

South Carolina
Spinal Cord Injury
Research Fund



2004/2005

Annual Report



Fund Board Members at July 2005 Meeting.

Standing left to right: Dr. Brian Cuddy (Chair), Dr. Daniel Westerkam, Dr. David Shallcross, and Dr. David Griesemer.

Seated: new Board Member John Stevens.

Not Pictured: Ms. Terry Peacock and Dr. Phanor Perot.



May 2005 First Annual SCSCIRF Scientific Conference.

Standing left to right: Dr. Mark S. Kindy, Fund Associate Scientific Director; Mr. James A. Shepherd, Jr.; Dr. Scott R. Whittemore; Walker Coleman, Fund Administrator; Dr. Barth A. Green; Dr. Brian Cuddy, Fund Board Chairman

Seated: Dr. James S. Krause, Fund Scientific Director.

State of South Carolina

Spinal Cord Injury Research Fund Board

“Dum Spiro Spero - While I breathe I Hope”

BOARD

Brian G. Cuddy, MD
Chairman

David A. Griesemer, MD
Terry Peacock

Phanor L. Perot, MD, PhD

David L. Shallcross, MD

John H. Stevens, MEd

W. Daniel Westerkam, MD



STAFF

J. Walker Coleman, III, MBA
Fund Administrator

James S. Krause, PhD
Scientific Director

Mark S. Kindy, PhD
Associate Scientific Director

Medical University of South Carolina
Office of the President
P.O. Box 250001
Charleston, SC 29425

July 2005

Dear Friends and Supporters;

On behalf of the Board of the Spinal Cord Injury Research Fund, I am pleased to report yet another year of hard work and progress by our projects, Board, and staff. Fund facts and figures clearly document a steady advancement from the development stage into effective operations.

As of June 30, 2005, total Fund DUI collections had passed the \$ 3,000,000 mark with \$ 2,157,470 allocated/committed and \$ 1,629,351 actually expended. Seven (7) new Round 03 projects were awarded funds. A Round 04 RFP was issued and resulted in three (3) fully approved projects as well as four (4) seed projects for possible full funding in FY 06.

Since the Fund started in 2001, thirty two (32) proposals were awarded either full or seed funding support. Eleven (11) of these completed their objectives by the end of this year or earlier, and I call attention to Part III of this Report which summarizes their accomplishments. Also in the same section is an extensive and impressive overview of additional Spinal Cord Injury related accomplishments that resulted directly or indirectly from Fund support: fourteen (14) Federal grants submitted and funded; thirty one (31) additional Federal grants submitted (some still pending); forty six (46) publications in professional journals; twenty six (26) additional manuscripts either in preparation or under review for publication; and sixty nine (69) invited talks and presentations. Because many funded projects are still in progress, a substantial number of additional accomplishments are forthcoming.

These figures also do not reflect the growing outreach efforts to those with SCI, their loved ones, health professionals, and researchers. A second Consumer Conference was held in Columbia, followed by the first Scientific Conference in Charleston. These successful events attracted national leaders and were attended by a total of more than 375 persons. Also of significance was the Fund special initiative to provide bridge support that will enable continuation of the South Carolina Statewide Traumatic Spinal Cord Injury Surveillance and Registry System and its essential data base as well as an opportunity to draw upon its resources for future research studies.

As we move on to even greater achievement in FY 05-06 and beyond, the Board would once again like to express special appreciation to all who have been so interested in and supportive of the Fund—particularly the S. C. Legislature, the Governor, the Medical University of South Carolina, Clemson University, and the University of South Carolina.

We look forward to an even more productive FY 05-06.

Sincerely,
Brian G. Cuddy, M.D., Board Chair

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May 2005 First Annual SCSCIRF Scientific Conference.

Dr. James S. Krause, Fund Scientific Director, provides a Fund scientific overview.



May 2005 First Annual SCSCIRF Scientific Conference.

Left to right: Fund Board Members Dr. Phanor Perot and Dr. Brian Cuddy with the family of deceased Board Member Judge Charles L. Allen, daughter Emily and wife Jean.

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PART I

OVERVIEW: {01/01/01 through 06/30/05}

PURPOSE/CHARGE: Promoting research to develop better understanding of causes and effective treatment strategies for paralysis, sensory loss, and other consequences of spinal cord injury and disease.

LEGISLATIVE BACKGROUND: The South Carolina Spinal Cord Injury Research Fund (SSCIRF) was established in 2000 by amendment (Bill S54 44-38-510) to Section 2, Chapter 38, Title 44 of the 1976 S.C. Code as signed by the Governor on July 20, 2000.

GOVERNANCE: The Fund is governed by a 7 member Board appointed by the Governor upon recommendation of the President of the Medical University of South Carolina. It is comprised of two medical doctors from MUSC; two medical doctors at large specializing or significantly engaged in the treatment of spinal cord injury; two members who have a spinal cord injury or a family member; and one at large medical doctor who is a member of the South Carolina. See **Appendix 1** for detailed Board Member Information.

ADMINISTRATION: The Fund is administered by the Medical University of South Carolina through a part-time Administrator (J. Walker Coleman, MBA) assigned from the Office of the President and two part-time Scientific Directors (Dr. James Krause and Dr. Mark Kindy) who oversee all aspects of research development and implementation including setting goals, developing project invitations to meet goals, and scientific review and recommendation to the Board of all such projects received.

AMOUNT COLLECTED: The \$ 100 per DUI surcharges started on January 1, 2001. As of July 2005, the Fund had raised almost \$ 3.3 Million. The average monthly amount collected over the first 54 months has been right at \$ 60,000. **Appendix 2** presents cumulative DUI collection figures.

PRIMARY OBJECTIVES:

- Advance knowledge of SCI injury repair and regeneration within the SC research community by encouraging physicians and scientists to apply expertise to SCI field.
- Foster collaborative interdisciplinary approaches to SCI research among SC hospitals, rehabilitative centers, research universities, and interested organizations.
- Nurture next generation of SCI researchers through support of young scientists and post-doctoral fellows.
- Improve well being and quality of life of individuals with SCI by research programs that prevent or treat the secondary conditions and consequences of SCI.
- Set budgets and administer funds for SCI research as mandated by the SC Legislative Act, and assure highest quality of research and commitment by investigators.

INITIAL FUNDING PRIORITIES:

- Translating basic and pre-clinical findings into clinical applications.
- Studying strategies to promote growth and survival at cellular level.
- Assuring efficacy of drugs or other interventions to prevent or reduce secondary injury and to provide insight to the mechanisms causing this progressive damage.
- Exploring the role of tissue transplantation in restoration of spinal cord function.
- Studying other disorders of spinal cord or brain that are reasonably expected to produce new insight into the mechanism or treatment of dysfunction following spinal cord injury.
- Defining anatomical, pathophysiological, inflammatory, and neurochemical characteristics of spinal cord injury or disease in well defined animal models.
- Elucidating biological and physical mechanisms that improve functions compromised by spinal cord injury, including dysfunction, chronic pain, and uncontrolled spasticity. Developing strategies to prevent or treat secondary complications from injury or disease of the spinal cord.
- Developing innovative rehabilitative strategies, services, or priorities to promote recovery and function following spinal cord injury.
- Developing public education programs to help decrease the occurrence of spinal cord injury by safety education, better safety practices, and decreased alcohol use as a contributing factor.
- Developing education programs for the injured and their families.

REQUESTS FOR PROPOSALS (RFP): There have been four regular rounds completed with two special initiatives under active review and a new round (Round 05) being developed for a 12/15/05 target issue date:

- ROUND 01--RFP issued 12/15/01 with 3/15/02 deadline. Received 12 proposals and awarded 8.
- ROUND 02--RFP issued 02/01/03 with 5/13/03 deadline. Received 12 proposals and awarded 10. Added were five Funding Mechanisms: Primary Research, Care Access/Delivery, Career Development, NIH Grand Seed, and Research Result Dissemination.
- ROUND 02A (Recruitment)—RFP issued 12/15/03 for special faculty recruitment initiative. To date no proposals have been received, but RFP is still open
- ROUND 02B (Rehabilitation)—RFP issued 02/01/04 for special contract initiative to complete an Assessment of Need and Feasibility of Enhancing Rehabilitation Services in the State of South Carolina. Received 3 bids, but the Board subsequently required additional clarifications and has targeted 12/15/05 as date to invite 2 of the bidders to resubmit.
- ROUND 03—RFP issued 12/15/03 with 03/15/04 deadline. Received 9 regular proposals plus 1 unsolicited special request and awarded 7.
- ROUND 04—RFP issued 12/15/04 with 03/15/05 deadline. Received 9 plus 1 supplemental proposals. Awarded 3 full, and 4 more as initial seed awards.
- ROUND 05—RFP to be issued 12/15/05 with updated priorities and initiatives.

ROUND 01 PROJECTS: A first round of eight (8) research projects were approved and awarded funds on 07/01/02 for periods ranging from 12 to 18 months, several subsequently receiving no-cost extensions as noted below.

- **SCIRF0202--Gene Expression Profiling of CNS Regions Implicated in a Mouse Model of Spinal Cord Injury** *{ \$ 85,466 for 18 months }*
P.I.: Jacqueline F. McGinty, PhD, Professor, Physiology and Neuroscience
Medical University of South Carolina
- **SCIRF 0302--Statewide Outcome Assessment for Spinal Cord Injury (SOASCI): Assessing the Implementation and Effectiveness of Methylprednisolone Protocol and Other Outcomes of Spinal Cord Injury In South Carolina** *{ \$ 123,349 for 12 months, with subsequent 12 month no-cost extension }*
P.I.: Stephen J. Haines, MD, Professor and Chair, Department of Neurological Surgery, Anbesaw W. Selassie, DrPH., Assistant Professor, Department of Biometry and Epidemiology., Medical University of South Carolina
- **SCIRF 0602--Assessment and Treatment of Musculoskeletal Pain in the Shoulder Girdle in SCI Through Surface-Recorded EMG and EMG Biofeedback** *{ \$ 91,990 for 18 months, with subsequent 6 month no-cost extension }*
P.I.: Susan J. Middaugh, PhD, PT, Professor, Department of Anesthesia and Perioperative Medicine, Medical University of South Carolina
- **SCIRF 0802--Spinal Modulation of the Nociceptive Pressor Reflex** *{ \$ 87,978 for 18 months, with subsequent 6 month no-cost extension }*
P.I.: Britt Wilson, PhD., Associate Professor, Pharmacology and Physiology, University of South Carolina School of Medicine.
- **SCIRF 1102--An In Vitro Model of the Reflex Arc as Applied to Spinal Cord Injury** *{ \$ 100,252 for 18 months }*
P.I.: James J. Hickman, PhD., Hunter Endowed Chair of Biomaterials
Department of Bioengineering, Clemson University
- **SCIRF 1202--Taking Charge of Your Life” –Statewide Conference for People With Spinal Core Injuries** *{ \$ 29,476 for 12 months }*
P.I.: Kermit L. Short, Executive Director, SC Spinal Cord Injury Association
- **SCIRF 1302—Recruitment Assistance for James S. Krause, PhD as Chair of the Department of Rehabilitative Sciences at MUSC and Scientific Director of the SCI Research Fund** *{ \$ 125,000 for 12 months, with 2 subsequent no-cost extensions adding 24 months }*
P.I.: James S. Krause, PhD., (& Danielle N. Ripich, PhD.), Chair, Department of Rehabilitative Sciences, College of Health Professions, Medical University of South Carolina
- **SCIRF 1402—Recruitment Assistance for Mark S. Kindy, PhD as The Admiral Pihl Endowed Chair of Neuroscience at MUSC and Associate Scientific Director of the SCI Research Fund** *{ \$ 75,000 for 12 months, with 2 subsequent no-cost extensions adding 24 months }*
P.I.: Mark S. Kindy, PhD., (& Peter Kalivas, PhD.), Admiral Pihl Endowed Chair of Neuroscience, Department of Physiology/Neuroscience, Medical University of South Carolina

ROUND 02 PROJECTS: A second round of ten (10) projects was approved on July 11, 2003 for periods ranging from 12 to 18 months and awarded funds as of September 1, 2003 or shortly thereafter.

- **SCIRF 0103--“Taking Charge of Your Life”—Continuing Education for People With Spinal Cord Injury** *{ \$65,000 for 12 months }*
P.I.: Kermit Short, Executive Director, SC Spinal Cord Injury Association
- **SCIRF 0303--Development of a Laser Cell Micropatterning System for In Vitro Investigation of Adult Stem Cell Spinal Cord Injury Treatment** *{ \$149,890 for 18 months }*
P.I.: Bruce Z. Gao, PhD., Assistant Professor, Department of Bioengineering, Clemson University
- **SCIRF 0403--In Vitro System to Determine Factors Promote Survival and Regeneration of Principal Neurons of the Spinal Cord** *{ \$ 74,892 for 18 months }*
P.I.: Peter Molnar, PhD., Research Assistant Professor, Department of Bioengineering, Clemson University
- **SCIRF 0503--Determination of Occurrence and Causes of Death Among South Carolina Residents with Traumatic Spinal Cord Injury** *{ \$ 145,000 for 18 months }*
P.I.: Elisabeth Pickelsimer, DA, Research Assistant Professor, Department of Biometry and Epidemiology/ Rehabilitative Sciences, Medical University of South Carolina
- **SCIRF 0603--The Prevalence of Upper Quarter Pain Among Persons with Long-term Spinal Cord Injury** *{ \$ 75,000 for 18 months }*
P.I.: David Morrisette, PT, ATC, MTC, PhD., Associate Professor, Physical Therapy Education Program, Department of Rehabilitative Sciences, Medical University of South Carolina
- **SCIRF 0703--Frequency, Severity, ad Risk Factors for Falls and Fall-Related Injuries Sustained by Individuals with Incomplete Spinal Cord Injury** *{ \$ 75,000 for 18 months }*
P.I.: Sandra S. Brotherton, PhD., Assistant Professor, Department of Rehabilitative Sciences, Medical University of South Carolina
- **SCIRF 0803--Estrogen Therapy for Spinal Cord Injury** *{ \$ 137,592 for 18 months }*
P.I.: Swapan K. Ray, PhD., Assistant Professor, Department of Neurology, Medical University of South Carolina
- **SCIRF 0903--Theraputic Use of Minocycline for Spinal Cord Injury** *{ \$ 24,988 for 12 months }*
P.I.: Narayan R. Bhat, PhD., Professsor, Department of Neurology, Medical University of South Carolina
- **SCIRF 1003--Project M.I.L.E. (Mobile Inclusion Life-Training Evaluation)** *{ \$ 3,000 seed funds for additional conceptual development }*
P.I.: Michael E Godkin, Director, Disabilities Resource Center, North Charleston
- **SCIRF 1103--Anti-inflammatory Approaches for Spinal Cord Injury** *{ \$ 75,000 for 18 months }*
P.I.: Ernest Barbosa, MD, Associate Professor, Departments of Neurology and Pediatrics, Medical University of South Carolina

ROUND 03 PROJECTS: A third round of seven (7) projects were approved on June 25, 2004 for periods ranging from 12 to 24 months and awarded funds as of July 1, 2004 or shortly thereafter:

