do not respond to these treatments and ultimately succumb to their disease. The 8p11-p12 genomic region is amplified in 15% of breast cancers, primarily the ER+ luminal B subtype, and is associated with poorer prognosis. This genomic region harbors several oncogenes, three of which are epigenetic modifiers of chromatin (WHSC1L1, KAT6A, ASH2L). The 8p11 amplicon-bearing SUM-44 cell line, which overexpresses both WHSC1L1 and wild-type ER, is tamoxifen-resistant and estrogen-independent for growth, survival, and ER-mediated gene transcription,
but relies on the receptor to accomplish these functions. Knockdown of WHSC1L1 in this cell line decreased ER expression and activity, proliferation, and the ability of ER to bind chromatin and participate in gene transcription in the absence of estrogen. Treatment with fulvestrant, a selective estrogen receptor degrader (SERD), produced similar results. Overexpression of WHSC1L1 increased ER expression in amplicon-bearing cell lines but not the amplicon-null MCF7 breast cancer cell line, suggesting one or more additional oncogenes from the 8p11 region are involved in estrogen-independent activation and overexpression of ER. Ongoing studies are focused on elucidating the mechanism of estrogen-independent activation of ER, including understanding the epigenetic actions of WHSC1L1, ASH2L, and KAT6A on a global histone scale as well as their modifications of non-histone proteins, such as ER itself, and how these three oncogenes cooperate to fuel tumor progression. These studies are essential to understanding the behavior of luminal B breast tumor resistance to anti-estrogen therapies and how the 8p11 amplicon can serve as a predictor for patients who would benefit from treatment with a SERD, epigenetic therapies, or a combination thereof. NIH R01CA130933; MUSC MSTP

275 Class I Histone Deacetylases Localize to Cardiac Myocyte Mitochondria and Contribute to Ischemia Reperfusion Injury, Daniel J Herr¹, Sverre E Aune¹, Xinh Xinh Nguyen¹, Jennifer R Bethard², Lauren E Ball², Donald R Menick³; ¹Medicine, MUSC, ²Pharmacology, MUSC, ³Ralph H. Johnson VAMC.

Although rapid reperfusion of ischemic tissue is the treatment of choice for myocardial infarction, a significant amount of damage occurs as a result of reperfusion itself. The role of epigenetic enzymes in modulating this reperfusion-induced damage has become an area of intense interest in basic cardiac research. Previously, we have shown that pharmacological inhibition of the class I histone deacetylases (HDACs) with MS-275 (entinostat) preserves left-ventricular (LV) function and substantially reduces the area of infarcted tissue in isolated rat hearts subjected to ischemia-reperfusion (IR) injury. Interestingly, we have also observed that class I HDAC inhibition during 60 minutes of reperfusion alone is sufficient to protect cardiac tissue viability following I/R injury. Therefore, we hypothesized that class I HDACs mediate reperfusion injury by modulating acetylation of non-histone proteins in signaling cascades that are essential to cell fate decisions. To examine this, hearts from male Sprague-Dawley rats were subjected to I/R injury +/- class I HDAC inhibition during reperfusion. We then performed mass spectrometry to analyze the changes in the acetylome between sham and I/R groups with and without class I HDAC inhibition. Unexpectedly, mass spectrometry analysis revealed significant changes in the acetylation state of multiple mitochondrial enzymes. Further biochemical studies show that class I HDACs localize to the mitochondrial fraction of cardiac tissue homogenates and may directly modulate mitochondrial acetylation. This study emphasizes the importance of exploring class I HDAC inhibitors for protection against ischemia-reperfusion injury. VA BX002327; NIH F30 HL129629, T32 GM008716, T32 HL007260, TL1 TR000061, UL1 TR000062

276 A Shift in Thoracic Aortic Smooth Muscle Cell Phenotype and Gene Expression Contributes to Aortic Structural and Mechanical Changes with Aging, Jason B Wheeler¹, Robert E Stroud², Rupak Mukherjee², John S Ikonomidis³, Jeffrey A Jones³; ¹MCB, MUSC, ²Surgery, MUSC, ³Surgery, MUSC

Background: The thoracic aorta undergoes structural and mechanical changes with age, including dilation and increased collagen leading to decreased compliance. However, how age-dependent changes in resident cells mediate this aging process is not well understood. Previous studies have demonstrated a reduction in both ex vivo aortic contraction and in vitro collagen gel contraction by aortic smooth muscle cells (AoSMCs) from old mice relative to young, suggesting a deficit in AoSMC contractility with age. Vascular SMCs are known to shift out of a contractile phenotype, with disease or mechanical injury, to remodel the extracellular matrix (ECM). Therefore, we hypothesized that AoSMCs undergo a phenotype change with age that contributes to aortic structural and mechanical changes with aging. Methods/Results: AoSMCs were cultured from thoracic explants harvested from 6 month ("young", n=6) and 21 month ("old", n=6) C57 mice. Phenotype was defined by assessing proliferation, migration, adhesion, and gene expression. When measured over 7 days, old AoSMCs displayed reduced proliferation relative to young AoSMCs. In a modified Boyden chamber, migration by old AoSMCs was reduced compared to young (13.4±1.0 vs. 28.8±4.8 migrated cells). Old AoSMCs were less adherent to a poly-D-lysine surface after mechanical washing relative to young (12.6±1.3% vs. 23.3±1.9% adherence). A PCR array was used to measure the expression of ECM remodeling genes, including ECM proteins (collagens), matrix metalloproteinases (MMPs), and tissue inhibitors of MMPs. Increased expression of these genes produced a distinct genotypic profile in old AoSMCs relative to young. Conclusions: With aging, AoSMCs exhibit reduced proliferation, migration, and
adolescence. Furthermore, old AoSMCs have upregulated expression of ECM remodeling genes, including collagens. Together, these results suggest that altered AoSMCs phenotype plays an active role in aortic structural and mechanical changes with age. NIH R01AG036954, IO1BX000904

