MOLECULAR & CELLULAR BIOLOGY & PATHOBIOLOGY PROGRAM

Donald R. Menick, Ph.D., Director

Annual Report 2010-2011

Division Directors

Dennis K. Watson, Ph.D.
Cancer Biology

Donald R. Menick, Ph.D.
Cardiovascular Biology

Joseph Schoepf, M.D.
Michael Rosol, Ph.D.
Cardiovascular Imaging

Steven A. Rosenzweig, Ph.D.
Cell Regulation

Keith L. Kirkwood, DDS, Ph.D.
Caroline Westwater, Ph.D.
Craniofacial Biology

Andy Wessels, Ph.D.
Genetics and Development

Eric R. Lacy, Ph.D.
Marine Biomedicine and
Environmental Science

Progress Committee

Dr. Craig Beeson
Dr. Edward L. Krug
Dr. Steven W. Kubalak
Dr. Donald R. Menick

Students

Nine (9) Students Graduated May 20, 2011

<table>
<thead>
<tr>
<th>Student’s Name</th>
<th>Matriculation Date</th>
<th>Mentor</th>
<th>Degree Sought</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alge, Joseph</td>
<td>2009</td>
<td>Dr. John Arthur</td>
<td>M.D./Ph.D.</td>
</tr>
<tr>
<td>Aseem, Obaidullah</td>
<td>2006</td>
<td>Dr. Scott Argraves</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>Bertin, Matthew</td>
<td>2008</td>
<td>Dr. Peter Moeller</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Briggs, Laura</td>
<td>2008</td>
<td>Dr. Andy Wessels</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>Brunelle, Stephanie</td>
<td>2005</td>
<td>Dr. Francis Van Dolah</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Butler, Jonathan</td>
<td>2003</td>
<td>Dr. Naren Banik</td>
<td>M.D./Ph.D.</td>
</tr>
<tr>
<td>Corum, Daniel</td>
<td>2009</td>
<td>Dr. Robin Muise-Helmericks</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Name</td>
<td>Year</td>
<td>Advisor</td>
<td>Degree</td>
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<tr>
<td>Cribben, Kathryn</td>
<td>2009</td>
<td>Dr. Paul McDermott</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Czajka, Caitlin</td>
<td>2009</td>
<td>Dr. Chris Drake</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Dahrouj, Mohammad III</td>
<td>2010</td>
<td>Dr. Craig Crosson</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>Flanary, Jocelyn</td>
<td>2004</td>
<td>Dr. Paul Becker</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Funk, Jason</td>
<td>2007</td>
<td>Dr. Rick Schnellmann</td>
<td>DMD</td>
</tr>
<tr>
<td>Gault, Christopher</td>
<td>2003</td>
<td>Dr. Lina Obeid</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>Gentile, Carmine</td>
<td>2008</td>
<td>Dr. Christopher Drake</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Grant-Burton, Elizabeth</td>
<td>2004</td>
<td>Dr. Steven Kubalak</td>
<td>MD/Ph.D.</td>
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<tr>
<td>Grass, G. Daniel</td>
<td>2008</td>
<td>Dr. Bryan Toole</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>Griffin, Alfred III</td>
<td>2007</td>
<td>Dr. Keith Kirkwood</td>
<td>DMD</td>
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<tr>
<td>Harikrishnan, Keerthi</td>
<td>2008</td>
<td>Dr. W. Scott Argraves</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Heffernan-Stroud, Linda</td>
<td>2004</td>
<td>Dr. Lina Obeid</td>
<td>M.D./Ph.D.</td>
</tr>
<tr>
<td>Hoover-Jophlin, Loretta</td>
<td>2003</td>
<td>Dr. Steven Kubalak</td>
<td>MD/Ph.D.</td>
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<tr>
<td>Hung, Hsun-I</td>
<td>2008</td>
<td>Dr. Anna-Lisa Nieminen</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Kimbrough, Denise</td>
<td>2009</td>
<td>Dr. Donald R. Menick</td>
<td>Ph.D.</td>
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<tr>
<td>Kimes, Nikole</td>
<td>2006</td>
<td>Dr. Pamela Morris</td>
<td>Ph.D.</td>
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<tr>
<td>Leifield, Tod</td>
<td>2005</td>
<td>Dr. John Wessels</td>
<td>Ph.D.</td>
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<tr>
<td>Lindner, Amanda</td>
<td>2007</td>
<td>Dr. Mui-se-Helmericks</td>
<td>Ph.D.</td>
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<tr>
<td>Lockhart, Marie</td>
<td>2007</td>
<td>Dr. Arno Wessels</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Lynch-Johnson, Jillian</td>
<td>2007</td>
<td>Dr. Francis Van Dolah</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Lyon, Barbara</td>
<td>2005</td>
<td>Dr. Giacomo Ditullio</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>McCoy, Jessica</td>
<td>2010</td>
<td>Dr. Louis Guillette</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Moschella, Phillip</td>
<td>2002</td>
<td>Dr. Dhandapani Kuppuswamy</td>
<td>MD/Ph.D.</td>
</tr>
<tr>
<td>Moseley, Vondina</td>
<td>2007</td>
<td>Dr. Michael Wargovich</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Mullen, Thomas</td>
<td>2003</td>
<td>Dr. Lina Obeid</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>O’Quinn, Michael</td>
<td>2001</td>
<td>Dr. Robert Gourdie</td>
<td>MD/Ph.D.</td>
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<tr>
<td>Orr, Kathryn Alexa</td>
<td>2006</td>
<td>Dr. Lina Obeid</td>
<td>Ph.D.</td>
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<tr>
<td>Palatinus, Joseph</td>
<td>2005</td>
<td>Dr. Robert Gourdie</td>
<td>M.D./Ph.D.</td>
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<tr>
<td>Pruet, Nathanael</td>
<td>2004</td>
<td>Dr. Alexander Awgulewitsch</td>
<td>Ph.D.</td>
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<tr>
<td>Rhett, Joshua Matthew</td>
<td>2004</td>
<td>Dr. Robert Gourdie</td>
<td>Ph.D.</td>
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<tr>
<td>Ross, Jessica</td>
<td>2006</td>
<td>Dr. Ashley Cowart</td>
<td>Ph.D.</td>
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<tr>
<td>Samuel, Glady</td>
<td>2005</td>
<td>Dr. Maria Trojanowska</td>
<td>Ph.D.</td>
</tr>
<tr>
<td>Saunders, Janet</td>
<td>2008</td>
<td>Dr. Craig Beeson</td>
<td>Pharmaceutical</td>
</tr>
</tbody>
</table>
Students’ publications