- **SCIRF 0104—Biomaterial-based Gene Delivery for Spinal Regeneration** *{\$ 150,000 for 24 Months}*
P.I.: C. Kenneth Webb, Ph.D., Assistant Professor, Department of Bioengineering, Clemson University
- **SCIRF 0204—2005 Statewide Conference for People with Spinal Cord Injury in South Carolina; And Beyond the Walls—Education Outside of Rehabilitation** *{\$ 60,000 for 12 Months}*
P.I.: Kermit L. Short, Executive Director, South Carolina Spinal Cord Injury Association
- **SCIRF 0304—Home Physical Activity Program for the Promotion of Health and Wellness in Individuals with Spinal Cord Injury** *{\$ 150,000 for 24 Months}*
P.I.: Holly H. Wise, PT, Ph.D., Assistant Professor, Department of Rehabilitative Sciences, Medical University of South Carolina
- **SCIRF 0604—Patterns of Care for Spinal Cord Injury: South Carolina and the Model Systems** *{\$ 61,632 for 12 Months}*
P.I.: David E. Murday, Ph.D., Assistant Director, Center for Health Services Policy & Research Arnold School of Public Health, University of South Carolina
- **SCIRF 0704—Telemedicine: A Lifeline for Continuity of Care for Spinal Cord Injury** *{\$ 3,000 seed funds for additional conceptual development}*
P.I.: Tracie L. Mertz, Ph.D., Clinical Psychologist, Neuropsychologist, Roger C. Peace Rehab Hospital, Greenville Hospital System
- **SCIRF 0804—Dissemination of Information Regarding Evidenced-Based Practices to Enhance Independent Lifestyles for People with Spinal Cord Injuries** *{\$ 70,000 for 24 Months}*
P.I.: Jill Monger, P.T., MHS; Michael Godkin, Executive Director DisAbility Resource Center of Charleston
- **SCIRF 1004—Bridge Funding Support for the S. C. Statewide Traumatic Spinal Cord Injury Surveillance and Registry System** *{\$ 102,000 for 24 Months}*
P.I.: Anbesaw W. Selassie, DrPH., Assistant Professor, Department of Biometry and Epidemiology/Rehab. Sci., Medical University of South Carolina

ROUND 04 PROJECTS: A fourth round of three (3) fully funded and four (4) initial seed projects were approved July 01, 2005 and awarded funds on 07/01/05 and 09/01/02 for periods ranging from 3.5 to 24 months. It was anticipated that several of the seed projects could be fully funded in December after Fund Board review of revised proposals responding to concerns/suggestions arising during the initial scientific review. In addition, an earlier Round 02 project received a supplemental award. Following are the awards made based on Board decisions at its July 1, 2005 meeting:

- **SCIRF 0105A—(SEED REDEVELOPMENT) Repetitive Movement Therapy as an Intervention for Individuals with Incomplete Spinal Cord Injury {\$ 5,000 for 3.5 Months}**
P.I.: Stacy L. Fritz, Ph.D., PT, Clinical Assistant Professor, Department of Exercise Science, Physical Therapy Program, University of South Carolina
TYPE APPLICATION: Primary Research
GOALS: *To revise and submit a full grant proposal that addresses the issues brought up through scientific review and board review.*
- **SCIRF 0205—Modulation of Inflammatory Response and Secondary Injury {\$ 25,000 for 12 Months}**
P.I.: Stephen Tomlinson Ph.D., Professor, Department of Microbiology and Immunology, Medical University of South Carolina
TYPE APPLICATION: Pilot Project
GOALS: *The overall goal of this project is to alter the inflammatory response in spinal cord injury to improve outcome. Inflammation can be beneficial and detrimental in the progression of SCI. These studies will help to determine the role of inflammation in SCI.*
- **SCIRF 0505A—(SEED INITIATION AND REDEVELOPMENT) Engineering Regeneration Through Bridge/Host Distal Interference {\$ 25,000 for 6 Months}**
P.I.: Andrew T. Metters, Ph.D., Assistant Professor, Department of Chemical and Biomolecular Engineering, Clemson University
TYPE APPLICATION: Primary Research
GOALS: *The overall goal of this research is to develop biomaterials that can be used to help in the regeneration of the spinal cord following spinal cord injury.*
- **SCIRF 0605—Tissue Engineering for Spinal Cord Regeneration {\$ 100,000 for 24 Months}**
P.I.: Xuejun Wen, M.D., Ph.D., Assistant Professor, Clemson-Medical University of South Carolina Bioengineering Program, 173 Ashley Avenue, CRI#305
TYPE APPLICATION: Primary Research
GOALS: *The overall goal of this proposal is to engineer materials at the site of injury in the spinal cord to allow for neuronal bridging to promote injured CNS neurons to regenerate axons and guide their regeneration to their appropriate targets to recover function.*
- **SCIRF 0705—Assessing Disparities in Patterns of Health Care After Traumatic Spinal Cord Injury {\$ 119,598 for 24 Months}**
P.I.: Elisabeth Pickelsimer, DA, Research Assistant Professor, Department of Biometry and Epidemiology/ Rehabilitative Sciences, Medical University of South Carolina
TYPE APPLICATION: Primary Research
GOALS: *The overall goal of this proposal is to assess the differences in health care to patients with SCI to determine the influence on recovery and rehabilitation.*
- **SCIRF 0805—(SEED REDEVELOPMENT) Dynamic Postural Patterns during Task Performance in Individuals with Paraplegia {\$ 5,000 for 3.5 Months}**
P.I.: Hon K. Yuen, Associate Professor, Department of Rehabilitative Sciences College of Health Professions, Medical University of South Carolina

TYPE APPLICATION: Primary Research

GOALS: *To revise and submit a full grant proposal that addresses the issues brought up through scientific review and board review.*

- **SCIRF 1005—(SEED DEVELOPMENT) South Carolina Spinal Cord Injury Association Cooperative Study** {\$ 5,000 for 9 Months}

P.I.: Richard F. Bridges, Executive Director, South Carolina Spinal Cord Injury Association

TYPE APPLICATION: Educational

GOALS: *To bring together appropriate stakeholders and advisers in order to develop a plan for education of people with SCI from the state of South Carolina that will be done in collaboration with South Carolina Spinal Cord Injury Research Fund. This plan will be reviewed by the Board of Directors and a contract issued for appropriate activities.*

- **SCIRF 0303S—(SUPPLEMENTAL AWARD) Development of a Laser Cell Micropatterning System for In Vitro Investigation of Adult Stem Cell Spinal Cord Injury Treatment** {\$ 23,000 added to the original \$149,890 for an extended period of 30 months}

P.I.: Bruce Z. Gao, PhD., Assistant Professor, Department of Bioengineering
Clemson University 20634-0905

TYPE APPLICATION: Grant-in-Aid

GOALS: *To develop a laser cell micropatterning system to study the effects of endogenous and exogenous factors on the biological properties of adult stem cells.*

SUMMARY OF PROGRESS: So far there have been thirteen (13) Basic Science projects awarded a total of \$ 1,040,466; nine (9) Applied Science projects for \$ 731,220; six (6) Education projects totaling \$ 232,476; and one (1) Interdisciplinary project at \$ 123,349. Part III of this Report contains additional information on some of the projects that have completed their funding. Two of the education projects held very successful statewide conferences on spinal cord injury and continuing education programs for people with SC (May of 2003 and 2005). In addition, the Fund and its Scientific Staff held the first Annual Scientific Conference on the MUSC campus May 13, 2005 which included presentations about current and future state of spinal cord research from national leaders as well as findings/accomplishments by Principle Investigators of ten (10) of the completed Fund projects. The Fund also organized, financed, and co-sponsored (with the South Carolina Brain Injury Association, the South Carolina Brain Injury Alliance, and the South Carolina Brain Injury Leadership Council) the “South Carolina Rehabilitation Meeting” of statewide leadership to discuss parameters of an acute care rehabilitation services need/feasibility study.

FUTURE GOALS: Future goals of the Fund are to provide support for the recruitment of SCI scientists to the state, and selected programs to enhance ever-evolving Fund priorities. Additional goals are to determine the need for rehabilitation services, to provide educational programs and to reduce the incidence of SCI in South Carolina.

SUMMARY BUDGET INFORMATION Between July 1, 2002 and June 30, 2005, the Fund has obligated a total of \$ 2,423,973 (\$ 99,603 in Administration/Other; \$ 166,900 in Research Development; and \$ 2,157,470 in funded Projects). These obligations will cover Administration and Scientific Development through 06/30/06, and all of the projects until they end, some as late as on 06/30/07. Actual expenditures for the period totaled \$ 1,629,351. The Fund is expected to continue collections at a rate of approximately \$ 60,000 per month as well as recoup additional unexpended funds at year-end and project-end from various budget components.

Appendix 3 presents detailed budget information.

PART II

HIGHLIGHTS OF FY 04-05 {07/01/04--06/30/05}

CHRONOLOGICAL HIGHLIGHTS OF FY 04-05: The year witnessed a steady progression of activity, the highlights of which follow:

- **July/August:** The Third Round of seven (7) projects awarded funds for periods ranging from 12 to 24 months.
- **October:** Board Chair Cuddy and member Peacock visited the Shepherd Center in Atlanta, one of the Country's premier SCI rehabilitation facilities, for orientation as well as consultation with respect to South Carolina rehabilitation facility/service needs and possibilities. Dr. Cuddy also made Fund presentations at the Annual Meeting of the South Carolina Spinal Society as well as a seminar for physical medicine and rehabilitation professionals.
- **December:** The Board met and approved the Fund's Annual Report 03/04, a strengthened Scientific Review Process for projects, a Round 04 RFP, and conceptual plans for the first Fund Scientific Conference in the Spring. The Round 04 RFP was subsequently issued statewide on December 15 and, at month's end, Mr. William Stevens was appointed by the Governor to fill the Board position of deceased member Judge Charles Allen.
- **March:** Nine (9) Round 04 proposals were received and forwarded for scientific review.
- **May:** Second statewide conference held in Columbia for people with SCI and their circle of friends (family & caregivers) with the title: "Experience the Power:"—279 registrants plus 29 vendors and exhibitors attended. This was followed by the first annual Scientific Conference in Charleston with three nationally known keynote speakers, presentations by 10 of the SCIRF funded projects, and over 100 scientists and clinicians in attendance.
- **July:** The Board met and welcomed Mr. Stevens as new member; recommended several Board reappointments to the MUSC President and Governor; set major FY 05-06 goals and five year strategic goals; finalized priorities and timeline for a Round 05; continued revision of Round 02B (Rehabilitation) RFP and timeline; and charged the Scientific Directors with identifying additional special focus areas where Fund support might be effectively earmarked/allocated to permit significant improvements to SCI and related research. They also approved three (3) Round 04 projects in full; another three (3) as seeds to complete additional clarifications for potential end of year funding; awarded a special seed initiative to the S. C. Spinal Cord Injury Association; and a supplemental award to a Round 02 project.

BUDGET DISCUSSION: The FY 04-05 budget witnessed the third full year of research project activity with final budget and expenditures as follows:

<u>FY 04-05 SCIRF</u>	<u>BUDGET</u>	<u>EXPEND</u>
<u>PROGRAM ADMINISTRATION CORE</u>	<u>\$ 30,931</u>	<u>33,057.69</u>
<u>RESEARCH DEVELOPMENT CORE</u>	<u>\$ 74,696</u>	<u>62,152.69</u>
<u>ONGOING ROUND 01 PROJECTS (Extension)</u>	<u>\$ 152,129</u>	<u>54,716.13</u>
3. Haines/Salassie	47,709	47,709.21
13. Krause	97,263	0.00
14. Kindy	7,157	7,006.92
<u>ONGOING ROUND 02 PROJECTS (Last 6 mos.)</u>	<u>\$ 434,932</u>	<u>267,099.15</u>
1. Short	14,459	14,457.00
3. Gao	77,753	61,614.78
4. Molinar	2,416	2,416.34
5. Pickelsimer	112,011	60,636.06
6. Morrisette	37,646	18,526.32
7. Brotherton	44,690	29,821.34
8. Ray	123,337	57,143.65
9. Bhat	11,018	10,881.91
11. Barbosa	11,602	11,601.75
<u>APPROVED ROUND 03 PROJECTS</u>	<u>\$ 606,597</u>	<u>193,929.80</u>
1. Webb	150,000 (2 yr)	47,950.21
2. Short	60,000 (1 yr)	60,000.00
3. Wise	150,000 (2 yr)	45,279.80
6. Murday	61,632 (1.5 yr)	38,526.20
7. Mertz	3,000 (1yr)	0.00
8. Monger/Godkin	70,000 (2yr)	2,095.39
10. Selassie	111,965 (2yr)	78.20
<u>TENT. COMMITMENT ROUND 02B PROJECT</u>	<u>\$ 100,000</u>	<u>0.00</u>
<u>TOTAL BUDGET ESTIMATE/EXPENDITURES</u>	<u>\$ 1,399,285</u>	<u>610,955.46</u>

While it might appear that approximately half of the FY 03-04 budget was saved, the \$ 1.3 Million total included obligations for the full project periods of all projects awarded--some for as long as 24 months. These funds will continue to be expended until the projects actually end as can be noted in a review of the following budget approved for FY 05-06. As mentioned in previous Reports, Program Administration saves significant funds each year through the assistance volunteered by several offices of MUSC including the Office of the President, Research Office, Grants Accounting, the MUSC Medical Center Marketing Department that coordinated the Annual Report statewide mailings, and the College of Health Professions which designed and maintains the Web page. **Appendix 3** includes the FY 05-06 budget figures in greater detail, and the "Cash Analysis" included provides an overall picture of the receipts and actual outlays from January 2001 through June 30, 2005. It also includes actual as well a projected commitment of funds for the upcoming year. Any uncommitted funds that remain unexpended at the end of any fiscal year, as well as any other Fund savings from any part of the budget, will be recouped and used to increase the amount of funds available for the future rounds of research projects and special initiatives.

The Board approved the following budget for FY 05-06 as well as the additional estimated amount available for Round 02A and 04 projects based upon the previously mentioned “Cash Analysis”. This will once again result in a year-end “Reserve Target” exceeding \$ 800,000 as set by the Board to assure that sufficient funds are always available to fully meet Fund budget commitments. Given the constant variation of monthly totals received through DUI collection (so far ranging from averages of \$ 72,000 to \$ 60,000), the Board established the Reserve Target to assure full fiscal control and accountability.