277 Th17 Cells Are Refrigeratory to Senescence Retaining Robust Antitumor Activity After Long-term Ex Vivo Expansion, Jacob S Bowers¹, Michelle H Nelson¹, Kinga Majchrzak¹, Stefanie R Bailey¹, Baerbel Rohrer², Carl Atkinson¹, Luca Gattinoni³, Chrystal M Paulos¹, ¹Microbiology and Immunology, MUSC, ²Ophthalmology, MUSC, ³Experimental Transplantation and Immunology, NCI.

Abstract not available.

278 Speech Recognition Based on Short Glimpses: Effects of Age and Cognitive Abilities, William J Bologna, Kenneth I Vaden, Jayne B Ahlstrom, Judy R Dubno; Otolaryngology, MUSC.

Speech communication often occurs in environments where background sounds fluctuate and mask portions of the intended message. While younger adults are adept at identifying audible fragments of speech and filling in missing information, older adults are known to experience greater difficulty, particularly when the background contains other talkers. The purpose of this study was to determine the extent to which this age-related difficulty can be explained by declines in (1) recognizing of short glimpses of audible speech, (2) perceptual restoration of missing speech segments, and/or (3) separating audible glimpses from a background containing other talkers. An additional goal was to examine contributions from specific cognitive abilities to individual differences in recognition of interrupted speech. To test these hypotheses, younger and older adults with normal hearing listened to sentences that were periodically interrupted by silence or noise, leaving different proportions of the original sentence intact, and were presented in quiet and with a competing talker. When present, intervening noise was modulated by the broadband temporal envelope of the missing speech and facilitated keyword recognition (“phonemic restoration”). A battery of cognitive measures assessed inhibitory control, working memory, processing speed, and linguistic closure. Keyword recognition was analyzed with a logistic regression using a generalized linear mixed model. Results indicated that older adults were poorer than younger adults at recognizing keywords based on short glimpses, but benefited more when envelope-modulated noise filled silent intervals. Recognition declined with a competing talker, but declined equally for younger and older adults. Faster processing speed and better linguistic closure were predictive of better recognition among older but not younger adults. This finding suggests that glimpsing speech may place high demands on cognitive resources, which may limit performance for some older adults. NIH R01DC00184, P50DC00422; American Academy of Audiology

279 The Effects of Adolescent Intermittent Ethanol Exposure on Discrimination and Reversal Learning with Probabilistic Reinforcement in Adulthood, Corrin Garr¹, Justin T Gass¹, Stan B Floresco², Judson Chandler¹; ¹Neuroscience, MUSC, ²Psychology, University of British Columbia.

Adolescence is frequently associated with risk-taking and poor decision making that are thought to reflect poor behavioral control by the prefrontal cortex (PFC). Unlike most other brain regions, the developmental period of the PFC continues into early adulthood. The PFC mediates inhibitory control, decision-making, and behavioral flexibility. Our lab uses the adolescent intermittent ethanol (AIE) model to investigate how repeated episodes of adolescent binge-like alcohol exposure impact the adult brain. Previous studies have shown that AIE is associated with a "lock-in" of an adolescent-like phenotype that includes deficits in behavioral flexibility. Other studies involving a single prolonged stress (SPS) paradigm to investigate changes associated with PTSD have also reported impaired behavioral flexibility using a probabilistic reversal learning (PRL) task. In this study, we hypothesized that AIE would potentiate prefrontal-associated cognitive deficits associated with SPS – that is, impaired performance on the PRL task. To test this hypothesis, 24 male rats went through AIE exposure by vapor inhalation between post-natal days 28-44 and were tested in adulthood. Before initiation of operant training, several behavioral tasks were used to assess alterations in anxiety and exploratory behavior. Consistent with our previous studies, AIE did not increase anxiety when assessed in adulthood, but appeared to promote enhanced exploratory behavior. AIE did impair initial discrimination learning using probabilistic reinforcement on the first day of testing, but did not induce any subsequent impairments in reversal learning over 16 days of testing. Rats were then subjected to SPS and reexamined on the PRL task after one week. Contrary to our hypothesis, SPS did not exacerbate impaired reversal performance. However,
AIE + SPS caused an increase in negative feedback sensitivity (NFS) compared to AIE alone. NIH AA007474, U01AA019967, R01AA010983

280 Development of Allosteric Hydrazide-Containing Class I Histone Deacetylase Inhibitors for Use in Acute Myeloid Leukemia. Jesse McClure¹, Cheng Zhang¹, Elizabeth Inks¹, Yuri Peterson¹, Jiaying Li², C James Chou³; ¹Drug Discovery, MUSC, ²CofC.

