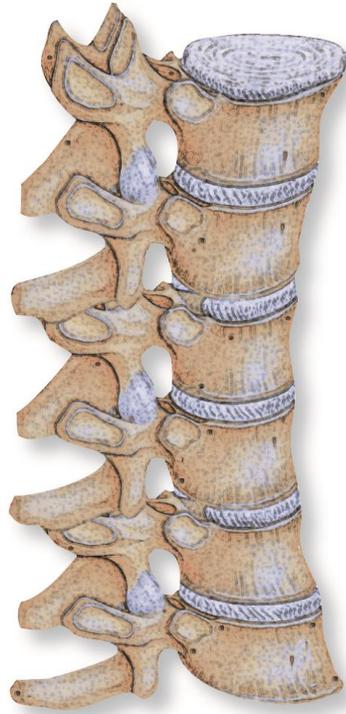




Department
of Health



SPINAL
CORD
INJURY
RESEARCH
BOARD

Annual Report

January 1, 2014 to December 31, 2014

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NEW YORK STATE SPINAL CORD INJURY RESEARCH BOARD

Roster of Members

As of December 31, 2014

Lorne Mendell, Ph.D., Chair
Stony Brook University, SUNY

Donald S. Faber, Ph.D., Vice Chair
Albert Einstein College of Medicine at Yeshiva University

Thomas N. Bryce, M.D.*
Icahn School of Medicine at Mount Sinai

Nancy A. Lieberman*
Skadden, Arps, Slate, Meagher & Flom, LLP

David A. Carmel*
Carmel Asset Management, LLC

Gary D. Paige, M.D., Ph.D.
University of Rochester Medical Center

Jeffrey D. Ehmann
Gannett Co., Inc.

Paul Richter
Spinal Cord Society

Brooke M. Ellison, M.A.+
The Brooke Ellison Project

Mark Menniti Stecker, M.D., Ph.D.*
Winthrop University Hospital
Department of Neuroscience

Michael E. Goldberg, M.D.
Columbia University
College of Physicians and Surgeons

Adam B. Stein, M.D.
North Shore-Long Island Jewish
Health System

Keith Gurgui
Resource Center for Accessible Living

Robert D. Trotta, Esq⁺

Jonathan R. Wolpaw, M.D.
Wadsworth Center
New York State Department of Health

* Appointed in 2014

+ Service concluded during 2014

NEW YORK STATE DEPARTMENT OF HEALTH
Wadsworth Center, Extramural Grants Administration
Staff Support to the Board

Bonnie Jo Brautigam
Executive Secretary to the Board and Director

Teresa K. Ascienzo
Associate Accountant

Charles J. Burns*
Health Program Administrator 1

Mary Rogers+
Health Program Administrator 1

Jeannine M. Tusch*
Health Program Administrator Trainee

* Service commenced during 2014

+ Service concluded during 2014

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State of New York
Spinal Cord Injury Research Board
Annual Report
January 1, 2014 to December 31, 2014

I. INTRODUCTION

Spinal cord injury (SCI) was once thought of as incurable. Significantly, the basic science carried out by researchers in this field, much of it accomplished in New York State, has served as an important stimulus for the clinical trials now underway in fields as diverse as neuro-rehabilitation, axon growth, cell biology and robotics. Although it is not yet possible to reliably repair the human spinal cord, there are new treatments that improve the lives of SCI patients, and continued scientific explorations offer hope for doing more.

The New York State Spinal Cord Injury Research Board (SCIRB or Board) appreciates the opportunity to serve the citizens of New York State by focusing on this important public health problem while stimulating economic growth through investigation and discovery. The Board looks forward to providing additional financial support for such highly meritorious SCI research in the coming years.

II. BACKGROUND

SCIs contribute to significant disability, illness and death in the United States. Each year, approximately 1,000 New York residents suffer traumatic SCIs¹ joining the nearly 276,000 people living in the United States with paralysis.² The personal and economic costs to these individuals, their families and society are immense.