FY 05-06 SCIRF

PROGRAM ADMINISTRATION CORE **\$ 35,250***

RESEARCH DEVELOPMENT CORE **\$ 76,458***

ONGOING ROUND 01 PROJECTS (Extension) **\$ 97,413**

SCIRF 1302	Krause	97,263
SCIRF 1402	Kindy	150

ONGOING ROUND 02 PROJECTS (Extension) **\$ 167,692**

SCIRF 0303	Gao	16,138
SCIRF 0503	Pickelsimer	51,347
SCIRF 0603	Morrisette	19,119
SCIRF 0703	Brotherton	14,868
SCIRF 0803	Ray	66,193

ONGOING ROUND 02 PROJECT (Supplemental) **\$ 22,300***

SCIRF 0303S	Gao	22,300
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ONGOING ROUND 03 PROJECTS (Final Year) **\$ 409,664**

SCIRF 0104	Webb	102,049
SCIRF 0304	Wise	104,720
SCIRF 0604	Murday	23,105
SCIRF 0804	Monger/Godkin	67,904
SCIRF 1004	Selassie	111,886

SET ASIDE FOR ROUND 02B PROJECT **\$ 100,000**

AWARDED ROUND 04 PROJECTS **\$ 284,598***

SCIRF 0105A	Fritz	\$ 5,000
SCIRF 0205	Tomlinson	25,000
SCIRF 0505A	Metters	25,000
SCIRF 0605	Wen	100,000
SCIRF 0705	Pickelsimer	119,598
SCIRF 0805A	Yuen	5,000
SCIRF 1005A	Bridges	5,000

TOTAL BUDGET ESTIMATE 05/06 **\$ 1,193,375**

*NOTE: These four items totaling \$ 418,606 are the only new commitments in the budget. The remainder were committed in prior years. The three Round 04 projects with an “A” following the number were requested to revise and resubmit in mid-October for another Scientific and Board Review. If all three were fully funded, it could add an additional commitment of up to \$ 360,000 for a two year period.

PART III

RESEARCH ACCOMPLISHMENTS

(REPORT OF SCIENTIFIC DIRECTORS)

A. FINAL REPORTS OF COMPLETED PROJECTS

As of 6/30/05, the following projects had completed activity and submitted final reports, brief summaries of which are included:

Round 01 Projects

SCIRF 0302--Statewide Outcome Assessment for Spinal Cord Injury (SOASCI): Assessing the Implementation and Effectiveness of Methylprednisolone Protocol and Other Outcomes of Spinal Cord Injury In South Carolina --Stephen J. Haines, MD, Professor and Chair, Department of Neurological Surgery & Anbesaw W. Selassie, DrPH., Assistant Professor, Department of Biometry and Epidemiology, Medical University of South Carolina

A survey was completed of ED physicians, trauma and neurosurgeons on Methylprednisolone use in SC. Thirty-five of 62 hospitals responded, with 14 reporting having ever had a formal protocol for methylprednisolone administration for SCI. Twelve of the 14 protocols conformed to NASCIS 2 or 3 specifications, and 13 reported date of initiation. Five protocols were initiated in the years following NASCIS 2, 6 following NASCIS 3, and 2 following the Joint Section report. All protocols were still in place at the time of the survey. In univariate analyses, hospitals reporting ever (versus never) having a formal protocol were those with more beds, more full-time ED staff, more active neurosurgeons, and more active orthopedic surgeons. Among responding hospitals, 40% initiated formal protocols following the release of the NASCIS results suggesting enhanced recovery in individuals receiving methylprednisolone. None of the protocols were discontinued in the months immediately following the Joint Section report citing insufficient evidence to support treatment standards or guidelines. The study also established a contact list of potential research participants for research. Also completed a study on the causes of death after spinal cord injury and compared the data with Colorado. Published 1 article in Journal of Trauma, submitted 2, and 1 is under final review. Conducted a survey on unmet needs and receipt of post-acute rehab care and presented the findings at two national conferences. Provided epidemiological data, facts and figures, and supporting documents to 17 research applications to MUSC faculty and collaborating partners around the state. Key Findings: 2 out of 3 South Carolinians with Spinal Cord Injury have poor general health after acquiring the injury. 1 out of 2 South Carolinians with Spinal Cord Injury lose their jobs after injury and remain unemployed. 1 out of 4 South Carolinians with Spinal Cord Injury do not get any kind of rehab treatment after acute care.

SCIRF 0602--Assessment and Treatment of Musculoskeletal Pain in the Shoulder Girdle in SCI Through Surface-Recorded EMG and EMG Biofeedback--Susan J. Middaugh, PhD, PT, Professor, Department of Anesthesia and Perioperative Medicine, Medical University of South Carolina

Musculoskeletal cervical and shoulder pain is a problem for 42% of spinal cord injured (SCI) individuals who use manual wheelchairs. Prevalence increases with duration of injury and becomes an added concern for SCI individuals as they age. Prevalence also increases among the most active, with over 60% of wheelchair athletes

reporting shoulder pain. Recent research on work-related cumulative trauma indicates that pain may develop from muscle overuse due to (1) loss of normal muscle work/rest cycles during repetitive movements such as wheelchair operation and (2) compensatory muscle strategies adopted by SCI individuals for trunk stabilization during functional activities. Recent research also indicates that surface EMG recording can objectively evaluate muscle strategies in individuals and EMG feedback (biofeedback) training can improve muscle strategies. Two pilot studies test these propositions. Study 1 compares 15 SCI individuals having cervical or shoulder pain with 9 SCI individuals having 0-to-minimal pain on measures of (a) sensory thresholds, (b) pain above and below the level of SCI injury, (c) upper body range-of-motion and posture and (d) EMG measures of muscle use during test activities including manual wheelchair operation. Study 2 compares two treatment interventions, Exercise Only (N=7) versus Exercise Plus EMG Biofeedback training (N=8), on pre- versus post-treatment measures. Data analysis to date indicates: (1) There are marked individual differences in muscle strategies as measured on laboratory tests and during wheelchair use in the environment. (2) EMG biofeedback training can improve these muscle strategies. (3) Treatment with exercise plus EMG biofeedback training effectively decreased cervical / shoulder pain ($p < .05$) while exercise alone did not (10-week average treatment period, both groups). These preliminary findings support the hypotheses that muscle overuse is a contributory factor in upper-quarter pain in SCI and EMG biofeedback is an effective tool in reducing muscle overuse and associated pain.

SCIRF 0802--Spinal Modulation of the Nociceptive Pressor Reflex--Britt Wilson, PhD., Associate Professor, Pharmacology and Physiology, University of South Carolina School of Medicine.

Enhanced reflex cardiovascular increases in response to somatic and visceral stimulation are a common problem for spinal cord injury patients (termed autonomic dysreflexia). The mechanism for autonomic dysreflexia is unknown at present. The primary goal of this proposal was to establish a model to determine if reflex cardiovascular increases evoked by stimulation of somatic (skin and skeletal muscle) afferent neurons are altered by peripheral inflammation and/or injury. In turn, the long-range goal of such a model is to determine the mechanism(s) by which this augmentation occurs, concentrating on the possibility that the locus for this augmentation lies within the spinal cord. Ascertaining the mechanism(s) that mediate inflammation-induced augmentation of somatic pressor reflexes may be useful for the autonomic dysreflexia experienced by spinal cord injury patients. With regard to the primary goal, we completed a study showing that application of heat to one hindpaw causes a temperature dependent increase in mean arterial pressure (MAP) and heart rate (HR) in a decerebrate Guinea pig model. This increase in cardiovascular function was abolished by peripheral nerve transection, demonstrating it was a reflex. In addition, we demonstrated that acute inflammation of the ankle joint augmented the reflex increases in MAP and HR in male animals, but not female. A subsequent study showed ankle inflammation augmented the reflex in ovariectomized female guinea pigs. This latter finding is important because it indicates circulating agents modulate the central nervous system's ability to change in response to tissue inflammation. In turn, this provides a foundation for exploring therapeutic agents that can prevent or eliminate the augmentation of reflex cardiovascular increases evoked from somatic tissue, which may be very applicable to treating autonomic dysreflexia.

SCIRF 1102--An In Vitro Model of the Reflex Arc as Applied to Spinal Cord Injury--James J. Hickman, PhD., Hunter Endowed Chair of Biomaterials Department of Bioengineering, Clemson University

The purpose of our grant from the SC Spinal Cord Research Foundation was to leverage off an existing DARPA project in robotic control systems to address fundamental research in spinal cord injury. The long-term goal of the DARPA grant was to develop patterned artificial surfaces to study development of synaptic communication between individual cells of the three basic types that comprise the spinal stretch reflex arc: a dorsal root ganglion (DRG) neuron, a motoneuron, and a muscle cell. Our major hypothesis for the work under the SC Spinal Cord Research Program was that by studying the development of neural circuitry in this minimalist model, we could apply what we learn to develop new paradigms to restore function in damaged spinal systems. This grant has

produced the first example of a multi-component model of a CNS system using single cells to precisely and reproducibly create functional units integrated with silicon microstructures. The project was to also develop preliminary data and research collaborations at MUSC to submit joint proposals to NIH to further this work. This has been successful in that we have been funded for an R01 proposal entitled “An In Vitro Model of Stem Cell Innervation of Myotubes” in collaboration with Dr. Mark Kindy at MUSC. The progress on this grant, in combination with work on the DARPA grant, has also allowed additional projects to be submitted to NIH and the VA to address not only spinal cord repair but also Amyotrophic Lateral Sclerosis (ALS).

SCIRF 1202--Taking Charge of Your Life—Statewide Conference for People With Spinal Core Injuries--
Kermit L. Short, Executive Director, SC Spinal Cord Injury Association

See details at end of following Part III.B, section on “Dissemination to SCI Consumers, Providers, and Researchers as presented on page 33.

Round 02 Projects

SCIRF 0103--“Taking Charge of Your Life”—Continuing Education for People With Spinal Cord Injury--
Kermit Short, Executive Director, SC Spinal Cord Injury Association

The South Carolina Spinal Cord Injury Association developed and widely disseminated three 30 second public service announcements aimed at decreasing spinal cord injury from automobile, gunshot, and recreation/fall injuries. At risk populations were specifically targeted through a cable TV contract. A part-time nurse educator organized, developed curriculum (resource book), and conducted “Health Habit” workshops in four locations with total attendance of 160. These workshops will be continued and expanded to new areas of the state as well as in subject matter covered such as practical management of bowel and bladder issues, nutrition, exercise, and routing health maintenance. In addition, the nurse is available to answer health related questions and provide additional educational resources to people with SCI as well as help increase referrals for acute care, rehabilitation, and home care providers.

SCIRF 0403--In Vitro System to Determine Factors Promote Survival and Regeneration of Principal Neurons of the Spinal Cord--Peter Molnar, PhD., Research Assistant Professor, Department of Bioengineering, Clemson University

Regeneration of the principal neurons in the spinal cord depends on the extracellular (soluble and contact) signals reaching the neurons from their environment. Recently, an in vitro system was developed in the Hybrid Neuronal Systems Laboratory at Clemson, which has been shown to promote the growth and differentiation of motoneurons and DRG cells. Using this system the extracellular environment (both soluble factors and growth substrate) could be modified in a systematic and effective way. In the framework of this project, embryonic motoneurons and DRG cells were cultured on patterned surfaces in serum-free media. Surface patterns was created using self-assembled monolayers. The cell body of the neurons was localized in the middle of the pattern; axons was directed to grow parallel outward to enable fast and effective measurement of axonal outgrowth. Surfaces was modified with growth inhibiting proteins (Tenascin-R, Neurocan) to mimic conditions in the spinal cord. These proteins inhibited the growth of embryonic motoneurons. Several neurotrophic factors have been identified which promote survival and regeneration of spinal cord motoneurons. Brain-derived neurotrophic factor (BDNF), neurotrophin-3 (NT3) and leukemia inhibitory factor (LIF) have been shown to stimulate the sprouting of corticospinal connections and enhance axonal regeneration. We studied the effect of NT3 in our defined system in details. Addition of NT3 and vitronectin to the culture medium improved the survival of the motoneurons significantly. Moreover, electrophysiological recordings indicated more adult-like behavior

(prolonged spontaneous activity upon depolarization) of the cultured motoneurons. We also performed a detailed electrophysiological characterization of DRG cells in our defined system. In summary, during this project we have created a test system where the effect of drugs on axonal outgrowth of motoneurons and DRG cells plated on growth inhibitory surfaces can be studied in an effective way. Results obtained during this project were used for an NIH R21 grant application.

SCIRF 0903--Therapeutic Use of Minocycline for Spinal Cord Injury--Narayan R. Bhat, PhD., Professor, Department of Neurology, Medical University of South Carolina

The aim of the project was to test the beneficial effect of minocycline, an anti-inflammatory agent, in a spinal cord injury model. Soon after the project was funded, there were 2 publications appearing in the literature documenting such an effect in two different models of SCI including the one proposed in our pilot project. Therefore, we decided to focus on the protective effect of the drug directly on spinal neurons to determine the mechanisms involved. Since ischemic injury combined with excitotoxicity may play a significant role in the degeneration of motor neurons after spinal cord injury, we used this injury paradigm in an in vitro model. Motor neuron cultures subjected to oxygen and glucose deprivation (OGD) can mimic ischemia and hence are useful for studying molecular determinants of neuronal injury and protection. For our studies, we employed NSC34, a spinal motor neuron cell line, and investigated the effect of minocycline on OGD-induced cell death. We found that minocycline as well as NBQX, an AMPA receptor antagonist, were able to suppress OGD-induced neuronal cell death. Both these compounds also inhibited OGD-induced activation of pro-apoptotic $\text{p}38$ kinases, i.e., $\text{p}38$ MAPK and JNK. That $\text{p}38$ MAPK, in particular, mediates hypoxia-induced motor neuron cell death was confirmed by using a specific kinase inhibitor (SB203580) and by transfection of cells with $\text{p}38$ kinase-specific siRNA, both treatments showing substantial neuroprotection.

SCIRF 1103--Anti-inflammatory Approaches for Spinal Cord Injury--Ernest Barbosa, MD, Associate Professor, Departments of Neurology and Pediatrics, Medical University of South Carolina

Spinal cord injury is a devastating and complex clinical condition which produces a predictable pattern of progressive injury entailing neuronal loss, axonal destruction and demyelination at the site of impact. The involvement of pro-inflammatory cytokines and inducible nitric oxide synthase (iNOS) in exacerbation of SCI pathology is well documented. We have previously reported the anti-inflammatory properties as well as immunomodulatory activities of statins (HMG-CoA reductase inhibitors) in the animal model of multiple sclerosis i.e. experimental allergic encephalitis (EAE) (Nath et al. 2004; Stanislaus et al. 1999). The present study was undertaken to investigate the efficacy of atorvastatin (Lipitor; LP) treatment in attenuating SCI-induced pathology. Immunohistochemical detection and real time PCR analysis showed increased expression of iNOS, $\text{TNF}\alpha$ and $\text{IL-1}\beta$ following SCI. In addition neuronal apoptosis was detected 24 h following injury followed by a profound increase in ED1 positive inflammatory infiltrates, GFAP positive reactive astrocytes and oligodendrocyte apoptosis by one week following SCI relative to control. LP treatment attenuated the SCI-induced iNOS, $\text{TNF}\alpha$ and $\text{IL-1}\beta$ expression. LP also provided protection against SCI-induced tissue necrosis, neuronal and oligodendrocyte apoptosis, demyelination and reactive gliosis. Furthermore, rats treated with LP showed a profoundly better neurological score (BBB score) following SCI (19.13 ± 0.53) as compared to the untreated rats (9.04 ± 1.22). Therefore, this study reports the beneficial effect of atorvastatin for the treatment of SCI-related pathology and disability. This study investigates whether statins when given 'post-trauma' can act rapidly enough to provide neuroprotection in spinal cord injury (SCI) and delineates the mechanism of action. Atorvastatin was given hours (2, 4 or 6 h) post-injury. AT-treated rats demonstrated near-normal recovery of locomotor function 3 weeks post-injury with BBB scores in the range of 17-18 (on a scale of 0-paralyzed to 21-normal). However, placebo (VHC)-treated animals averaged at 7 and did not progress beyond this stage. Neuroprotection by AT was evident even 48 h to 72 h post-injury wherein the AT-treated rats had higher BBB scores when compared to the VHC-treated ones. AT prevented SCI-induced blood-spinal cord barrier (BSCB)

disruption through an isoprenoid-dependent preservation of tight junctions. This was achieved by inhibition of injury-induced MMP9 gene expression which further attenuated pivotal SCI-induced neurodegenerative events such as myelin/axonal degeneration and neuronal apoptosis (that cause functional loss). In summary, acute atorvastatin treatment post-injury reduces the extent of secondary damage and subsequent functional loss. To the best of our knowledge, this is the first study demonstrating rapid neuroprotective effects of atorvastatin in an in vivo model of SCI. In the present scenario, with the lack of any available effective therapy for SCI-patients, this study might be a turning point as it underscores the efficacy of AT as a potential therapeutic agent to attenuate neurodegeneration and enhance functional recovery following SCI in humans.