One of the biggest hurdles yet to be overcome for the continued improvement of Histone Deacetylase (HDAC) inhibitors is finding alternative motifs equipotent to the classic and ubiquitously used hydroxamic acid. The N-hydroxyl group of this motif is highly subject to rapid sulfation/glucoronidation-based inactivation in humans; compounds containing this motif, including three of the four FDA approved HDAC inhibitors, require much higher dosing in clinic to achieve therapeutic concentrations. Further, this group is known to chelate bidentate metals indiscriminately, leading to significant drug-drug interactions secondary to non-specific binding of ferrous-centered cytochrome p450 enzymes. With the goal of developing a second generation of HDAC inhibitors, free from this hydroxamate group, we designed a series of potent and selective class I HDAC inhibitors using a hydrazide motif. Through confirmation with ESI-LC/MS combined with human liver microsomes and performing Lineweaver-Burke transformations, we confirmed these compounds are both impervious to glucuronidation and demonstrate allosteric inhibition. In vitro and ex vivo characterization of our lead analogs’ efficacy, selectivity, and toxicity profiles demonstrate they induce dose-dependent and selective cell death against models of Acute Myeloid Leukemia (AML) in the low nanomolar range, while also being at least 100-fold more selective for AML than solid tumor cells such as HEK293. Further, these compounds demonstrate more favorable toxicity profiles than other FDA approved HDAC inhibitors when polled against human peripheral blood mononuclear cells. Lastly, using molecular modeling techniques, we identified a potential allosteric binding tunnel with which our drug series may be interacting. NIH R01CA163452, 8P20GM103542; Hollings Cancer Center

281 N-acetyl Cysteine Interferes with the Trinder Reaction Based Assays and Beyond, Yun Wang, Susan Clapps, Beverly Horne, Yusheng Zhu; Pathology and Laboratory Medicine, MUSC.

N-Acetyl-L-cysteine (NAC) is primarily used to treat acetaminophen poisoning and other diseases. This study aims to determine the clinically relevant interference of NAC in multiple laboratory tests. Excess patient serum was spiked with therapeutic doses of NAC. Serum without NAC was used as a control. Various analytes were measured either immediately post-NAC addition or after up to 48 hr storage at 4 °C. The interference was defined as % difference in NAC-containing samples from the control. Our results showed that NAC dose-dependently reduced the analyte measurements with a maximum of 5-95% reduction among different analytes. Clinically relevant interferences were observed for multiple Trinder reaction-based assays with NAC at concentration as low as 250 - 1250 mg/L. Statistically significant but nonclinically relevant negative or positive bias were also observed for several non-Trinder reaction-based assays in the presence of NAC. In general, NAC interference was gradually attenuated by prolonged storage except that a negative bias in insulin immunoassay increased with storage time and lasted for up to 48 hrs. Additionally, the negative interference of NAC was also confirmed using samples from 6 different acetaminophen-overdosed patients collected pre- and post-NAC infusion. Moreover, true value predictive equations for individual analytes in the presence of NAC were generated using multiple variable regression model. The predicted analyte concentrations showed significant Pearson correlation with the measured values (P<0.05). In conclusion, this study indicates that therapeutic dosages of NAC can cause clinically relevant negative interference in several Trinder reaction-based assays. This interference can be effectively eliminated via postponing assay. Additionally, this study reports for the first time the significantly negative interference of NAC in insulin immunoassay, which might be attributed to the NAC binding to insulin causing impaired antibody-insulin recognition. Therefore, particular caution should be taken when clinicians interpret these assays’ results of patients receiving NAC treatment.

282 MEF2C Regulates Cortical Excitatory and Inhibitory Synapses and Behaviors Relevant to Neurodevelopmental Disorders, Adam J Harrington¹, Aram Raissi², Carly Hale³, Kacey Rajkovich³, Stefano Berto³, Genevieve Konopka³, Kimberly Huber³, Christopher W Cowan¹; ¹Neurosciences, MUSC, ²Psychiatry, HMS, ³Neuroscience, UTSW.

Abstract not available.
283 Hand Functional Recovery Using Sensory Stimulation in Chronic Stroke Patients, Ryan J Downey¹, Blair HS Dellenbach², Leonardo Bonilha³, Michelle L Woodbury², Na Jin Seo¹; ¹Health Professions, MUSC, ²Health Sciences and Research, MUSC, ³Neurology, MUSC.

Introduction: After stroke, individuals experience sensory and motor deficits, which hinder their ability to perform activities of daily living. Sensory stimulation in the form of subthreshold white noise vibration applied at the wrist has been previously shown to immediately improve both sensory abilities and hand function post-stroke. However, its potential to enhance therapy is presently unclear. The overall objective of this study is to determine the effectiveness of sensory stimulation on improving hand therapy outcomes for individuals post-stroke. Methods: A double-blinded randomized controlled design was used. Stroke survivors in the treatment group received subthreshold (i.e., imperceptible) wrist vibration during standardized task-practice therapy by an occupational therapist whereas stroke survivors in the control group wore the device during therapy but received no vibration. Clinical evaluations (e.g., Wolf Motor Function Test), biomechanical evaluations of precision pinch, and EEG evaluations were conducted pre-, post- and 2 weeks post-therapy. Results: Clinically, the treatment group had greater average improvements in hand function scores than the control group. Biomechanically, the treatment group had greater average improvements than the control group in sensory feedback-based hand motor tasks such as the ability to reproduce force at a certain level, but not in pure motor tasks such as the reaction time. With regard to EEG evaluations, the treatment group had an average decrease in the power modulation of the sensorimotor rhythm for hand grip compared to the control group. Conclusions: Sensory stimulation appears promising. The improvement in hand function appears to originate from improved sensory feedback-based motor controls. Reduced EEG modulation may imply that less brain activity is required to execute grip tasks following therapy in the treatment group. Current analysis focus is in utilizing lesion-specific mapping and source localization for sensory and motor processing centers using EEG, TMS, and fMRI. New participants are continuously being enrolled. NIH P20GM109040

