SCIRF Funding for the
Basic Science Research Initiative

Naren L. Banik, Ph.D.
Early Spinal Cord Injury Research in South Carolina
Basic Research Findings from PPG NS11066 (1974-1992)

- Increased intracellular calcium after injury
- Calpain
- Degeneration of axons/myelin
- CaCl$_2$-induced injury model
- Prostaglandins
- Cell death
- Efficacy of protease inhibitors
- Increased proteases
- Activation of inflammatory cells
- Phagocytosis and removal of myelin debris
Post-PPG Projects

NIH R01s
- Proteinase in SCI (1993-2012)
- Efficacy of Estrogen in SCI (2003-2010)

Veterans Administration
- Estrogen in SCI (2014- )

Other
- MUSC CTSA (2007-2009)
- SCIRF (Banik, Varma, Samantaray)
New scientists must be recruited, trained, and encouraged to work in the field as part of a basic science initiative. The SCIRF has committed to support such a program.

This program will support:

- One postdoctoral fellow for three years
- Two Masters or one pre-doctoral student for up to 5 years
To investigate new areas of research

- telomerase and biomarkers in animal models and human SCI
- This study will balance the rehabilitation and outcomes research with basic science research
This establishment of basic science research must be statewide.

To help guide and train the next generation of researchers, two masters/pre-doctoral students will be recruited.

After 6-8 weeks of training in laboratories where basic science research in SCI with translational potential is recognized, students will return to their mentor’s laboratory rather than confining research to one location.
The following novel areas of research may be developed:

- Regeneration of axons and myelination in SCI
  - Maturation of oligodendrocyte progenitor cells (OPCs)
  - Axonal growth cones forming synaptic relationships with OPCs
  - Permeabilization of glial scar

- Development of therapeutic agents (e.g. combination treatment)

- Targeted delivery of drugs – a major problem in clinical studies
  - Nanoparticle delivery of drugs, e.g. estrogen, premarin, melatonin, which must be developed for use in human SCI

- Inclusion of exercise as a component in animal SCI with assessment of behavioral and functional outcome

- Biomarkers in serum/PBMCs in animal and human SC for genetic markers

- Project on neuromuscular well being
Postdoctoral fellow will be recruited with support for 3 years
  - Salary will depend on experience (approximately $67,500)
  - Supplies ($20,000 per year)

Two Masters/pre-doctoral students for up to 5 years
  - Stipend support (approximately $30,000 per year)
  - Supplies ($15,000 per year each)
Basic Science Research in SCI at MUSC and other institutions has made significant contributions to the State. Students (Ph.D., M.D.-Ph.D.) have been trained in SCI research over the years. Support from the SCIRF will help train our next generation of students from state institutions in SCI research. This will help develop new ideas for research and new therapeutic strategies that will benefit individuals with SCI in our state.
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