Round 03 Projects

SCIRF 0204--2005 Statewide Conference for People with Spinal Cord Injury in South Carolina; And Beyond the Walls—Education Outside of Rehabilitation--Kermit L. Short, Executive Director, South Carolina Spinal Cord Injury Association

See details at end of following Part III.B, section on “Dissemination to SCI Consumers, Providers, and Researchers as presented on page 34.

B. ACCOMPLISHMENTS MADE POSSIBLE BY GRANT AWARDS

Following is a listing of accomplishments by those awarded grants from the South Carolina Spinal Cord Injury Research Fund that resulted directly or indirectly from the Fund support. The information is summarized in several sections including: (a) funded grants, (b) grant applications either pending or not funded, (c) publications, (d) manuscripts under review or in preparation, (e) presentations at conferences, and (f) dissemination to consumers. All information was provided by awardees, some of whom updated information through the end of the year. The outputs are primarily projects which are either completed or near completion¹.

Grants Funded

Spinal Cord Related grants

1. **Gao, B.Z. (Co-Principal Investigator)** Automatic Multiple Beam Laser Cell Micropatterning System, Clemson University Research Instrumentation Equipment Grant, \$50,000, 04/16/04-08/15/04.
2. **Hickman, J. (Principal Investigator) & Kindy, M.S. (co-Principal Investigator) An In Vitro Model of Stem Cell Innervation of Myotubes** 1 R01 NS050452-01A1, \$499,580, 10/01/05-07/31/10.
3. Kindy, M.S. (Principal Investigator) EPSCoR Rhenomics Center for Neuroscience Research, NSF, \$1,000,000, 06/01/05-05/31/08.
4. **Krause, J.S. (Principal Investigator)** A 6-Year Longitudinal Study of Community Integration, Subjective Well-Being, and Health after Spinal Cord Injury: Relationship with Gender, Race/Ethnicity, and Environmental Factors, National Institute on Disability and Rehabilitation Research, Department of Education; \$449,515, 9/1/02-8/31/06

¹ Information on accomplishments has been submitted directly by grant recipients who are responsible for the accuracy of the information. There has been no independent verification as to the accuracy of the information. References are made in either medical or psychological format, depending on author/recipient preference.

5. **Krause, J.S. (Principal Investigator)** Mortality Rates and Causes of Death in the First Decade After Spinal Cord Injury Onset: A Comparative Study of Veterans and Non-Veterans, Veteran's Administration (VISN-7), \$116,000, 7/03-7/05.
6. **Krause, J.S. (Principal Investigator)** Stability of Vocational Interests Two Years after Spinal Cord Injury: Relationship with Employment, Participation, and Subjective Well-Being, National Institute on Disability and Rehabilitation Research, Department of Education; \$444,209, 10/01/03-9/30/06.
7. **Krause, J.S. (Principal Investigator)** Risk for Early Mortality After Spinal Cord Injury, National Institute on Disability and Rehabilitation Research, Department of Education; \$449,944, 10/01/03- 9/30/06.
8. **Krause, J.S. (Principal Investigator)** Risk for Adverse Outcomes after SCI: A Longitudinal Study. R01, National Institutes of Health; \$2,098,101, 01/01/06-12/31/11.
9. **Krause, J.S. (Principal Investigator)** Risk for Adverse Health Events after SCI: A Longitudinal Study of 1,391 participants, National Institute on Disability and Rehabilitation Research, Department of Education, \$449,990, 12/01/05-11/30/08.
10. **Webb, K. (Principal Investigator)** Development of cyanoacrylate/polyethylene glycol diacrylate blends as internal tissue adhesives, Spartan Medical, \$100,000, 9/1/05-9/1/06.

Non-Spinal Cord Related grants (Funds from SCSCIRF helped obtain these funds)

11. **Ray, S.K. (Principal Investigator)** Proteolytic Control of Glioblastoma R01 (CA-91460), National Cancer Institute of the National Institutes of Health Award Period, 2003-2008.
12. **Gao, B.Z. (Principal Investigator)** A Novel Laser Diagnostic System for Early Detection of Cancer Cells, the Oak Ridge Associated Universities (ORAU), \$10,000, 06/04 – 11/05.
13. **Gao, B.Z. (Co-Investigator)** 3-D Test Systems: New Tools for Unlocking the Mysteries of Breast Cancer, Department of Defense, \$200,000, 01/01/2005 - 12/31/2009.
14. **Gao, B.Z. (Principal Investigator)** Laser Cell Micropatterning to Study Electrical Coupling between Cardiac Fibroblasts and Myocytes, American Heart Association, \$120,000, 07/01/2005 - 06/30/2007.

Grants Submitted: Not funded/Pending

Grants Submitted

Spinal cord related grants

- 1) **Banik, N.L. (Principal Investigator) & Ray, S.K. (Co-Principal Investigator)** Involvement of spinal cord in MPTP-induced parkinsonism, National Institutes of Health, 2005-2007.
- 2) **Barbosa, E. (Principal Investigator)** Atorvastatin enhances Neuronal Regeneration and Remyelination following Spinal Cord Injury. National Institutes of Health, 2005-2009.
- 3) **Gao, B.Z. (Principal Investigator)** Laser Cell Micropatterning to Study the Formation of a Neuronal Circuit on MEA, NSF-CAREER, \$459,943, 02/01/06 - 01/31/11.
- 4) **Gao, B.Z. (Principal Investigator)** Nanosensors for Feedback Control of Micropatterned Neuromuscular Junctions, NSF-NER, \$160,000.
- 5) **Gao, B.Z. (Principal Investigator)** Development of a Laser Cell Micropatterning Microscope Based on Optical Force, NSF-MIR, \$321,497.

- 6) **Gao, B.Z. (Principal Investigator)** Laser Patterned Hybrid Interface for in vitro 3D Neuronal Network Construction, DoD-SCEPSCoR, \$750,000.
- 7) **Kindy, M.S. (Principal Investigator)** In Vitro Model of the Reflex Arc for ALS, Bioengineering Research Partnership at NIBIB and NINDS, NIH, \$250,000/year, 7/1/06-6/30/11.
- 8) **Krause, J.S. (Principal Investigator)** Rehabilitation Research and Training Center on Psychological Aspects of Aging with a Disability, United States Department of Education, \$3,612,163, 10/1/03-09/30/08.
- 9) **Krause, J.S. (Principal Investigator)** Risk for Adverse Health Outcomes After Spinal Cord Injury: A Longitudinal Study of 1,391 Participants, United States Dept. of Education, \$308,217, 8/1/04-7/31/09.
- 10) **Krause, J.S. (Principal Investigator)** Personality, Behavior, and Coping After Spinal Cord Injury, National Institutes of Health, \$1,250,000, 8/1/04-7/31/09.
- 11) **Krause, J.S. (Principal Investigator)** Risk of Adverse Outcomes After Spinal Cord Injury: A Longitudinal Study, National Institutes of Health, \$1,900,484, 1/1/05-12/31/09.
- 12) **Krause, J.S. (Principal Investigator)** Participation, Subjective Well-being, Health, and Spinal Cord Injury: A 33-year Longitudinal Study, United States Department of Education, \$449,989, 10/1/05-9/30/08.
- 13) **Krause, J.S. (Principal Investigator)** Disparities in Earnings from Gainful Employment After Spinal Cord Injury: Environmental Factors and Job Accommodations, National Institutes of Health, \$2,967,312, 1/1/06-12/31/10.
- 14) **Krause, J.S. (Principal Investigator)** Early Risk for Mortality After Spinal Cord Injury, National Institutes of Health, \$2,967,312, 1/1/06-12/31/10.
- 15) **Krause, J.S. (Principal Investigator)** Early Risk for Mortality After Spinal Cord Injury, National Institute of Health, \$2,666,994, 10/1/06-9/30/11.
- 16) **Ray, S.K. (Principal Investigator)** Cell Death Mechanisms and Therapeutic Strategies in SCI R21, National Institutes of Health, 2005-2007.
- 17) **Ray, S.K. (Principal Investigator)** Photodynamic therapy (PDT) and paclitaxel nanotechnology (PNT) for treating brain tumor, NASA EPSCoR Partnership Program 2005-2006.
- 18) **Varma, A. (Principal Investigator) & Ray, S.K. (Co-Principal Investigator)** Melatonin as a Therapy for Spinal Cord Injury, South Carolina Spinal Cord Injury Research Foundation (SCIRF-0905), 2006-2008.
- 19) **Webb, K. (Principal Investigator)** Scaffold-derived spatio-temporal signals for stem cell recruitment and differentiation, DARPA, \$1,425,000, 2005-2007. (Declined)
- 20) **Webb, K. (Principal Investigator)** Biomaterials for guided neural regeneration, NIH COBRE. \$400,000, 2006-2008. (Declined)
- 21) **Webb, K. (Principal Investigator)** Topographic fibers as templates for tissue regeneration, National Textile Council, \$300,000, 2005-2008.
- 22) **Webb, K. (Principal Investigator)** Molecular gradients for directing axonal regeneration, NIH R21 (NINDS), \$250,000, 2006-2007.
- 23) **Webb, K. (Principal Investigator)** Engineering regeneration through the distal bridge / host interface, Christopher Reeve Paralysis Foundation, \$148,324, 2004-2006. (Declined)

- 24) **Webb, K. (Principal Investigator)** Engineering regeneration through the bridge / host interface, Paralysis Project of America, \$50,000, 2004-2005. (Declined)
- 25) **Webb, K. (Principal Investigator)** Topographic fibers as templates for tissue organization, National Textile Council, \$300,000, 2004-2007. (Declined)
- 26) **Wilson, L.B. (Principal Investigator)** Influence of Inflammation and Gender on Reflex Control of the Circulation, American Heart Association—Mid Atlantic, \$120,000.
- 27) **Wilson, L.B. (Principal Investigator)** Influence of Inflammation and Gender on Reflex Control of the Circulation, National Science Foundation, \$350,000.

Non-spinal cord related grants

- 28) **Gao, B.Z. (Principal Investigator)** Laser Micropatterning of Adult Stem Cells and Cardiomyocytes, NIH-COBRE, \$150,000/yr, 01/01/06 – 12/31/10.
- 29) **Gao, B.Z. (Principal Investigator)** Myocyte Hypertrophic Response to Mechanical Force Generated by Fibroblast, American Heart Association, \$264,000, 01/01/2006 - 12/31/2009.
- 30) **Gao, B.Z. (Principal Investigator)** Laser Micropatterning to Study Cardiac Scar Formation, NIH R21, \$125,000/yr.
- 31) **Gao, B.Z. (Principal Investigator)** Development of a Laser Cell Deposition Microscope for Cancer Immunotherapy Studies, Coulter Foundation, \$240,0

Publications

- 1) Bakken, D., Burg, K, Narasimhan, S., & **Gao, BZ.** Laser Micropatterning of Polylactide Microspheres into Neuronal-Glial Coculture for the Study of Axonal Regeneration. *Macromolecular Symposia* 2005; 227:335-344.
- 2) **Barbosa.** Attenuation of Acute Inflammatory Response by Atorvastatin after Spinal Cord Injury. *J. Neurosci Res.* 2005; 79:340-350.
- 3) Bombardier CH, Richards JS, **Krause JS**, Tulskey D, Tate DG. Symptoms of major depression in people with spinal cord injury: Implications for screening. *Archives of Physical Medicine and Rehabilitation.* 2004;85:1749-1756.
- 4) Broderick LE. & **Krause JS.** Breast and gynecologic screening behaviors among 191 women with spinal cord injuries. *Journal of Spinal Cord Medicine.* 2003;26 (2):145-9.
- 5) Chera B, Schaecher KE, Rocchini A, Imam SZ, Sribnick EA, **Ray SK**, Ali SF, and Banik NL Immunofluorescent labeling of increased calpain expression and neuronal death in the spinal cord of 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP)-treated mice. *Brain Res.* 2004;1006: 150-156.
- 6) Das A, Wingrave JM, Del Re AM, Woodward JJ, Appel SH, Banik NL, and **Ray SK.** Calpain activation in apoptosis of ventral spinal cord 4.1 (VSC4.1) motoneurons exposed to glutamate: Calpain inhibition provided functional neuroprotection. *J. Neurosci. Res.* 2005;81:551-562.
- 7) Das A, Banik NL, Patel SJ, **Ray SK.** Dexamethasone protected human glioblastoma U87MG cells from temozolomide induced apoptosis by maintaining Bax:Bcl-2 ratio and preventing proteolytic activities. *Mol. Cancer.* 2004;3(36):1-10.