284 Survival Studies in Cecal Ligation and Puncture-induced Murine Sepsis: role of MiRNAs, Joy J Buie¹, Andrew Goodwin², James Cook, John Vournakis³, Marina Demcheva³, Perry V Halushka⁴, Hongkuan Fan¹; ¹Pathology and Laboratory Medicine, MUSC, ²Pulmonary, Critical Care, Allergy and Sleep Medicine, MUSC, ³Marine Polymer Technologies, ⁴Pharmacology, MUSC.

Abstract not available.

285 Sertraline Impairs Bone Remodeling in Murine, Critical-sized, Calvarial Defects, Rebecca N Howie¹, Emily L Durham¹, Gracie Bennfors¹, Samuel Herberg², William D Hill³, James J Cray¹; ¹Oral Health Sciences, MUSC, ²School of Engineering, Case Western, ³Cell Biology and Anatomy, AU.

Bone remodeling is a dynamic and tightly controlled process that is required for the healing of damaged bone. External factors can alter this process leading to delayed or failed wound healing. Recent studies have found that selective serotonin reuptake inhibitors (SSRI) can reduce bone mass and increase the rate of implant failure. With 10% of Americans on antidepressants combined with the fact that craniofacial injuries make up 20 million emergency room visits per year, this suspected SSRI impaired bone remodeling has the potential to adversely affect millions of patients’ ability to heal after sustaining trauma. 58 C57BL6 mice were treated with 10 mg/kg Sertraline in drinking water (n=26) or normal water (n=32) for 2 weeks prior to surgery where a 5 mm calvarial defect was either A) left empty B) filled with a 4 mm DermaMatrix soak-loaded with sterile PBS or C) Derma Matrix soak-loaded with 542.5 ng BMP-2. 4 weeks post-transplantation, all animals were sacrificed, skulls collected, and histological, x-ray, and µCT analyzes were performed on the calvarial defect. Sertraline treatment was found to decrease percent bone healing in the osteoconductive scaffold group and BMP-2 group compared to unexposed animals. Sertraline also decreased osteoclast activity and cartilage formation, while increasing the formation of mature, thick, collagen fibers and ALP activity within the defect. This suggests not merely a delay in healing but impaired healing, as well as, contrasting osteoclast/osteoblast function that could indicate an uncoupling of bone remodeling leading to scar formation. Relevant bone cell populations were shown to react differently to SSRI treatment demonstrating the complex cell-cell interactions that take place during bone remodeling. Sertraline inhibits healing within calvarial defects compared to control animals causing the formation of scar tissue instead of bone, and BMP2, a known osteogenic agent, is unable to overcome the negative effects of the SSRI. Musculoskeletal Transplant Foundation; NIH P30GM103331. T32DE017551
286 Hippocampal GABAergic Neurons Are Susceptible to Amyloid Beta Toxicity in Vitro and Are Decreased in Number At the Early Stage of Alzheimer's Disease in APPSwID Mouse Model, Seungho Choi, Je-Seong Won, Inderjit Singh; Pediatrics, MUSC.

Abstract not available.

287 Cognitive Persistence Predicts Speech Recognition in Noise in Older Adults, Susan E Teubner-Rhodes, Kenny I Vaden, Lois Matthews, Judy R Dubno, Mark A Eckert; Otolaryngology - Head & Neck Surgery, MUSC.

Older adults experience difficulty understanding speech in background noise, even after controlling for speech audibility[1-2]. Their difficulties may be partly explained by age-related declines in attentional set-shifting[3], which refers to flexibility in focusing attention on task-relevant information. Maintaining such attentional control requires effort and can cause fatigue[4]—we therefore hypothesized that cognitive persistence, the application of effort to overcome mental challenges, is also important for recognizing speech in noise. 135 adults aged 19-88 years completed hearing assessments including pure-tone thresholds at frequencies from 0.25-8.0 kHz and the revised Speech Perception in Noise (SPIN) test[5], which requires participants to repeat the last word of low-context sentences presented in babble at +8 dB signal-to-noise ratio. SPIN scores were adjusted for audibility by taking the difference between observed scores and scores predicted from pure-tone thresholds, speech levels, and noise levels using a modified Articulation Index calculation[6]. Set-shifting and persistence were assessed using metrics from the Wisconsin Card Sorting Test. Age, set-shifting, persistence, and their interactions accounted for 21% of variance in audiability-adjusted SPIN scores. These factors interacted such that better set-shifting predicted better word recognition in younger adults but not older adults. In contrast, higher persistence predicted better word recognition in older adults but not younger adults. As speech understanding in noise becomes more difficult with age, cognitive persistence becomes more important for successful communication, perhaps reflecting variance in motivational factors that are critical for sustaining attention during challenging tasks. [1]Divenyi et al. (2005). J Acoust Soc Am, 118(2), 1089-1100. [2]Dubno et al. (1984). J Acoust Soc Am, 76(1), 87-96. [3]Ellis et al. (2016). Ear Hear, 37(1), 73-79. [4]Eckert et al. (2016). Ear Hear, 37(S1), 101S-110S. [5]Bilger (1984).