Journals


Palatinus JA, Rhett JM, Gourdie RG., “Enhanced PKCε mediated phosphorylation of connexin43 at serine 368 by a carboxyl-terminal mimetic peptide is dependent on injury.” Channels (Austin). 2011 May 1;5(3).


Palatinus JA, Rhett JM, Gourdie RG., “Enhanced PKCε mediated phosphorylation of connexin43 at serine 368 by a carboxyl-terminal mimetic peptide is dependent on injury.” Channels (Austin). 2011 May 1;5(3).


**Abstracts:**


M. Kannan Kunchithapautham1, Mausumi Bandyopadhyay1, Mohammad Dahrouj, Joshua Thurman, and Bärbel Rohrer: “Sublytic Membrane-Attack-Complex (MAC) Activation and VEGF Secretion in Retinal Pigment Epithelial Cells”. This work was supported in part by National Institutes of Health Grants DK077661 and DK076690 (JMT), the Foundation Fighting Blindness (BR), and an unrestricted grant to MUSC from Research to Prevent Blindness, Inc., New York, NY. BR is a Research to Prevent Blindness Olga Keith Weiss Scholar.

Dahrouj, Mohammad, “Natriuretic Peptides Protect the RPE From AGE-Induced Barrier Breakdown”, 11-A-3403-ARVO 2010 Visionary Genomics”.

Kannan Kunchithapautham1, Mausumi Bandyopadhyay1, Dahrouj, Mohammad, Joshua M. Thurman, and Bärbel Rohrer: Chapter XX, “Sublytic Membrane-Attack-Complex (MAC) Activation and VEGF Secretion in Retinal Pigment Epithelial Cells”.