- 8) Guo G & **Bhat NR.** Glutamate release and hypoxia-induced motor neuron cell death. *J. Neurochem.* 2004;90 (Suppl 1):14.
- 9) Guo, G & **Bhat, NR.** Role of MAPK in hypoxia-induced motoneuron cell death. p.38
- 10) Guyton MK, Wingrave JM, Wilford GG, Sribnick EA, Matzelle DC, Tyor WR, **Ray SK**, and Banik NL. Upregulation of calpain correlated with increased neurodegeneration in acute experimental allergic encephalomyelitis. *J. Neurosci. Res.* 2005;81:53-61.
- 11) Guyton MK, Sribnick EA, Wingrave JM, **Ray SK**, & Banik NL. Axonal damage and neuron death in MS and EAE: The role of calpain. In: Waxman SG, ed. *Multiple Sclerosis as a Neuronal Disease.* New York, NY: Elsevier Academic Press; 2005:293-303.
- 12) Guyton MK, Sribnick EA, **Ray SK**, Banik NL. A role for calpain in Lewis rat model of optic neuritis. *Ann. N. Y. Acad. Sci.* 2005;(In press).
- 13) Kemp BJ, Kahan JS, **Krause JS**, Adkins RH, & Nava G. Treatment of major depression in individuals with spinal cord injury. *Journal of Spinal Cord Medicine.* 2004;27:22-28.
- 14) **Krause J S** & Broderick, LE. Outcomes after spinal cord injury: Comparisons as a function of gender and race ethnicity. *Archives of Physical Medicine and Rehabilitation.* 2004; 85:355-362.
- 15) **Krause JS.** Return to employment after spinal cord injury. *Archives of Physical Medicine and Rehabilitation.* 2003; 84(9):1282-1289.
- 16) **Krause JS.**, Broderick, LE, & Broyles J. Subjective Well-Being Among African-Americans with Spinal Cord Injury: An Exploratory Study Between Men and Women. *Neurorehabilitation.* 2004; 19: 81-89.
- 17) **Krause JS.** & Broderick LE. Recurrent pressure ulcers after spinal cord injury: Identification of risk and protective factors. *Archives of Physical Medicine and Rehabilitation.* 2004;85(8):1257-1264.
- 18) **Krause JS.** Factors associated with risk for subsequent injuries after the onset of traumatic spinal cord injury. *Archives of Physical Medicine and Rehabilitation.* 2004;85(9): 1503 – 1508.
- 19) **Krause JS.**, DeVivo, MJ, & Jackson AB. Risk factors for mortality after spinal cord injury. *Archives of Physical Medicine and Rehabilitation.* 2004;85:1764-1773.
- 20) **Krause, JS.**, & Broderick LE. A 25-year longitudinal study of the natural course of aging after spinal cord injury. *Spinal Cord*, in press.
- 21) **Krause, JS.** & Broderick, LE. Relationship of personality and locus of control with employment outcomes among participants with spinal cord injury. *Rehabilitation Counseling Bulletin*, in press.
- 22) **Krause JS.**, Broderick LE, Saladin L, & Broyles J. Gender and racial disparities in health outcomes after spinal cord injury. *Spinal Cord Medicine*, in press.
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Manuscripts (Under review – In preparation)

- 1) **Barbosa, E**. HMG-CoA Reductase Inhibitor protects against Endothelial Dysfunction and Inflammatory Disease in a Rat Model of Spinal Cord Injury. In preparation.
- 2) Brewer KL, Nolan T, Saurin J, **McGinty JF**. Effects of excitotoxic spinal cord injury on genes of oxidative phosphorylation in the anterior cingulate cortex.
- 3) **Brotherton SS, Krause JS**, Nietert PJ. Falls in individuals with incomplete spinal cord injury. *Spinal Cord*. 2005 (submitted manuscript)
- 4) **Brotherton SS, Krause JS**, Nietert PJ. Risk Factors for falls in individuals with incomplete spinal cord injury. *Spinal Cord Med*.
- 5) Cribb, RC and **Webb K**. Expression and Characterization of a 140 KDa physiological fragment of the human L1 neural cell adhesion molecule extracellular domain in baculovirus. In preparation for submission to *Protein Expression and Purification*.
- 6) Datar K, Cho EH, Lee JS, Vyavahare NR, **Webb K**. Degradable coatings for controlled release from polymer fibers. In preparation for submission to *Journal of Controlled Release*.
- 7) Dean D, Ma W, **Kindy MS**, Dooley L, **Gao BZ**. Cord Blood Stem Cell Differentiation into Nerve Cells under Microfabricated Environment. To be submitted to *SPIE Proceedings 2005*
- 8) Dean D, Ma W, **Kindy MS**, Dooley L, **Gao BZ**. Mechanical Factors Affecting Cord Blood Stem Cell Differentiation. To be submitted to *ASME: Journal of Biomechanical Engineering 2006*.
- 9) Fulk LJ, Stewart MC, Hand GA, Durstine JL, Carson JA, and **Wilson LB**. Sex differences in reflex cardiovascular responses to nociceptive stimulation in decerebrate guinea pigs. Submitted to *AJP*.
- 10) Fulk LJ, Hand GA, Durstine JL, Carson JA, **Wilson LB**. Sex differences in the upregulation of the nociceptive pressor reflex following tissue inflammation in decerebrate guinea pigs. In Preparation.
- 11) G. Guo, **N. R. Bhat**. Role of MAPK in hypoxia-induced motoneuron cell death. p.38.
- 12) **Morrisette DC**, Richards JS, **Krause J**, Coker J. Nietert P. Prevalence of Upper Quarter Pain in Individuals with Chronic SCI.

- 13) **Morrisette DC**, Richards JS, **Krause J**. Inter-rater Reliability and Agreement for Classification of Pain Types in Individuals with Chronic SCI.
- 14) Nicholas JS, **Selassie AW**, **Pickelsimer**, Yallapragada A, Haines S. Administration of Methylprednisolone for Spinal Cord Injury in South Carolina Acute Care Hospitals. Scheduled for submission in Dec 2005.
- 15) **Pickelsimer EE**, Gabella BA, Wilson DA, **Selassie AW**, DeVivo MJ. Differences in occurrence, probability of dying, and causes of death of South Carolina and Colorado residents with traumatic spinal cord injury.
- 16) Pirlo RK, **Gao BZ**. Automatic Laser Cell Micropatterning System. To be submitted to IEEE Journal of Biomedical Engineering 2006
- 17) **Ray SK**, Karmakar S, Nowak MW, and Banik NL. Inhibitors of calpain and caspase-3 prevented apoptosis and preserved electrophysiological properties of voltage-gated and ligand-gated ion channels in rat primary cortical neurons exposed to glutamate. Neuroscience (Under revision). 2005.
- 18) **Selassie AW**, **Pickelsimer EE**, Lineberry LA, Nicholas J, Veldheer, L. Epidemiology of Traumatic Spinal Cord Injury in South Carolina, 1981-2003. JSCMA February 2006.
- 19) **Selassie AW**, **Pickelsimer E**, Nicholas J, Lineberry L., Gu J. Functional Outcomes of TSCI one year after discharge from acute care facilities. To be submitted to the Journal of Trauma by April 2006.
- 20) **Selassie AW**, **Pickelsimer E**, Nicholas J, Lineberry L, Gu J. Psychosocial Outcomes of TSCI one year after discharge from acute care facilities. To be submitted to the Journal Spinal Cord by June 2006.
- 21) Sribnick EA, Matzelle DD, **Ray SK**, and Banik NL. Estrogen treatment of spinal cord injury attenuates calpain activation and apoptosis. (Submitted to J. Pharmacol. Exp. Therap.).2005.
- 22) Sribnick EA, Delre AM, **Ray SK**, and Banik NL. Estrogen attenuates glutamate-induced cell death by inhibiting Ca²⁺ influx through L-type voltage-gated Ca²⁺ channels. (Submitted to Eur. J. Neurosci.). 2005.
- 23) Stewart MC, Fulk LJ, **Wilson LB**. Afferent pathways and central nervous system sites involved in the nociceptive pressor reflex evoked by heat. In Preparation
- 24) Sweeney AJ, Pirlo RK, Ma W, and **Gao BZ**. Neurite Outgrowth Stimulated by the NGF Encapsulated in Biodegradable Microspheres. To be submitted to Acta Biomaterialia
- 25) Vyavahare NR, Lu Q, **Webb K**. Micro-grooved fibers as scaffold in tissue engineering. U. S. Patent Application.
- 26) **Webb K**, Vyavahare NR. Hydrogels with variable degradation rates. U. S. Patent Application.

Invited Talks and Presentations

- 1) **Barbosa E**. Attenuation of Acute Inflammatory Response by Atorvastatin after Spinal Cord Injury. Presented at the annual meeting of the American Society of Neurochemistry, August 14, 2004.
- 2) **Barbosa E**. HMG-CoA Reductase Inhibitor protects against Endothelial Dysfunction and Inflammatory Disease in a Rat Model of Spinal Cord Injury. To be presented at the annual meeting of the Society for Neuroscience, November 12, 2005.
- 3) **Brotherton SS**, Nietert PJ. Falls among individuals with incomplete spinal cord injury. Platform presentation at: South Carolina Spinal Cord Injury Research Fund Scientific Conference; Charleston, SC, May 2005.

- 4) **Brotherton SS, Krause JS, Nietert PJ.** Risk factors for falls among individuals with incomplete spinal cord injury. Abstract submitted to the APTA Combined Sections Meeting; San Diego, CA, February 2006.
- 5) **Brotherton SS, Krause JS, Nietert PJ.** Falls among individuals with incomplete spinal cord injury Abstract submitted to the APTA Combined Sections Meeting; San Diego, CA, February 2006.
- 6) **Cribb RC, Lee JS, and Webb K.** Cloning and expression of bioactive recombinant L1 neural cell adhesion molecule (submitted Regenerate World Tissue Engineering Congress 2006).
- 7) **Datar K, Lee JS, Vyavahare NR, Webb K.** Controlled release hydrogel coatings on deep groove polymer fibers for spinal cord regeneration. Society for Biomaterials; Memphis, TN, 2005.
- 8) **Gao BZ.** Automation of laser micro cell patterning. Presented at The First US National Symposium on Frontiers in Biomechanics Forging a New Biomechanics in the Era of Modern Biology; Nashville, TN, September 30 – October 1, 2003.
- 9) **Gao BZ.** Mechanical interactions between cardiac myocytes, cardiac fibroblasts and extracellular matrix. Presented at the First US National Symposium on Frontiers in Biomechanics Forging a New Biomechanics in the Era of Modern Biology; Nashville, TN, September 30 – October 1, 2003.
- 10) **Gao BZ.** Generalized analysis and design of radiation force-based systems (optical trapping, laser guidance). Presented at the Annual fall meeting of the Biomedical Engineering Society; Nashville, TN, October 1-4, 2003.
- 11) **Gao BZ.** Laser Cell Guidance of Embryonic Chick Forebrain Neuronal Cell for Study of Spinal Cord Microenvironments. Presented at the Fifth Frontiers in Neuroscience Research Day, Charleston, SC; March 19, 2004.
- 12) **Gao BZ.** Multiple beam system for single cell patterning. Presented at the Fifth Frontiers in Neuroscience Research Day; Charleston, SC, March 19, 2004.
- 13) **Gao BZ.** Multiple beam laser cell micropatterning system. Presented at the International Symposium on Optical Science and Technology (SPIE 49th Annual Meeting); Denver, Colorado, August 2-6, 2004.
- 14) **Gao BZ.** Laser Micropatterning of Polylactide Microspheres into Neuronal-Glial Coculture to Quantitatively Study Axonal Regeneration. Presented at the 2004 Polymer Networks Conference; Bethesda, MD, August 15-19, 2004.
- 15) **Gao BZ.** Investigation of Axonal Regeneration Using Laser Cell Micropatterning. Presented at the Society for Biomaterials' Symposium on Biomaterials in Regenerative Medicine: The Advent of Combination Products; Philadelphia, PA, October 16 - 18, 2004.
- 16) **Gao BZ.** Laser Cell Micropatterning to Engineer Microenvironments for Cardiomyocyte-Fibroblast Interactions. Presented at the 2004 BMES Annual Fall Meeting; Philadelphia, PA, October 13-16, 2004.
- 17) **Gao BZ.** Electrical Coupling between Laser Patterned Fibroblasts and Myocytes. Presented at the 2nd International Workshop on Bioprinting, Biopatterning and Bioassembly; Charleston, SC, Mach 13-15, 2005.
- 18) **Gao BZ** Laser Cell Micropatterning System. Presented at the 2nd International Workshop on Bioprinting, Biopatterning and Bioassembly; Charleston, SC, Mach 13-15, 2005.
- 19) **Gao BZ.** Release of Nerve Growth Factor from Polylactide-co-glycolide Microspheres for use in Laser Micropatterning. Presented at the 6th Annual Frontiers in Neuroscience Research Day – Neuromics: From Genomics to Metabolomics; Charleston, SC, March 18, 2005.

- 20) **Gao BZ.** Analysis of Neurite Outgrowth for a Laser Patterned Neuronal Culture. Presented at the 2nd International IEEE EMBS Conference on Neural Engineering; Washington D.C., March 16-19 2005.
- 21) **Gao, BZ.** Mechanical Interactions between Myocytes and Fibroblasts at the Single Cell Level. Presented at the Society For Biomaterials 30th Annual Meeting; Memphis, TN, April 27-30 2005.
- 22) **Gao, BZ** Axon Guided by the Release of Neuron Growth Factor from Polylactide-co-glycolide Microspheres. Presented at the Society For Biomaterials 30th Annual Meeting; Memphis, TN, April 27-30 2005.
- 23) **Gao, BZ** Electrical Coupling of Myocyte and fibroblast on various ECMs. Presented at the Society For Biomaterials 30th Annual Meeting; Memphis, TN, April 27-30 2005.
- 24) **Gao, BZ** Multielectrode Arrays Surface Characterization and Modification for Neuronal Cell Adhesive and recording. Presented at the Society For Biomaterials 30th Annual Meeting; Memphis, TN, April 27-30, 2005.
- 25) **Gao, BZ** Motor Units Created on a Homogenous Coated Biosurface. Presented at the Society For Biomaterials 30th Annual Meeting; Memphis, TN, April 27-30, 2005.
- 26) **Gao BZ.** Cell Diagnosis Based on Optical Forces. Presented at the International Society for Optical Engineering Annual Meeting; San Diego, CA, July 31-August 4, 2005
- 27) **Gao BZ.** Mechanical Interactions between Myocytes and Fibroblasts at the Single Cell Level. To be presented at the Biomedical Engineering Society's 2005 Annual Meeting; Baltimore, MD, September 28 - October 1, 2005.
- 28) **Gao BZ.** Laser Cell Micropatterning for the Formation of Neuromuscular Junctions on an MEA. To be presented at the Biomedical Engineering Society's 2005 Annual Meeting; Baltimore, MD, September 28 - October 1, 2005.
- 29) **Gao BZ.** Effects of Nerve Growth Factor Release from a Single PLGA Microsphere on Individual Neurons. To be presented at the Biomedical Engineering Society's 2005 Annual Meeting; Baltimore, MD, September 28 - October 1, 2005.
- 30) **Gao BZ.** Automated Laser Patterning of Neurons into Isolated Microenvironments on an MEA. To be presented at the Biomedical Engineering Society's 2005 Annual Meeting; Baltimore, MD, September 28 - October 1, 2005.
- 31) **Gao BZ.** Fibroblast-Myocyte Electrical Coupling in a Micropatterned Cell Coculture. To be presented at the Biomedical Engineering Society's 2005 Annual Meeting; Baltimore, MD, September 28 - October 1, 2005.
- 32) **Krause JS.** Vocational interests of persons with recent spinal cord injuries. (co-presenter: Broderick, L.E.) Presented at the annual conference of the American Association of Spinal Cord Injury Psychologists and Social Workers; Las Vegas, NV, September 2003.
- 33) **Krause JS.** Pressure ulcer history and spinal cord injury. Presented at the annual conference of the American Congress of Rehabilitation Medicine; Tucson, Arizona, October 2003.
- 34) **Krause JS.** The use of longitudinal design in spinal cord injury research. Pre-conference course to be presented at the annual conference of the American Spinal Injury Association; Denver, CO, May 2004.
- 35) **Krause JS.** Risk Factors for Mortality After SCI. (co-presenters: DeVivo, M.J, Jackson, A.) Presented at the annual conference of the American Spinal Injury Association; Denver, CO, May 2004.
- 36) **Krause JS.** Patterns of alcohol and substance use/abuse with SCI: Risk factors and correlates. (presented by: Tate, D. G.; co-presenters: Forchheimer, M., Meade, M. & Bombardier, C.) Presented at the annual

conference of the American Spinal Injury Association; Denver, CO, May 2004.