288 Sphingosine Kinase-2/Sphingosine 1-Phosphate Signaling Regulates P16INK4A Mediated Accelerated Aging in Normal Somatic Tissues and TCF21 Mediated Tumor Suppression in Lung Cancer, Shanmugam Panneer Selvam1, Marion Cooley2, Kristi Helke3, Elizabeth Garrett-Mayer4, Charles Smith5, Besim Ogretmen1; 1Biochemistry and Molecular Biology, MUSC, 2Regenerative Medicine and Cell Biology, MUSC, 3Comparative Medicine-Lab Animal Resources, MUSC, 4Public Health Sciences, MUSC, 5Apogee Biotechnology Corporation, Pennsylvania.

Sphingosine 1-phosphate (S1P), a pro-proliferative sphingolipid is upregulated in many cancers. Telomerase (hTERT), is a ribonucleoprotein that extends the ends of chromosomes (telomeres), to promote lung cancer growth. We discovered that SK2 generated S1P binds and stabilizes telomerase in the nuclear periphery by allosterically mimicking protein phosphorylation. Mechanistically, S1P binding protected hTERT from MKRN1 mediated degradation thereby preventing telomere dysfunction (Panneer Selvam et al, Science Signaling, 2015). The objective of this study is to delineate the molecular mechanisms of SK2/S1P mediated telomere dysfunction in aging and lung cancer. SK2/- mice tissues showed increased telomeric DNA damage and senescence associated-beta galactosidase activity. Moreover, SK2/- mice displayed aging phenotypes by reduced subcutaneous fat, atrophy in spleens and hypoplasia in mice testes. Also, SK2/- fibroblasts showed increased senescence and robust p16INK4A expression and interestingly, p16INK4A ablation rescued SK2/- fibroblasts from senescence. Importantly, we found SK2 and hTERT protein levels to be upregulated in lung cancer tumor tissues (N=48). Mechanistically, pharmacological inhibition of SK2 by ABC294640 (in Phase II clinical trials) leads to telomere dysfunction in A549 cells and interestingly wild type hTERT overexpression prevented telomere dysfunction whereas S1P defective mutant hTERTD684A did not. In vivo, inhibition of SK2 by ABC294640 or shRNA knockdown displayed reduced tumor volume, decreased hTERT protein levels and increased TUNEL positive cells. Interestingly, qPCR based gene array revealed robust increase in TCF21 tumor suppressor in stable shSK2 tumors. Furthermore, shRNA against TCF21 following SCID mice xenograft studies showed protection against ABC294640 induced...
Kallistatin Via Its Structural Elements Induces Cancer Cell Autophagy and Apoptosis, Pengfei Li, Youmin Guo, Lee Chao, Julie Chao; Biochemistry, MUSC.

Kallistatin is an endogenous protein that exerts pleiotropic beneficial effects in tumor progression. Kallistatin via its active site and heparin-binding site regulates differential signaling pathways. Our recent study showed that kallistatin blocked Wnt/beta-catenin signaling by binding to Wnt co-receptor, low-density lipoprotein receptor-related protein 6 in breast cancer cells. In this study, we determined the role and mechanism of kallistatin in breast cancer cell autophagy and apoptosis. We showed that kallistatin induced breast cancer cell autophagy, as evidenced by altered autophagy markers, such as LC3B, Atg5 and Beclin-1 levels. Moreover, kallistatin-induced autophagy was abolished by Wnt3a ligand, or PPARγ antagonist. Kallistatin via its heparin-binding site increased PPARγ expression, which was blocked by Wnt3a, indicating a role of Wnt-PPARγ signaling. Furthermore, microRNA-21 is a key player in cancer biology as an oncogene, and miR-34a acts as a tumor suppressor. In this regard, kallistatin induced cancer cell apoptosis in conjunction with reduced Akt phosphorylation, miR-21 and Bcl-2 synthesis, and increased BAX expression, as well as elevated miR-34a and p53 expression. Kallistatin via its active site modulated miR-21 and miR-34a synthesis. This is the first study to demonstrate that kallistatin through its structural elements induces cancer cell autophagy and apoptosis via regulating Wnt signaling and miRNA synthesis. NIH HL118516

Moesin Regulates Optimal TGF-β Signaling and iTreg Cell Differentiation and Attenuation Improves Adoptive T Cell Therapy, Ephraim A Ansa-Addo¹, Serhan Karvar², Philip H Howe³, Zihai Li¹;
¹Microbiology and Immunology, MUSC, ²Gastroenterology and Hepatology, MUSC, ³Biochemistry and Molecular Biology, MUSC.

Abstract not available.

The Fli-1 Transcription Factor Impacts Inflammatory Disease Through the Regulation of Inflammatory Cytokines and Chemokines, Mara L Lennard Richard¹, Shuzo Sato¹, Xian K Zhang²; ¹Rheumatology, MUSC, ²Rheumatology, MUSC and Ralph H Johnson VA Medical Center.