Moschella, Phillip, “PKCε Regulates PI3K/mTOR Complex-2-Dependent AKT Activation Independent of c-Raf/MEK/ERK Pathway”, AHA Basic Cardiovascular Sciences, 2011.


**Presentations**

Brunelle, Stephanie
Completed final dissertation May 26, 2011: ““Cell Cycle Regulation in the Florida red tide dinoflagellate, Karenia brevis”.


Trombetta, Jessica
Honorable Mention Poster Presentation from Veteran’s Administration, The Perry V. Halushka Student Research Day, Charleston, SC; November 5, 2010. 2nd Place Poster Presentation PhD Category. Medical University of South Carolina College of Dental Medicine Scholar’s Day, February 24, 2011.

Flanary, Jocelyn
Class 724: Appointed Monday Seminar Class “Coordinator”: Fall 2010 & Spring 2011 Semesters.

Funk, Jason
Oral Poster Presenter at the Society of Toxicology meeting in Washington DC in March entitled "Mitochondrial homeostasis after acute kidney injury: Sustained alterations in mitochondrial proteins, fusion/fission, and biogenesis”, March 2011.

Funk, Jason

Gault, Christopher
Completed final dissertation January 28, 2011: “Sphingosine Kinase 1 is an Essential Enzyme for Ras Oncogenesis”.


Heffernan-Stroud, Linda

Mullen, Thomas

Orr, Kathryn Alexa
Attended the 1st Annual Cardiovascular Training Grant Retreat in January 2011, the 6th International Charleston Ceramide Conference in March 2011 in Villars, Switzerland, the 10th Annual MUSC Hollings Cancer Research Day in November 2010.

Orr, Kathryn Alexa
45th Southeastern Regional Lipid Conference in Cashiers, NC in November 2010, and the MUSC Department of Medicine Research Day in December 2010.

Completed final dissertation April 15, 2010: “The Connexon Switch: Zonula Occludens-1 Regulates Connexin43 Hemichannel to Gap Junction Transition”.


Samuel, Glady
Completed final dissertation June 16, 2011: "Novel Mediators of TGFB Signaling Contribute to Scleroderma Fibrosis: Role of Protein Phosphatase 2A and Acid Spingomyelinase"

Saunders, Janet

Trombetta, Jessica, Amy Bradshaw, Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. SPARC knock out mice have Irregular collagen Morphology within the Periodontal Ligament. Poster Presentation, Aging Research Day, Folly Beach, SC, February 19, 2010.

Trombetta, Jessica, Hong Yu, Carlos Rossa, Keith Kirkwood, Amy Bradshaw Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. SPARC regulates collagen in the PDL in health and disease. Poster Presentation, Medical University of South Carolina Craniofacial Biology Research Day, Charleston, SC, February 26, 2010.

Trombetta, Jessica, Hong Yu, Carlos Rossa, Keith Kirkwood, Amy Bradshaw, Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. SPARC regulates collagen in the PDL in health and disease. Poster Presentation, NIDCR T32 Trainee Day, Bethesda, MD, March 3, 2010.
**Trombetta, Jessica**, Hong Yu, Carlos Rossa, Keith Kirkwood, Amy Bradshaw Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. SPARC regulates collagen in the PDL in health and disease. Poster Presentation, American Association of Dental Research Annual Meeting, Washington, DC, March 6, 2010.

**Trombetta, Jessica**, Hong Yu, Carlos Rossa, Keith Kirkwood, Amy Bradshaw, Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. SPARC regulates collagen in the PDL in health and disease. Poster Presentation, Medical University of South Carolina Medical Scientist Training Program Research Day, Folly Beach, SC, September 11, 2010.

**Trombetta, Jessica**, Hong Yu, Daniela Arias, Carlos Rossa, Keith Kirkwood, Amy Bradshaw, Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine; Erskine College. The absence of SPARC is associated with increased loss of collagen in a periodontal disease model. Poster Presentation, American Society of Matrix Biology Meeting, Charleston, SC, October 2010.