- 37) **Krause JS.** The frequency, phenomenology and correlates of probable major depression one year after spinal cord injury. (presented by: Bombardier, C. H.; co-presenters: Richard, J. S., S., Tulsy, D., Tate, D. G.) Presented at the annual conference of the American Spinal Injury Association; Denver, CO, May 2004.
- 38) **Krause JS.** Maintenance of healthy affect and avoidance of depression after spinal cord injury. (presented by: Coker, J.; co-presenter: Broderick, L.) Presented at the annual conference of the American Association of Spinal Cord Injury Psychologists and Social Workers; Las Vegas, NV, September 2004.
- 39) **Krause JS.** Preinjury Alcohol Use, Intoxication at Injury, and Personality Among Persons With SCI. (presented by: Coker, J.; co-presenter: Broderick, L.) Presented at the annual conference of the American Association of Spinal Cord Injury Psychologists and Social Workers; Las Vegas, NV, September 2004.
- 40) **Krause JS.** Spiritual Coping: Differences between Caucasians and African Americans with spinal cord injuries. (presented by: Coker, J.; co-presenter: Broderick, L.) Presented at the annual conference of the American Association of Spinal Cord Injury Psychologists and Social Workers; Las Vegas, NV, September 2004.
- 41) **Krause JS.** Factors associated with earnings from gainful employment after spinal cord injury. (presented by: Coker, J.; co-presenter: Broderick, L.) Presented at the annual conference of the American Association of Spinal Cord Injury Psychologists and Social Workers; Las Vegas, NV, September 2004.
- 42) **Krause JS.** Risk factors for mortality after spinal cord injury. (Presented by: Pickelsimer, E.; co-presenters: DeVivo, M., Jackson, A., Broderick, L.) Presented at the annual conference of the American Congress of Rehabilitation Medicine; Ponte Vedre Beach, FL, September 2004.
- 43) **Krause JS.** Health Status, community integration and economic risk factors for mortality after spinal cord injury. (presented by: DeVivo, M. J.; co-presenter: Jackson, A.) Presented at the annual conference of the International Spinal Cord Society; Athens, Greece, September 2004.
- 44) **Krause JS.** Spiritual coping: Differences between Caucasians and African Americans with SCI. (Presented by: Broderick, L.) Presented at the annual conference of the American Public Health Association; Washington, DC, November 2004.
- 45) **Krause JS.** Maintenance of healthy affect and avoidance of depression after spinal cord injury. (Presented by: Broderick, L.; co-presenters: Kemp, B, Coker, J.) Presented at the annual conference of the American Public Health Association; Washington, DC, November 2004.
- 46) **Krause JS.** Spiritual coping: Differences between Caucasians and African Americans with SCI. (Presented by: Broderick, L.) Presented at the annual conference of the American Spinal Injury Association; Dallas, TX, May 2005.
- 47) **Krause JS.** Vocational Interests among participants with spinal cord injury. (co-presenter Broderick, L.) To be presented at the annual conference of the American Psychological Association; Washington, DC, August 2005.
- 48) **Krause JS.** A 30-year longitudinal study of outcomes after spinal cord injury. To be presented at the annual conference of the American Congress of Rehabilitation Medicine; Chicago, IL, September 28-October 1, 2005.
- 49) **Krause JS.** Depressive symptoms during inpatient rehabilitation for spinal cord injury. To be presented at the annual conference of the American Congress of Rehabilitation Medicine; Chicago, IL, September 28-October 1, 2005.

- 50) **Krause JS.** A 30-year longitudinal study of outcomes after spinal cord injury. (co-presenter, Broderick, L.) To be presented at the annual conference of the American Public Health Association; New Orleans, LA, November 5-9, 2005.
- 51) **Krause JS.** Depressive symptoms during inpatient rehabilitation for spinal cord injury. (co-presenter, Broderick, L.) To be presented at the annual conference of the American Public Health Association; New Orleans, LA, November 5-9, 2005.
- 52) Kuty JK, Reifsnider C, Lu Q, Vyavahare NR, **Webb K.** Synthesis and characterization of composite hydrogels for vocal fold applications. Society for Biomaterials; Memphis, TN, 2005.
- 53) **McGinty JF.** Gene Expression Profiling of CNS Regions Implicated in a Mouse Model of Spinal Cord Injury-Induced Pain. Presented at the South Carolina Spinal Cord Injury Research Fund Scientific Conference, Medical University of South Carolina; Charleston SC, May 13th, 2005,
- 54) **Middaugh SJ.** Thomas KJ, Klingmueller J, Smith AR, McFall TL, Gilbert SP, and Bailey JA. Assessment and treatment of musculoskeletal pain in the neck and shoulder in manual wheelchair users with spinal cord injury. First Annual South Carolina Spinal Cord Injury Research Conference; Charleston, SC, May, 2005 (Platform Presentation).
- 55) **Middaugh SJ, Thomas KJ,** Klingmueller J, Smith AR, McFall TL, Gilbert SP, and Bailey JA. Treatment of musculoskeletal pain in the neck and shoulder in manual wheelchair users with spinal cord injury. Association for Applied Psychophysiology and Biofeedback 35th Annual Meeting; Colorado Springs, Colorado, 2004 (Poster presentation). Prevalence of Upper Quarter Pain in Individuals with Chronic SCI. Presented at the annual meeting of the South Carolina Spinal Cord Injury Research Fund; Charleston, SC., May 13, 2005
- 56) **Pickelsimer EE,** Gabella BA, Wilson DA, **Selassie AW,** DeVivo MJ. Determination of occurrence and causes of death within five years of injury among South Carolina and Colorado residents with traumatic spinal cord injury. American Congress of Rehabilitation Medicine Annual Conference; Chicago, September 28-October 3, 2005.
- 57) **Pickelsimer EE.** Occurrence and causes of death of persons with traumatic spinal cord injury. South Carolina Spinal Cord Injury Annual Conference; Columbia, SC, May 12, 2005.
- 58) **Pickelsimer EE,** Wilson DA. Occurrence and causes of death of persons with traumatic spinal cord injury. South Carolina Spinal Cord Injury Research Fund Scientific Meeting; Charleston, SC, May 13, 2005.
- 59) **Pickelsimer EE,** Gabella BA, Wilson DA, **Selassie AW,** DeVivo MJ. Occurrence, causes of death, and probability of dying within five years of injury among South Carolina residents with traumatic spinal cord injury. 8th World Conference on Injury Prevention and Safety Promotion; Durban, South Africa, April 2-5, 2006. (accepted)
- 60) **Ray SK.** Experimental Therapeutics for Activation of Apoptosis in Glioblastoma, MCBP External Seminar Series, Medical University of South Carolina; Charleston, SC, October 23, 2003.
- 61) **Ray SK.** Glioblastoma – an update from the AACR 2004 meeting’, Neurology, Medical University of South Carolina; Charleston, SC, May 12, 2004.
- 62) **Ray SK.** Dexamethasone damages chemotherapeutic action of temozolomide in glioblastoma’, Department of Neurosciences, Medical University of South Carolina; Charleston, SC, February 8, 2005.
- 63) **Ray, SK.** Therapeutic Effects of Estrogen in Spinal Cord Injury’, SC Spinal Cord Injury Research Foundation (SCIRF) Conference; May 13, 2005.

- 64) Sinclair K, Brown PJ, and **Webb K**. Capillary channel polymer fibers as structural templates for ligament reconstruction. (submitted Regenerate World Tissue Engineering Congress 2006).
- 65) **Webb, K**. Deep groove fiber applications in axonal regeneration. 56th Southeastern Regional Meeting of the American Chemical Society; November 2004.
- 66) Wilson DA, **Pickelsimer EE, Selassie AW**. Mortality within five years after traumatic spinal cord injury. American College of Epidemiology; New Orleans, LA, Sept 17-20, 2005. (Note: This presentation has been cancelled due to Hurricane Katrina's destruction in New Orleans.)
- 67) **Wilson LB**. Poster presentation at 2004 Experimental Biology Meeting in Washington, D.C.: Effect of gender on reflex cardiovascular responses to heat stimulation in decerebrate Guinea Pigs.
- 68) **Wilson LB**. Role of spinal ionotropic excitatory amino acid receptors in the nociceptive pressor reflex evoked by noxious heat (poster presentation). International Congress of Physiological Sciences Meeting; San Diego, CA, 2005.
- 69) **Wilson LB**. Afferent neural pathways and central nervous system sites involved in the nociceptive pressor reflex (poster presentation). International Congress of Physiological Sciences Meeting; San Diego, CA, 2005.

Dissemination to SCI Consumers, Providers, and Researchers

- **Website and periodic newsletter:** The **SC Spinal Cord Injury Association** maintains a very informative web-site (www.scscia.org) that includes contact/program information about the Association as well as new legislation that may or may not help the physically challenged and resource information about spinal cord injury.
- **Website:** **Disabilities Resource Center's** website is open to people with SCI to gain access to all DRC programs including this project.
- **Newsletter:** **SCSCIA** Quarterly news letter that the association publishes this news letter includes new updates on spinal cord injury research, a legal column, updates from the association from the Executive Director and the Board of Directors.
- **Consumer Oriented Conferences** by the **SCSCIA:**

The First Statewide Conference for people with Spinal Cord Injury and their "Circle of Friends" met at the Sheridan Convention Center on May 1, 2003 in Columbia, SC. It was indeed a historic occasion with 160 participants, 15 exhibitors and representatives from agencies and providers of SCI services throughout the state. The highlights of the conference were the enthusiastic individuals with spinal cord injury that "soaked up" invaluable information that educated and empowered them to "Take Charge of Their Own Lives". A diverse group of individuals interested in learning about staying healthy and about prevention and methods of improving their lives was enthusiastically supported by the participants. Future plans were made for a second conference in May 2005 which would concentrate n Spinal Cord Injury Health Care and Research issues that are helping in improving the quality of life for the SCI.

The Second Statewide Conference was held on May 12, 2005 at the Columbia Hotel and Conference Center with a title of “Experience The Power: A One Day Conference For People With SCI”. There were 279 registrants, 29 vendors & exhibitors, and a succession of excellent presentations including :

- ~ Optimism in SCI Research: Progress of New Treatments
- ~ Nuts and Bolts of Wheelchair Selection and Seating
- ~ Getting What You Need Through Effective Advocacy
- ~ News You Can Use: Update on Preventive Medical and Management of Common Complications After SCI
- ~ Ask The Experts Panel Session
- ~ SCIRF Fund Abstract Presentations

In addition to exhibit handout materials and a notebook with extensive resource information relative to all Conference subject matter, several publications were available including the “Paralysis Resource Guide” of the Christopher & Dana Reeve Paralysis Resourced Center; the “Exercise Guide for Individuals with SCI” published by the Rehabilitation Institute of Chicago; and the “Directors Summary 2003—2004” of the Miami Project To Cure Paralysis which highlighted research entitled “Axons Cross Spinal Cord Graft in Breakthrough Study”.

- **Scientific Conference by the S. C. Spinal Cord Injury Research Fund :**

The Fund’s first annual scientific conference was held May 13, 2005 in the Storm Eye Institute of the Medical University of South Carolina-- attended by approximately 100 scientists and clinicians from throughout South Carolina. Dr. Cuddy, as Fund Board Chair, provided opening remarks covering the Fund’s history to date, followed by Fund Scientific Director, Dr. Krause, giving an overview of the scientific accomplishments and future directions.

James Shepherd, chairman of the Board of Directors of the Shepherd Center in Atlanta GA, made the first formal presentation of the day, describing how his own spinal cord injury led to the development of the Shepherd Center, the leading specialty hospital in the treatment of SCI in the country and perhaps the world. A morning keynote address was then delivered by Dr. Barth Green of the Miami project who discussed the history and current status of research to enhance function after SCI. The morning session concluded with five Principle Investigators of Fund projects from the first two funding rounds presenting their work which focused on clinical and applied research.

Dr. Scott Whittemore, Director of the Kentucky Spinal Cord Injury Research Center and the University of Louisville, gave the afternoon keynote highlighting the status of his research which focused on restoring function after SCI. This was followed by Dr. Mark Kindy, Associate Scientific Director, updating on the “Current Status of Spinal Cord Injury Research. The conference closed with five Principle Investigators of Fund projects from the first two funding rounds presenting their work which focused on basic science research.

The Fund looks forward to annual research conferences as a means of building collaborations that are critical to the success of future research endeavors and disseminating knowledge from projects though that have been conducted in the state of South Carolina from around the nation.

APPENDIX 1—DETAILED BOARD INFO

~ 2 MEDICAL DOCTORS FROM THE STAFF OR FACULTY OF THE MEDICAL UNIVERSITY OF SOUTH CAROLINA (both initially appointed for 2 year terms, subsequently 4 year terms).

- * **Phanor L. Perot, Jr, M.D., PhD.**, Charleston, SC—Board Certified in Neurological Surgery and Professor Emeritus of Neurosurgery and past Department Chairman. *{initial 2 year term expired 2003, 1st 4 yr. term Expires 2007}*
- * **David A. Griesemer, M.D.**, Charleston, SC—Board Certified in Child Neurology, Director of Pediatric Neurosciences, and Professor of Neuroscience and Pediatrics. *{initial 2 year term expired 2003, 1st 4 yr. term Expires 2007}*

~ 2 MEDICAL DOCTORS SPECIALIZING OR SIGNIFICANTLY ENGAGED IN THE TREATMENT OF SPINAL CORD INJURIES IN SOUTH CAROLINA (both appointed for 4 year terms).

- * **David L. Shallcross, M.D.**, Greenville, SC—Board Certified in Physical Medicine and Rehabilitation and conducts a private practice, Upstate Medical Rehabilitation, as well as serves as Medical Director of the inpatient rehabilitation unit at BonSecours St. Francis Health System in Greenville. *{1st 4 yr. term Expired 2005, reappointed through 2009}*
- * **W. Daniel Westerkam, M. D.**, Columbia, SC--specialist in Physical Medicine and Rehabilitation who is Director of Rehabilitative Services at Palmetto Richland Memorial Hospital as well as Associate Medical Director at HealthSouth Rehabilitation Hospital in Columbia. *{1st 4 yr. term Expires 2005, reappointed through 2009}*

~ 2 MEMBERS WHO HAVE A SPINAL CORD INJURY OR WHO HAVE A FAMILY MEMBER WITH A SPINAL CORD INJURY (4 year terms, one will serve only 2 years for the first term).