Inflammation is a key aspect associated with health complications from a number of disorders including cancer, cardiovascular, neurodegenerative, and autoimmune diseases. According to data obtained from the National Heart, Lung, and Blood Institute, in 2010 health care expenditures associated with these diseases accounted for over 325 billion dollars in the US. The CDC reported that heart disease, cancer, Alzheimer’s disease and nephritis were four of the top ten causes of death in 2011 and contributed to more than 50% of the deaths for that year. The Fli-1 transcription factor plays a critical in the pathogenesis of systemic lupus erythematosus (SLE) in mice and humans and affects inflammatory cell infiltration into the kidneys. We recently discovered that Fli-1 is a critical regulator of a number of inflammatory cytokines, suggesting that Fli-1 may be more important in inflammation than previously recognized. Transfection experiments demonstrated that Fli-1 positively activates transcription for each of the inflammatory mediators tested. Chromatin Immunoprecipitation Assays were used to demonstrate that Fli-1 binds to the promoters of several cytokines and increased binding to the G-CSF promoter after stimulation by a bacterial substrate was observed. Mutating the Fli-1 protein at key regulatory sites led to the discovery that DNA binding, acetylation and phosphorylation are important molecular mechanisms behind Fli-1 mediated activation. In addition, the NFκB p65 subunit was shown to interact synergistically with Fli-1 to activate transcription from the MCP-1 promoter. We have discovered a novel role for the Fli-1 transcription factor in regulating the expression of several inflammatory cytokines and chemokines and identified several molecular mechanisms important for Fli-1 mediated activation of these genes. These studies have brought new insight into understanding the complex molecular mechanisms involved in the transcriptional regulation of inflammatory mediators and future studies will provide the groundwork for the discovery of novel methods for the treatment and prevention of inflammatory disease. NIH AR056670; American Association of Immunologists; MUSC Multidisciplinary Clinical Research Center; Ralph H. Johnson VA Medical Center
MicroRNA 204 Expression Disrupts Normal Lactation in the Mouse Mammary Gland, Lourdes Nogueira¹, Jerrica Walden², David P Turner¹, Victoria J Findlay¹;
¹Pathology, MUSC. ²USC.

The mammary gland develops through several distinct stages, however, lactation is the primary function. Upon pregnancy, the combined actions of progesterone and prolactin generate alveoli, which secrete milk during lactation. Lack of demand for milk at weaning initiates the process of involution whereby the gland is remodeled back to its pre-pregnancy state. Our knowledge of mammary gland development has significantly contributed to our understanding of breast cancer and has advanced the discovery of therapies to treat this disease. Until recently, data regarding the role of microRNAs in the mammary gland have been scarce. We identified miR-204 as a novel oncomir and are interested in defining its role during normal mammary gland function. In this study, we generated a unique dox-inducible miR-204 transgenic mouse model that allows us to temporally express miR-204 specifically in the ductal epithelium of the mammary gland at specific stages of normal mammary development. We extracted mammary glands for whole mount analysis and performed H&E and immunohistochemical staining. We also extracted RNA and protein to assess miR-204 and direct target expression levels. The increased expression of miR-204 during lactation resulted in a defect that led to an inability to nurse efficiently. Histologically, the mammary glands of the lactating miR-204 transgenic mice were distinguished by the lack of glandular structure, an abundance of adipocyte tissue, abnormal/involuting lobuloalveolar structures and an accumulation of large cytoplasmic lipid droplets in the alveolar epithelial cells. Histologically we identified an inhibition of the PRLR/JAK/STAT pathway and a subsequent reduction in the milk protein genes WAP1 and CSN2. Pup weight was significantly lower as a result. Our data suggests that miR-204 is important for the normal biology of the mammary gland specifically that the deregulation of miR-204 affects lactation through inhibition of the milk protein synthesis pathway.

Parenting Stress Among Substance-using Parents Involved in Treatment: Results From Qualitative Interviews, Sara Delmas, Angela Moreland; Psychiatry, MUSC.

Introduction/Rationale: Long-standing evidence indicates that stress plays a critical role in drug use. Less literature has examined the role of stress caused by parenting – which is surprising given that 50-79% of individuals in substance-use treatment are parents, and the cumulative negative effect of seemingly minor stressors, such as those related to parenting. This study aims to address this gap by identifying stressors.

Methods: Individual, semi-structured interviews were conducted with 32 parents actively involved in substance use treatment. Parents were recruited from...
two substance use treatment programs via presentations at the sites. Interviews were audio recorded and professionally transcribed. A qualitative content analysis informed by grounded theory was conducted. Parents were 81% female, with a mean age of 33.72; ethnicity was 75% Caucasian and 25% African American. Parents had 1-4 children and 76% had at least one child living at home with them. Mean age of children was 4.57. Results: Two overarching themes emerged. The first theme, stressors prior to entry into treatment, included parent-specific (behavior problems, DSS involvement, separation from children, shared parenting responsibilities), substance use-specific (kids not understanding substance use or recovery, being under the influence impacting functioning, lack of adult emotional support, risk for relapse, legal problems), and other stressors (transportation, financial, childcare, domestic violence). The second theme, parent-related stressors during and following treatment, included parent-specific (behavior problems, DSS involvement, separation from children, no parenting resources, unable to control environment outside of treatment, overwhelmed), substance-specific (kids not understanding treatment, comorbid mental health concerns, withdrawal symptoms, risk for relapse, time commitment required for treatment), and other stressors (transportation, financial, childcare, relationships with other people in treatment). Conclusions: Qualitative results indicated that parents report a range of stressors prior to, during, and following substance use treatment. Results inform development of programs to address parent-related stressors for substance using parents. NIH K12DA031794

295 The Association Between Olfaction and Depression: A Systematic Review, John S Muus, Christopher D’Esposito, Preeti Kohli, Zachary M Soler, Rodney J Schlosser, Shaun A Nguyen; Otolaryngology, MUSC.