**Trombetta, Jessica**, Hong Yu, Daniela Arias, Carlos Rossa, Keith Kirkwood, Amy Bradshaw, Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine; Erskine College. The absence of SPARC is associated with increased loss of collagen in a periodontal disease model. Poster Presentation, The Perry V. Halushka Student Research Day, Charleston, SC; November 5, 2010.

**Trombetta, Jessica**, Amy D. Bradshaw. The function of SPARC/Osteonectin in the periodontal ligament. Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. Poster Presentation, Medical University of South Carolina Department of Medicine Annual Research Day, Charleston, SC, December 9, 2010.

**Trombetta, Jessica**, Hong Yu, Keith L. Kirkwood, Amy D. Bradshaw. The function of SPARC in the periodontal ligament. Medical University of South Carolina, Department of Craniofacial Biology, Department of Medicine. Poster Presentation, Medical University of South Carolina College of Dental Medicine Scholars Day, Charleston, SC, February 24, 2011.


**Students’ honors and awards**

Bertin, Matthew  
Awarded a Slocum-Lunz Foundation Grant.

Briggs, Laura  
AHA Mid Atlantic Pre-Doctoral Fellowship (2011).
Buff, Haley
1st place PhD Year 3 poster: The Perry V. Halushka Student Research Day 2010
Awarded F30 Fellowship from NIDCR.

Butler, Jonathan
MUSC “Distinguished Graduate Student Award” finalist.

Cribben, Kathryn
Pre-Doctoral Fellow: NIH Training to Improve Cardiovascular Therapies Grant: T-32 HL 007260.
1st place, Ralph H. Johnson VA Medical Center poster category 2010.

Gentile, Carmine
2011 AAA Student Travel Award (EB2011).

Grass, Daniel
Outstanding Poster Award, “Interactions between hyaluronan, CD44 and CD147 (emmprin; basigin) regulate properties of highly tumorigenic subpopulations of cancer cells”, Gordon Research Conference on Proteoglycans: (Invited speaker selected from abstract): Travel Award July 11th-16th, 2010.
2nd place recipient, Ph.D VII Oral category: “Regulation of MT1-MMP and invadopodia assembly by emmprin (CD147)”: The Perry V. Halushka Student Research Day 2010.

Jophlin, Loretta
The Julius Sagel Excellence in Internal Medicine Award.
The Merck Manual Award.
The Glasgow-Rubin Certificate of Commendation.
Member of the Alpha Omega Alpha Honor Society.
MUSC “Distinguished Graduate Student Award” finalist.

Kimbrough, Denise
Pre-Doctoral Fellow: NIH Training to Improve Cardiovascular Therapies Grant: T-32 HL 007260.
Outstanding Graduate Student Volunteer from “MUSC Gives Back”.

Lockhart, Marie
Pre-Doctoral Fellow: NIH Training to Improve Cardiovascular Therapies Grant: T-32 HL 007260.
2010 Travel Award: Weinstein Cardiovascular Conference.

Moschella, Phillip
EMRA Region III Representative.
EMRA Medical Student Governing Council.
**Orr, Kathryn Alexa**  
Pre-Doctoral Fellow: NIH Training to Improve Cardiovascular Therapies Grant: T-32 HL 007260.

**Orr, Kathryn Alexa**  
Travel award, 6th International Charleston Ceramide Conference Villars, Switzerland, March 16-20.

**Palatinus, Joseph**  
2nd place PHD VIII oral presentation winner: The Perry V Halushka Student Research Day, November 5, 2010, “A Peptide Mimetic of the Connexin43 C-Terminus Increases Activity of Protein Kinase C ε in a Substrate-Specific Manner”.  

**Pruett, Nathanael**  
Accepted a Postdoctoral Fellowship position at the NIH (NIH-NIAMS, Laboratory of Molecular Immunogenetics) beginning August, 2011.

**Saunders, Janet**  
Pre-Doctoral Fellow: NIH Training to Improve Cardiovascular Therapies Grant: T-32 HL 007260.  
3rd Place Award: ASN, Oral Presentation: 2010.