- * **Charles L. Allen**, Mt. Pleasant, SC—spinal cord injured, Charleston Municipal Court Judge and teaches at Trident Technical College. *{initial 2 year term expired 2003, 1st 4 yr. term Expires 2007, but deceased 12/29/03}*
- * **John H. Stevens, M.Ed.**, Columbia, SC—spinal cord injured, retired Division Administrator, Head and Spinal Cord Injury of the S. C. Department of Disabilities and Special Needs. *{appointed by Governor to fill vacated Judge Allen 1st 4 year term which will Expire 2007}*
- * **Terry Peacock**, Columbia, SC—mother of a spinal cord injured who retired from the Office of Minority Affairs of the SC Department of Health and Environmental Control. *{1st 4 yr. term Expires 2005, recommended for a 4 year reappointment through 2009}*

~ 1 AT LARGE MEMBER WHO IS A MEDICAL DOCTOR AND A MEMBER OF THE SOUTH CAROLINA MEDICAL ASSOCIATION (initial term of 3 years, 4 year terms thereafter).

- * **Brian G. Cuddy, M.D.**, Charleston, SC—Board Certified Neurosurgeon in private practice, Clinical Associate Professor of Neurosurgery at MUSC, and directly involved in establishing the Spinal Cord Injury Research Fund. *{initial 3 year term expired 2004, 1st 4 yr. term Expires 2008}*

APPENDIX 2—CUMULATIVE DUI

	~2001~	~2002~
Jan.	\$ 4,285.00	43,035.45
Feb.	10,774.90	67,213.13
Mar.	26,570.32	110,797.84
Apr.	41,513.91	68,851.75
May.	42,606.41	73,028.36
June.	50,170.12	82,816.19
July.	54,159.28	58,312.09
Aug.	62,635.31	76,064.34
Sept.	53,845.08	60,925.72
Oct.	61,642.97	67,764.04
Nov.	60,039.88	69,631.96
Dec.	<u>63,716.54</u>	<u>65,987.31</u>
	<u>\$ 531,929.72</u>	<u>\$ 849,428.11</u>

{TOTAL FIRST 24 MONTHS: \$ 1,381,357.83}

	~2003~	~2004~	~2005~	~Cumulative~
Jan.	56,063.61	63,663.52	53,425.96	2,863,637.24
Feb.	79,548.82	57,270.58	57,445.32	2,921,082.56
Mar.	75,621.55	59,148.68	59,519.99	2,980,602.55
Apr.	67,871.19	57,654.32.	65,713.64	3,046,316.19
May	69,933.84	68,408.00	71,195.33	3,117,511.52
June	64,092.46	49,806.85	47,422.28	3,164,933.80
Extra	14,143.05	4,318.19	11,840.75	3,176,774.55
July	49,138.21	55,373.62	55,200.43	3,231,974.98
Aug.	70,190.90	61,492.46.		
Sep.	62,249.13	47,197.81		
Oct.	52,129.53	32,037.14		
Nov.	55,817.92	51,773.76		
Dec.	49,267.84	54,640.47		
TOT:	<u>766,068.05</u>	<u>662,785.40</u>		

{avge per mo. \$ 63,839} {avg. per mo. \$ 55,232}

APPENDIX 3—FUND BUDGET INFO

~FISCAL YEAR 05-06 BUDGET, SCI RESEARCH FUND~

{3rd Draft 10/09/05 with Board 07/01/05 and Followup decisions and final 04/05 expenditures}

I. <u>PROGRAM ADMINISTRATION CORE</u>		<u>\$ 35,250 *</u>
	PERSONNEL (Incl. F. B. at 28.6%)	29,432
	Fund Administrator (20%)	
	BOARD MEETING TRAVEL/MEALS/REFRESHMENTS	1,268
	Avg. 4 Board 1200 mi. two times year @ \$.345 mi= \$ 828	
	Meals at official meetings and while traveling (\$20x4x2)=\$160	
	Meals/Refreshments for Board Meetings (\$14x10peoplex2)=\$280	
	OTHER	4,550
	Printing stationery/envelopes (next run of 2,500)= \$ 500	
	Printing letters, RFPs, Guidelines, insert card, report= \$250	
	Printing 04/05 Annual Report=\$ 1,500	
	Mail processing (Target Mail)/Postage of any major mailouts=\$200	
	Other mailing throughout the year (RFPs, reports)= \$ 100	
	Meeting support materials (visuals/photos)= \$ 500	
	Photocopy and basic office supplies=\$ 500	
	Contingency for unexpected overruns= \$1,000	
II. <u>RESEARCH DEVELOPMENT CORE</u>		<u>\$ 76,458 *</u>
	PERSONNEL (Incl. F. B. at 28.6%)	47,208
	Scientific Director (15%) and Assoc. Dir (10%)	
	ANNUAL CONFERENCE SCIENTIFIC SESSIONS	12,000
	TRAVEL (Fund Promotion)	10,000
	REVIEW PROCESS	
	Stipends(\$1,000), Travel(\$2,000), Meetings(\$3,000), Mail(\$500), Other (\$704)	7,250
III. <u>ONGOING ROUND 01 PROJECTS (Extension)</u>		<u>\$ 97,413</u>
	SCIRF 1302 Krause 97,263	
	SCIRF 1402 Kindy 150	
IV. <u>ONGOING ROUND 02 PROJECTS (Extension)</u>		<u>\$ 167,692</u>
	SCIRF 0303 Gao 16,138	
	SCIRF 0503 Pickelsimer 51,347	
	SCIRF 0603 Morrisette 19,119	
	SCIRF 0703 Brotherton 14,868	
	SCIRF 0803 Ray 66,193	
V. <u>ONGOING ROUND 02 PROJECT (Supplemental)</u>		<u>\$ 22,300 *</u>
	SCIRF 0303S Gao 22,300	

VI. ONGOING ROUND 03 PROJECTS (Final Year)			<u>\$ 409,664</u>
SCIRF 0104	Webb	102,049	
SCIRF 0304	Wise	104,720	
SCIRF 0604	Murday	23,105	
SCIRF 0804	Monger/Godk	67,904	
SCIRF 1004	Selassie	111,886	
VII. SET ASIDE FOR ROUND 02B PROJECT			<u>\$ 100,000</u>
VIII. AWARDED ROUND 04 PROJECTS			<u>\$ 284,598 *</u>
SCIRF 0105A	Fritz	\$ 5,000	
SCIRF 0205	Tomlinson	25,000	
SCIRF 0505A	Metters	25,000	
SCIRF 0605	Wen	100,000	
SCIRF 0705	Pickelsimer	119,598	
SCIRF 0805A	Yuen	5,000	
SCIRF 1005A	Bridges	5,000	
TOTAL BUDGET ESTIMATE 05/06			<u>\$1,193,375</u>

***NOTE:** These four items totaling \$ 418,606 are the only new commitments in the budget. The remainder were committed in prior years. The three Round 04 projects with an “A” following the number were requested to revise and resubmit in mid-October for another Scientific and Board Review. If all three were fully funded, it could add an additional commitment of up to \$ 360,000 for a two year period.

~FY 2005/2006~

COMPOSITE BUDGET SPINAL CORD INJURY RESEARCH FUND

{DRAFT 3--Based on final FY 04/05 receipts and expenditures}

	Base	F.B. (28.6%)	Sub-Totals	TOTALS
<u>SALARIES/WAGES</u>				\$ 76,640
FUND ADMIN.				
Fund Administrator(20%)	22,887	6,545	29,432	
RESEARCH DEVEL.				
Scientific Direct.(15%)	25,678	7,344	33,022	
Assoc. Sci. Direct. (10%)	11,031	3,155	14,186	
(Res. Dev. Sub-Total)	(36,709)	(10,499)	(47,208)	
<i>S/W Sub-Totals</i>	59,596	17,044		
<u>TRAVEL(staff/Board)</u>				12,828
Admin. Core (Board)			828	
Research Devel. Core			12,000	
<u>OTHER</u>				22,240
Admin. Core			4,990	
Research Devel. Core				
including Sci. Conf.			17,250	
<u>SUBGRANTS</u>				1,081,667
Round 1 Projects Exten.			97,413	
Round 2 Projects Exten.			167,692	
Round 3 Projects Final Yr.			409,664	
Round 2B Set Aside			100,000	
Round 4 Projects Award			284,598	
Round 2 Project Supplem.			22,300	
<u>TOTAL</u>				\$ 1,193,375

**SOUTH CAROLINA SPINAL CORD INJURY RESEARCH FUND—
ONGOING CASH ANALYSIS (06/30/05)**

{Prepared for 04/05 Annual Report and July Meeting of SCIRF Board}

• **INITIAL 18 MONTHS (01/01/01—06/30/02)**

Total Collections	977,703
Total Expenditures	30,675

YEAR-END CASH BALANCE

947,028

• **FY 03 (07/01/02—06/30/03)**

Carryover from Prior Period	947,028
DUI Collections through 06/30/03	825,957
TOTAL CASH	1,772,985

Program Admin. Core Expenditures	27,624
Program Scientific Core Expenditures	18,987
Round 01 Projects First 12 Mos. Expenditures	301,951
TOTAL EXPENDITURES	349,562

YEAR-END CASH BALANCE

1,423,423

• **FY 04 (07/01/03—06/30/04)**

Carryover from Prior Period	1,423,423
Additional Collections through 06/30/04	699,064
TOTAL CASH	2,122,487

Program Admin. Core Expenditures	32,184
Program Scientific Core Expenditures	21,093
Round 01 Projects Expenditures	228,719
Round 02 Projects Expenditures	386,838
TOTAL EXPENDITURES	668,834

YEAR-END CASH BALANCE

1,453,653

- **FY 05 (07/01/04—06/30/05)**

Uncommitted Carryover from Prior Period	1,453,653
Additional Collections through 06/30/05(est)*	669,078
TOTAL CASH	2,122,731

Program Admin. Core Expenditures 04/05	33,058
Program Scientific Core Expenditures 04/05	62,152
Round 01 Ongoing Projects Expenditures	54,716
Round 02 Ongoing Projects Expenditures	267,099
Round 03 Ongoing Projects Expenditures	193,929
TOTAL EXPENDITURES	610,955

YEAR-END CASH BALANCE**1,511,776**

- **FY 06 (07/01/04—06/30/06)**

Cash Carryover from Prior Period	1,511,776
Additional Collections through 06/30/06(est)*	720,000
TOTAL CASH	2,231,776

Program Admin. Core Budget 05/06	35,259
Program Scientific Core Budget 05/06	76,458
Extended Round 01 Projects	97,413
Extended Round 02 Projects	167,692
Supplement Round 02 Project	22,300
Ongoing Round 03 Projects (Last Year)	409,664
Round 02B Set Aside	100,000
Round 04 Projects (First Year)	284,607
COMMITTED FUNDS	1,193,375

UNCOMMITTED YEAR-END BALANCE (est)**1,038,401****

NOTES: DUI collections estimated at \$ 60,000 per month (based on average collections over past six mos.)

TOTAL SCIRF EXPENDITURES SINCE 2001

BUDGET COMPONENTS		FY03	FY04	FY05	TOTAL
PROGRAM ADMINISTRATION		27,623.95	32,184.08	33,057.69	92,865.72
RESEARCH AND DEVELOPMENT		18,987.08	21,093.53	62,152.69	102,233.30
FUNDED PROJECTS					
ROUND 1 PROJECTS					
SCIRF 0202	McGinty	46,685.30	15,605.81		62,291.11
SCIRF 0302	Haines	57,852.09	17,787.70	47,709.21	75,639.79
SCIRF 0602	Middaugh	46,671.89	43,762.98		90,434.87
SCIRF 0802	Wilson	10,745.24	67,305.00		78,050.24
SCIRF 1102	Hickman	48,824.34	51,427.66		100,252.00
SCIRF 1202	Short	29,422.27	-		29,422.27
SCIRF 1302	Krause	9,315.59	18,420.80		27,736.39
SCIRF 1402	Kindy	53,434.51	14,408.96	7,006.92	67,843.47
ROUND 2 PROJECTS					
SCIRF 0103	Short		50,541.45	14,457.00	64,998.45
SCIRF 0903	Bhat		13,970.13	10,881.91	24,852.04
SCIRF 0303	Gao		72,136.93	61,614.78	133,751.71
SCIRF 0403	Molnar		72,475.66	2,416.34	74,892.00
SCIRF 0503	Pickelsheim.		32,988.67	60,636.06	93,624.73
SCIRF 0603	Morrisette		37,353.68	18,526.32	55,880.00
SCIRF 0703	Brotherton		30,310.07	29,821.34	60,131.41
SCIRF 0803	Ray		13,662.91	57,143.65	70,806.56
SCIRF 1103	Barbosa		63,398.25	11,601.95	75,000.20
ROUND 3 PROJECTS					
SCIRF 0104	Webb			47,950.21	47,950.21
SCIRF 0204	Short			60,000.00	60,000.00
SCIRF 0304	Wise			45,279.80	45,279.80
SCIRF 0604	Murday			38,526.20	38,526.20
SCIRF 0704	Mertz				
SCIRF 0804	Monger/God			2,095.39	2,095.39
SCIRF 1004	Selassie			78.20	78.20
TOTALS FOR FUNDED PROJECTS		302,951.23	615,556.66	515,745.08	1,434,252.97
TOTAL EXPENDITURES		<u>349,562.26</u>	<u>668,834.27</u>	<u>610,955.46</u>	<u>1,629,351.99</u>

APPENDIX 4—BOARD AGENDAS

AGENDA~

SPINAL CORD INJURY RESEARCH FUND BOARD

Friday December 3, 2004, 12:00 Noon

***Corporate Offices of the Medical Society of South Carolina,
69- B Barre St. (carriage house behind Edward Bennett House)***

Approval of Minutes (06/25/04 Meeting)

Report of Chairman

**10/01/04 Shepherd Center Visit
Updated Power Point Fund Presentation
Meeting Presentations (06/04, 10/23/04, & 10/26/04)
Update on Vacant Board Appointment
Entry in Legislative Manual/State Web Page**

Report of Fund Administrator

**DUI Collections Update
FY 03/04 Annual Report (including final expenditures)**

Report of Scientific Directors

**Projects' Progress
05/13/05 Scientific Conference (Location/Invitees/Agenda)
Update on Web Page
RFP 02A—still open (Recruitment)
RFP 02B—revised Rehabilitation RFP
RFP 04—new annual RFP
Review Process Concerns/Suggestions**

Other Old Business

New Business

Adjourn

~AGENDA~

SPINAL CORD INJURY RESEARCH FUND BOARD

Friday July 1, 2005, 12:00 Noon

**Corporate Offices of the Medical Society of South Carolina,
69-B Barre St. (carriage house behind Edward Bennett House)**

Roll Call/Introductions

Approval of December 03, 2004 Board Minutes

Report of Chairman

- **Welcome new Board Member Stevens**
- **Update on Legislative Manual, State Web Page, and PR initiatives**
- **Meeting with Governor or Staff**
- **Board Appointments/Reappointments/Officer Election**

Report of Fund Administrator

- **DUI Collections Update**
- **Revised 05/06 Budget**
- **Cash Analysis Update**
- **First Draft 06/07 Budget**
- **FY 06 and Five Year Strategic Goals**
- **FY 04/05 Annual Report**

Report of Scientific Directors

- **Report on May 12, 2005 SCSCIA Conference**
- **Report on May 13, 2005 Fund Scientific Conference**
- **Progress Report on Round 01/02/03 Projects**
- **Discussion of Any Potential 02A Proposals**
- **Revised RFP/Timeline for Round 02B Proposals**
- **Discussion of Round 05 Priorities and Timeline**
- **Update on Web Page**
- **Round 04 Proposals/Scientific Reviews**
- **Round 04 Scientific Review Summary Sheets**
- **Request for Supplemental Funding, Round 02 Project**

New Business

- **Date of Next Board Meeting**
- **Other New Business**

Adjourn

APPENDIX 5—RFPs ISSUED FY 04-05

RFP 04

RESEARCH ON SPINAL CORD INJURY (SCI)

Request For Proposals (RFP) 04

Issued by the Spinal Cord Injury Research Fund Board

Brian G. Cuddy, MD(Chair), David Griesemer, MD, Terry Peacock, Phanor L. Perot, MD, PhD, David L. Shallcross, MD, and W. Daniel Westerkam, MD

Administered by the Medical University of South Carolina (MUSC)

RFP 04

Date of Release: December 15, 2004

Deadline for Submission: March 15, 2005

Background: Amendment (Bill S54 44-38-510) to Section 2, Chapter 38, Title 44 of the 1976 S.C. Code was ratified on July 20, 2000 and authorized the new South Carolina Spinal Cord Injury Research Fund provided from a \$100 surcharge on each Driving Under the Influence (DUI) conviction. The Fund is administered by new Spinal Cord Injury Research Board appointed by the Governor, and was attached to MUSC for staff and administrative purposes. The law authorizes Fund use to cover basic operating and administrative costs, but directed that the balance be provided for spinal cord injury research projects.