Previous studies on the relationship between olfaction and depression have revealed mixed results. In addition, few have focused on the reciprocity of this association. The aim of this study is to combine depression and olfactory data in two separate patient populations to further understand their association. A systematic literature review was conducted using 3 online databases to identify studies correlating olfaction and depression in patients presenting with either primary depression or primary olfactory dysfunction. For the depressed population, weighted means and standard deviations for the Sniffin’ Sticks Test and the 40-item Smell Identification Test were combined using 10 studies. For the olfactory dysfunction population, weighted means of Beck’s Depression Inventory were combined using 3 studies. Independent t-tests were used to compare differences between groups. Comparing primary depressed patients with controls, depressed patients showed decreased scores in olfactory threshold (6.31±1.38 vs. 6.78±0.88, P = 0.0005), discrimination (12.05±1.44 vs. 12.66±1.36, P = 0.0073), identification (12.57±0.74 vs. 12.98±0.90, P < 0.0001), and 40-item Smell Identification Test (35.31±1.91 vs. 37.41±1.45, P < 0.0001). In patients with primary olfactory dysfunction, Beck’s Depression Inventory scores were significantly different between patients classified as normosmics, hyposmics and anosmics (5.21±4.73 vs. 10.93±9.25 vs. 14.15±5.39, P ≤ 0.0274 for all 3 comparisons). In conclusion, patients with depression have reduced olfactory performance when compared with the healthy controls and conversely, patients with olfactory dysfunction, have symptoms of depression that worsen with severity of smell loss.

296 The Cerebrovascular Mural Cell Continuum: A Structural and Biochemical Characterization of Smooth Muscle Cells, Pericytes, and Intermediary Hybrids, Roger I Grant, David H Hartmann, Robert G Underly, Ashley N Watson, Andy Y Shih; Neurosciences, MUSC.

Vascular smooth muscle cells (VSMCs) and pericytes are two primary mural cell types that reside on cerebral blood vessels. VSMCs are canonically thought to be arteriolar mural cells that completely encircle the endothelium, and lack a prominent cell body. Pericytes reside on capillaries, have elongated cellular processes which only partially cover the endothelium, and possess distinct ovoid-shaped cell bodies. It is widely accepted that VSMCs can regulate blood flow, but whether pericytes share this capacity remains controversial. To advance the field, investigators must be united on how to define mural cells. Towards achieving this goal, we studied traits of arteriolar and capillary mural cells using two photon microscopy of optically cleared and immunostained brain tissue. We classified mural cells based on morphology, and expression of the contractile protein alpha-smooth muscle actin. These characteristics were then related to subsurface microvessel branch order, defined as the number of bifurcations between a microvessel of interest and the nearest penetrating arteriole. With respect to branch order, VSMCs were solely located on the penetrating arteriole defined as zero order, hybrid mural cells were typically on 1st to 4th order branches, and classic pericytes were found on 5th order vessels and beyond. These data should aid in more accurately identifying mural cell types both in vivo and ex vivo. Our findings support a hypothesis of mural cell continuity, starting with arteriolar smooth muscle cells that gradually transition to capillary pericytes. Our data should
facilitate a discussion of how to define components of the cerebrovasculature so that we can study the elements of the cerebrovasculature using the same definitions. AHA 14GRNT20480366; NIH P20GM12345

297 Pediatric and Adult Recommendations Vary For Sibling Testing in Cystic Fibrosis, Kimberly L Brown, Patrick A Flume; Pulmonary, MUSC.

Background: Most cystic fibrosis (CF) patients are diagnosed early in life, yet 4-5% are diagnosed as adults and often have atypical CF. Genetically at-risk siblings may also have a subtle disease state. This study explored diagnostic testing recommendations for siblings of newly diagnosed patients. Methods: A REDCap survey was emailed to members of the CFF-LL and NSGC CF SIG. Questions assessed sibling testing practice in pediatric and adult care. Comparative statistics and thematic coding were used to assess practice in both settings. Results: Fifty-eight CF providers participated. When a newly diagnosed patient has siblings, 82.5% of pediatric and 36.4% of adult care respondents always recommend diagnostic testing for siblings. In adult care another 33.3% recommend testing if the sibling has symptoms. Following symptomology, adult care factors include patient-sibling relationship, insurance coverage and cost of testing. In pediatric care whether the sibling had newborn screening was most influential, followed by symptomology and age of siblings. Recommending diagnostic sibling testing was rated very important (92.3%) or somewhat important (7.7%) by all pediatric care respondents, and very important (45.7%) or somewhat important (42.9%) by most adult care respondents. Barriers to recommending testing in adult care included (1) cost/insurance coverage, (2) concern making or implementing recommendations for someone who is not the patient, and (3) logistical concerns including time and distance from clinic. Barriers in pediatric care included (1) emotional state of the parents, (2) logistical concerns and (3) equally endorsed were insurance coverage/cost of testing and parent belief that an apparently healthy sib could not have CF. Conclusions: Recommending diagnostic CF testing for siblings of newly diagnosed patients is less common in adult care than pediatric care, though is endorsed as important in both practices. Current practice is variable in both settings. These data may reveal an area for practice guidelines and standardization.
KEYWORDS