**Trombetta, Jessica**  

**Wilkerson, Brent**  
Travel award recipient; NAVBO Developmental Vascular Biology Workshop IV; February 2010.  
American Heart Association Predoctoral Fellowship, July 2010-2012.  
2nd place Winner; PhD Oral Presentation Category: The Perry V. Halushka Student Research Day; November 5, 2010.  
Student representative to the Graduate Admissions Committee: January-May 2011.

**Weber, Rebecca**  
Zhang, Xiaoyi
2nd place winner: Oral presentation: “MKP-1 deficiency increases susceptibility to 4-NQO-induced oral neoplasia”.
11th Annual South Carolina Head and Neck Cancer Awareness Workshop: “MKP-1 deficiency increases susceptibility to 4-NQO-induced oral neoplasia”, May 2011.

Department/Program Accomplishments for 2010-2011

This has been another outstanding year for the students in the MCBP Program. This year our students published 40 manuscripts, many in high-impact Journals, including The Journal of Biological Chemistry, Circulation Research, and the FASEB Journal. In addition to the manuscripts, our students have presented 55 abstracts at local, national, and international meetings. Our student’s work has been honored with an impressive number of highly competitive local, national, and international local awards and fellowships. Both Laura Briggs and Brent Wilkerson have received pre-doctoral fellowships from the American Heart Association (AHA); Joseph Palatinus was awarded an individual NIH Ruth L. Kirschstein National Research Fellowship; Matthew Bertin was awarded a Slocam-Lunz Foundation Grant. Four of our students, Kathryn Cribben, Marie Lockhart, Kathryn Alexa Orr, and Janet Saunders received NIH T-32 Training Fellowships, “NIH Training to Improve Cardiovascular Therapies”. Laura Briggs just came off of the NIH T-32 MST Training Grant in June 2011; Amanda Lindner and Kathryn Cribben received 1st place awards for their presentations in the MUSC “Perry V. Halushka 2010 Student Research Day”. Daniel Grass, Joseph Palatinus, Jessica Trombetta, Brent Wilkerson, and Rebecca Weber all received 2nd place awards in the MUSC 2010 “Perry V. Halushka 2010 Student Research Day”. Kathryn Cribben was also honored with a 1st place award for her presentation from the Ralph H. Johnson VA Medical Center. Loretta Jophlin received the prestigious Julius Sagel Excellence in Internal Medicine Award, the Merck Manual Award, the Glasgow-Rubin Certificate of Commendation, and is a member of Alpha Omega Alpha Honor Society. Many of our students have been honored by Travel Awards to both national and international meetings, and have been recognized with awards for their poster and/or oral presentations at some of those meetings. Lastly 9 of our students graduated from MUSC on May 20, 2011; 4 of them received a Ph.D., and 5 of them received both an MD & Ph.D degrees (Medical Scientist Training Program) (MSTP). Both Jonathan Butler and Loretta Jophlin were honored as “Distinguished Graduate Student Award finalists, and received their degree with honors. These graduates are moving on to post-doctoral training positions and internships in some of the best laboratories and institutions in the country. All of the students in the MCBP Program have done well and we are very proud of their accomplishments.
Department/Program Goals for 2011-2012
The MCBP Graduate Program provides a rich and diverse training environment for students, allowing for multi-disciplinary projects that can easily span the traditional areas of molecular biology, cell biology, pharmacology and physiology. One of the greatest challenges we continue to have in this time of increased difficulty in getting and maintaining extramural support for our research efforts is preventing the erosion of the quality of teaching and academic excellence. We are undergoing a concerted effort to maintain and even increase the number of advanced courses that are being offered to our students. Our commitment is to making the MCBP Program the best possible training environment for our students. To this end our goals for the next year are to ensure that the many MCBP advanced graduate courses including new courses are offered on a regular basis. This year the MCBP progress committee is also reexamining the MCBP written Qualifying Exam to insure that it serves to prepare our student to succeed and compete for the best post-doctoral fellowships and academic positions. We will work to insure that the journal clubs which have been established in many of the divisions are continued and new journal clubs established in those that do not have them, be more informative to students inquiring about the program as well as our own students who are currently in the program, and to re-double our efforts to giving our students the best training and preparation possible for a fulfilling career in biomedical research.