SCI is a serious and seldom reversible cause of disability. Often traumatic in origin, it may also result from inflammatory, neoplastic, developmental, or rarely infectious causes. The consequences of SCI are legion, including paralysis of legs and arms, even muscles of respiration; loss of sensation and autonomic control; chronic pain; impairment of bowel, bladder, and sexual dysfunction; metabolic disorders such as hypercalcemia; muscle spasticity with contractures of joints, fractures, and heterotopic ossification; complications such as decubitus ulcers, uncontrolled blood pressure, and frequent infections. People with SCI may face extraordinary demands due to the costs of medical care, limitations in rehabilitation resources after profound loss of mobility, and the absence of environmental supports. The spouses and children of people SCI also face additional demands and the cost of care to families and the residents of South Carolina are extraordinary and ongoing. The long-term goal of this research initiative is to minimize the risk and incidence of SCI, interrupt or reverse the process of SCI, and improve the health and quality of life for residents of South Carolina with SCI.

Areas of potential research interest include: basic neurobiology, including regeneration of cells and axons, modulation of inflammatory and destructive processes, prevention of injury-induced neurotoxicity or secondary injury; pre-clinical studies, including refinement of animal models of SCI; translation of pre-clinical findings into treatment, including pharmacological trials, surgical approaches, and previously unexplored treatments; clinical issues, including diagnostic assessment and monitoring, relationship to other spinal cord disorders and

psychological disorders; outcomes of rehabilitation, including therapies (prosthetic, physical, occupational, speech/language, recreational), quality of life (technological solutions, functional improvement), and attendant care; epidemiology, including factors affecting incidence, availability and quality of SCI care in South Carolina; education and prevention, including education curriculum for patients and families in appropriate and adequate SCI care (classroom, career), community (prevention of alcohol-related injury, opportunities for therapy and rehabilitation), and health care providers (curriculum at South Carolina colleges and universities, professional education).

Request For Proposals: The South Carolina Spinal Cord Injury Research Board invites grant and contract applications for research on all aspects of spinal cord injury (SCI) in an effort to develop better understanding and ultimately treatment for paralysis and other consequences of spinal cord injury and disease. This is the fourth annual call for grants that outline innovative and potentially groundbreaking research. It is estimated that \$800,000 will be available for projects funded in response to this request.

Funding Mechanisms

1. Primary research grants will not exceed \$120,000 over a 24-month period (\$60,000 per year). These will support research activities of junior faculty (usually within 1 to 5 years of their first faculty position or first research position) that range from basic science to applied science. Anticipated are three to four awards, with no more than a 2:1 ratio in either basic versus applied science. The primary goal of these research grants will be to perform studies that lay the foundation for larger projects that may bring federal funds into the state of South Carolina. We are particularly interested in funding projects that specifically addresses issues related to access to care or the health care delivery in the state of South Carolina. Possible topics include but are not limited to attendant care, access to primary rehabilitation, access to follow-up services, availability of physicians and other health care professions, the efficacy of existing programs, or outcomes associated with the quality of existing or pilot programs. No more than 20% effort for principal investigator may be paid from primary grant funds.
2. Career development awards will be utilized to support new investigators in the field of spinal cord injury, or to support the work of individuals crossing over to spinal cord injury research from other areas. A maximum of \$90,000 will be granted over a 24-month period. The primary goals of this mechanism will be to increase the likelihood that a researcher will be able to successfully compete for a federally funded K grant or other federally funded career development award upon completion of the project. The proposed award will give new investigators set-aside time from their other activities to focus on research, not to exceed 50% effort and lay the foundation for them to obtain awards. These awards may reflect either basic science projects or applied projects. Investigators must include a plan to develop an application for a federal career development as part of their scope of work. Quality of investigators career plans and likelihood of success in obtaining future extramural funds will be heavily weighed in evaluating career development applications.
3. Small pilot grant funds of up to \$25,000 will be available for single year projects. The goal of this award is specifically to support investigators who need to collect a modest amount of pilot data or purchase equipment necessary to position themselves for NIH grants. This mechanism will support the work of senior investigators. Three to five such awards per year are anticipated as funding levels permit. This mechanism also will have a second midyear cycle in which proposal may come directly to the Scientific Director or Associate Scientific Director who will set up a review from an external panel and then submit recommendations to the Board regarding approval.

4. Up to \$70,000 (\$35,000/year) will be set aside for projects that disseminate the results of research to the citizens in South Carolina with spinal cord injury and their families. This dissemination component is of great importance to the mission of the SCI Research Fund, as the information derived from the research studies must reach those individuals who can utilize it. Three types of activities will be supported under this mechanism: development of annual conference, generation of educational materials for consumers that may be directly disseminated to them (e.g., pamphlets), and funds for the continuation and updating of the website.

Eligibility and Terms of Support: Applications will be accepted from clinicians, therapists, educators, and scientists in South Carolina who have a terminal professional degree in their field and, in the case of research involving human subjects, have access to an Institutional Review Board. This includes, but is not limited to, faculty members of research and educational institutions throughout the state. All applicants will be required to submit a two-page progress report within 60 days of the termination of the award period. In addition, all applicants will be required to present their research at a Spinal Cord Injury Research Fund meeting and to have prepared a research proposal on SCI to be submitted within 6 months of the termination of the award.

Funding: Grant or contract support will be awarded initially for 24 months (except for pilot projects which are 12 months), with no guarantee of renewal. Further funding will depend on progress reports at 12-month intervals that include evidence of productivity, with consideration for renewal of projects that show progress or significant promise on re-submission. Reasonable amount of funds for support of the Principal Investigator's salary will be considered, but should not exceed 20% of the total requested budget (except for Career Development applications where it shall not exceed 50%). Grant or contract fund uses for equipment are not encouraged (the exception being the open announcement), but minor items will be considered provided they are clearly justified as absolutely essential to the successful conduct of proposed research. Requests for travel should be focused on development of networking necessary for the conduct of research. The Spinal Cord Injury Research Fund does not provide support for indirect costs and any such related costs essential to the proposed research should be included in the direct cost budget request.

Timeframes: There will be at least one call for proposals annually. The review of all proposals will be completed within 60 days following the grant submission deadline. The deadline for applications in response to this Request for Proposals is **March 15, 2005, at 5:00 PM**. The South Carolina SCI Research Board will make money available within 30 days following a recommendation for funding by the Review Committee, approval from the Board of Directors, and receipt of acceptance forms from successful applicants.

Review Process: Proposals will be reviewed by committees of reviewers approved by the Spinal Cord Injury Research Fund Board as drawn from a list of volunteers as well as those recommended by knowledgeable peers. One review committee will consider basic science or pre-clinical proposals, and another review committee will consider applied or clinical proposals. Investigators will be asked to submit the names of two (2) reviewers qualified to review their proposals, and these individuals may be selected as ad hoc reviewers. Grants will be scored in a manner similar to an NIH grant review committee where 100 is the best possible score and 500 is the lowest score. Three reviewers will be assigned to each grant and all members of the appropriate review committee present for the review will have an opportunity to vote on each proposal. The Board will consider these reviews and scores in making all final award decisions.

Submission Address: Grant applications should be submitted to Mark S. Kindy, PhD, Associate Scientific Director, South Carolina Spinal Cord Injury Research Fund, c/o Fund Administrator, Office of the President, Medical University of South Carolina, 135 Cannon Street, Suite 101, PO Box 250001, Charleston, SC 29425.

Application Format: The proposal must not exceed 12 pages in length, including the biosketch of the Principal Investigator. Pilot proposals should not exceed 5 pages. Proposals not adhering to page limitation may be refused. Please send a cover letter and complete the face page (attached to the end of this announcement) indicating which of the grant mechanisms to which you are applying and you may include the names and contact information for up to 2 reviewers who are experts in the field (this cover letter will not count against the page limit). The format is similar to that of a National Institutes of Health (NIH) research proposal. Specific elements that should be included are:

- I. Face page (name, position, department, proposal title, abstract)
- II. Response to previous critique (only for renewal applications or resubmission of a previously unfunded proposal – maximum of 1 extra page)
- III. Specific aims
- IV. Value to the State of South Carolina (benefit to the people of the State and/or plans for obtaining extramural funding and/or compatibility with Fund’s primary objectives and initial priorities. This section is particularly important to those applying for set aside funds for a project that specifically addresses the health care needs of individuals with SCI in South Carolina.)
- V. Background and rationale (Note: Career Development applications should focus on their rationale on how the proposed activities will facilitate the applicant’s research career development and how the award will assist the applicant in successfully competing for a federally funded career development award. Applicants also need to describe and highlight the qualifications of at least one mentor who will provide mentorship to them during the 24-month period and outline a plan for mentorship (e.g., how often they will meet).
- VI. Methods
- VII. Evaluation strategy (with measurable goals)
- VIII. References
- IX. Detailed Budget (with narrative justification)
- X. Biosketch (abridged NIH format, additional biosketches for each co-investigator should be included, adjusting page limit to accommodate more than one)

Please submit the original and six copies.

Review Criteria: Proposals will be reviewed by the Review Committees according to the following criteria:

1. Originality and significance of the hypothesis or product.
2. Feasibility and adequacy of the proposed research or product.
3. Qualifications and experience of the Principal Investigator and other key personnel. Special consideration will be given to new faculty and individuals less familiar with the extramural funding process.
4. Likelihood of the project ultimately receiving extramural support and/or benefiting the people of the State of South Carolina.

5. Availability of adequate facilities to conduct the proposed project
6. Appropriateness of the budget.
7. Relevance to the Fund's primary objectives and initial priorities as presented in the Background section of this RFP.

Note: Career Development Awards will be reviewed based on the quality and clarity of the overall career development plan and how the current award will enhance the qualifications of the investigator and assist in obtaining an extramural career development award. Quality of mentorship will also be evaluated in applications for Career Development Awards. Although applicants research plan will be evaluated, it will not be expected to be as rigorous as with primary grants, as a greater emphasis will be placed on the career development plan, particularly how the applicant will gain expertise in spinal cord injury.

Awarding of Funds: Projects will be awarded by grant or contract based upon applicable South Carolina policies, procedures, and laws concerning the expenditure of State funds.

For Questions or Additional Information: Potential applicants should contact Dr. James Krause, Scientific Director or Dr. Mark S. Kindy, Associate Director, South Carolina Spinal Cord Injury Research Fund. Procedural and basic science questions should be addressed to Dr. Kindy. Questions regarding applied or clinical research, the set aside funds for special needs of people with SCI in South Carolina, career development awards, or consumer education should be addressed to Dr. Krause.

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APPENDIX 6—FUND SPONSORED CONFERENCES

AGENDA—06/13/05 SCIENTIFIC CONFERENCE

S.C. Spinal Cord Injury Research Fund

First Annual Scientific Conference

Friday May 13, 2005

8:30 a.m. until 4:30 p.m.

Storm Eye Institute Auditorium

167 Ashley Ave, Charleston, SC 29425

Welcome and Introductions--Brian Cuddy, M.D., Chair SCSCIRF Board

Fund Scientific Overview--James Krause, Ph.D., SCSCIRF Scientific Director

~Clinical/Applied Science Sessions~

Opening Invited Address, “A Dream of Hope”-- James Shepherd, Board Chair of Shepherd Center

Keynote Address, “The Miami Project to Cure Paralysis: Yesterday, Today and Tomorrow”—
Barth A. Green, M.D., Lois Pope Life Center and the Miami Project to Prevent Paralysis

Selected P.I.s of SCSCIRF Funded Projects—Anbesaw Salassie, PhD (MUSC); David Morrisette, PhD (MUSC); Elisabeth Pickelsimer, PhD (MUSC); and Sandra Brotherton, PhD (MUSC)

~Basic Science Sessions~

Current Status of Spinal Cord Injury Research—Mark S. Kindy, Ph.D., Associate SCSCIRF Scientific Director

Keynote Address, “The Myths and Realities of Stem Cell Repair for Spinal Cord Injury”-- – Scott Whittemore, Ph.D., Director, Kentucky Spinal Cord Injury Center and the University of Louisville

Selected P.I.s of Fund Projects—Jakie McGinty, Ph.D.(MUSC); Britt Wilson, Ph.D. (USC); Bruce Gao, Ph.D.(Clemson); Swapan Ray, Ph.D. (MUSC); and Ernie Barbosa, M.D. (MUSC)

~Conclusions/Discussion/Challenges~

AGENDA—06/12/05 CONSUMER CONFERENCE
EXPERIENCE THE POWER:
A ONE DAY CONFERENCE FOR PEOPLE WITH SCI
“Living Well After Spinal Cord Injury”
Thursday May 12, 2006
Columbia Hotel and Conference Center
Columbia, South Carolina

Welcome & Keynote Address: “Optimism in SCI Research: Progress of New Treatments—Marie Amador, RN, Director of Education, The Miami Project to Cure Paralysis

Break & Exhibits

“Nuts & Bolts of Wheelchair Selection and Seating”—Panel

Lunch with Spinal Cord Injury Research Fund Project Abstract Presentations

Getting What You Need Through Effective Advocacy—Panel

“News You Can Use: Update on Prevention and Medical Management of Common Complications after SCI”—Adora Matthews, MD.

Ask The Experts—Panel of Speakers

Closing Remarks and Evaluations