24-Hour Recall 174
Abdominal Hernia 79
acetazolamide 115
achalasia 122
acute coronary syndrome 75
acute liver failure 256
Acute Myeloid Leukemia 280
ADAMTS5 3,4,133,210
diabetes 95,173
Addiction Sciences 96
Adipocyte 249,255
adipose tissue 255
Adolescent 62
adolescent ethanol 279
adolescents 7
Adaptive Cell Therapy 277
Adaptive T cell therapy 48,198,290
Adaptive T cell transfer therapy 192
Advanced Glycation End-Product 219
Adverse Drug Events 108
AED 29
Aerobic Exercise 152
Affordable Care Act 31
African American 5,151
age-related macular degeneration 188
aggrecan 133
Aging 217,223,243,276,278,287,288
AHT 57
AIE 279
Airway equipment 56
Airway management 56
Alcohol 174
Alcohol septal ablation 61,113
ALK-1 38
Allosteric Inhibitors 280
alpha 1 antitrypsin 36
Altitude 11
Alveolar Epithelial 11
Alzheimer's disease 137,286
AML 120
Amygdala 194
Analgesic 35
Anastomosis 138
Aneurysm 190,230
Angiogenesis 166,196
Angiography 59,85
anisotropy diffusion 130
Anosmia 295
anterior cruciate ligament (AC 109
Antibiotic Resistance 123,140,177
Antidepressive agents 247
Anti-Infective Agents 123
Antimicrobial 110
Antimicrobials 34,136
Antioxidants 11
aneuploidy 165
Anxiety 211,241
Aorta 217,276
aortic dissection 68
Aphasia 244,245
Apolipoprotein E 226
APPE 99
Arm Use 18
arthroplasty 121
Artificial antigen presenting 198
aspiration thrombectomy 63
Assessment 234,235
Asthma 242
Athletic Trainer 82
ATP 248
Attachment 8
Audit and Feedback 28
Auditory Nerve 163,170,185
Auranofin 106
autism 282
Autism Spectrum Disorder 13,78
autograft 109
Autoimmune Disease 119
Automated Multiple Pass Method 174
autophagy 251
Awareness 179
Axon regeneration 203
B cells 243,270
Bayesian 146
Bayesian RAR 262
BDI 295
BDNF 137,159
Bessel beam 246
beta-Amyloid 286
Bicuspid Aortic Valve Disease 162
Binary 74
binary outcome 269
Biochemistry 160,171
Bioengineering 138
Biofabrication 52
biomarkers 126
biomechanical strength 240
biomechanics 121
Blind 37
Blunt disease 86
bone 267
cardiac structure 47
bone fracture 118
Bone Remodeling 285
BRAF 264
brain oscillation 155
brain stimulation 26,180,258
Brain Stimulation Research 96
Brain-Computer Interface 201
Breast Cancer
5,107,112,126,160,161,165,
251,274,289
Breast Cancer Risk 219
burst latency 26
bystander 29
C3a 98
Ca2+-dependent regulation 1
Cal27 103
Calcifying Aponerotic Fibrobra 72
calcium channel 1
calcium homeostasis 188
calcium scoring 71
calvarial 111
Calvarial Defect 285
Cancer
53, 105, 119, 161, 171, 185, 213, 263
Cancer Immunotherapy
48,192,271,277,290
Cancer Therapy 42
Candida 98,222
candidiasis 98
Carbapenem-resistant
Enterobacteriaceae 91
Cardiac Arrest 29
Cardiac Development 215
cardiac differentiation 149
Cardiac hypertrophy 2
Cardiology 61
Cardiometabolic 5,158
Cardiovascular 275
Cardiovascular Development 128
Cardiovascular Health 151
Case Study 72
CD11b 170
CD26 271
CD4+ T cell 192
Cell Cycle 215
cell junctions 49
cell signaling 92,160
Ceramide 105,120,265
cerebrovascular 169,296
cerebrovascular inflammation 63
checkpoint therapy 197
chemistry 171
Chemotherapy 182
Chikungunya 69
Chronic 54
chronic kidney disease 179
chronic rejection 189
chronic rhinosinusitis 225
circadian rhythm 255
circuits 153
Cirrhosis 70
C-Jun 44
Cleft Palate 214
clinical 69
clinical decision-making 227
Cocaine 94,173,180
Cochlear Implant 231
Cochlear Synaptopathy 184
Co-Immunoprecipitation 40
Collagen 2,45,104,268
community vs academic 122
comorbidities 78
complement 98,222,224
complement anaphylatoxins 207
Complement Inhibition 206
Complement system 188,205,207,257
Complications 232
Component Separation 79,87
Computed Tomography 59,68,71
cone snail 125
Confidence 15
Congenital Heart Disease 6
Connectivity 156
connectome 245
continuous theta burst stimulation
96,208
Contraction 74
Controlled release 52
Copper Nanoparticle 110
Coronary 59
coronary artery disease 68
coronary CT angiography 75
cortical excitability 9