Most frequently, these injuries are caused by motor vehicle accidents, falls, sports injuries, or acts of violence. SCI results in an abrupt change in the quality of life for those affected. Injuries to the spine near the head can result in quadriplegia, with the loss of motor control, sensation and function of the arms, legs, bowel, bladder, chest, abdomen and diaphragm. Injuries to the lower spine can result in loss of sensation and movement in the lower body, and loss of bowel and bladder control. Both types of injuries can result in significant chronic pain.

The economic costs of SCI are great. In addition to societal and individual costs incurred for medical care and through loss of productivity, there are significant costs for home and vehicle modifications, equipment purchase, medications and personal assistance services. The National Spinal Cord Injury Statistical Center reported that first-year costs for an individual with SCI range from approximately \$342,112 to more than \$1,048,259, with annual costs thereafter ranging from approximately \$41,554 to \$182,033.² These expenses are borne by the individuals, their families and society at large.

¹ New York State Department of Health, Bureau of Occupational Health and Injury Prevention, 2010-2012 data

² "Spinal Cord Injury Facts and Figures at a Glance." *National Spinal Cord Injury Statistical Center*. University of Alabama at Birmingham, August 2014. Web. 22 December 2014. <https://www.nscisc.uab.edu/>

The Board was created in 1998 to solicit, review and support proposals from leading New York State researchers in their efforts to find a cure for SCI. The Spinal Cord Injury Research Trust Fund (Trust Fund) was established to fund this research. It is financed primarily by a portion of surcharges on moving traffic violations, because motor vehicle accidents are the leading cause of SCI, followed by falls.² The Board and Trust Fund are authorized by Title IV (Sections 250 through 251) of Article 2 of the Public Health Law and Section 99-f of Article 6 of the State Finance Law. The Board's enabling statute can be found in Appendix 1 of this report and at www.wadsworth.org/extramural/spinalcord.

The Board was first convened in August 1999. It is responsible for advising the Commissioner of Health on research proposals from leading New York State researchers in their efforts to find a cure for SCI. The Board is required to report annually to the Governor and Legislature on funds appropriated for SCI research and the progress of the Board in terms of the results of its SCI research efforts.

New York's investment in SCI research has generated millions of dollars in additional funding for New York State researchers from sources such as the National Institutes of Health (NIH), the Department of Veterans' Affairs, the Craig H. Neilsen Foundation, the Christopher and Dana Reeve Foundation and the Department of Defense, among others.³ The number of NIH funded SCI awards made to New York State researchers grew from nine in 1998 to 37 in 2014.⁴ At least 22 spinal cord injury-related patent applications have been filed by New York State researchers since 2001.⁵ The scientific advancements of New York State's research community continue to lead to a better quality of life for its injured residents and their families.

III. BOARD ORGANIZATION AND MEMBERSHIP

The Board's membership is comprised of 13 members appointed by the Governor and legislative leaders (see page iii and Appendix IV). There are no vacancies. The current composition of the Board includes five researchers, three clinicians and five spinal cord-injured persons. Members serve four-year terms.

IV. BOARD OPERATIONS

Meetings

Meetings are announced at least two weeks in advance whenever possible and are open to the public. Meeting agendas are posted on the Wadsworth Center's web site at:

<http://www.wadsworth.org/extramural/spinalcord/>.

³ As reported by SCIRB-funded contractors to the Chair of the Board in 2010.

⁴ National Institutes of Health, Research Portfolio Online Reporting Tools. Search limited to "spinal cord injury."

⁵ United States Trade and Patent Office on-line search, search limited to "spinal cord injury."

A recording of each meeting is available via the Department of Health's public web site <http://www.health.ny.gov/events/webcasts/archive/> for 30 days after a meeting, opening the proceedings to a wide audience.

All Board meeting agendas and approved minutes are available by request from the Board's Executive Secretary.

The Board held five meetings in 2014. See Section VI for details.

Bylaws

No changes were made to the Board's bylaws in 2014. The bylaws can be found at <http://www.wadsworth.org/extramural/spinalcord> and in Appendix II of this report.

V. PROGRAM FUNDS

Through December 31, 2014, deposits to the Trust Fund totaled \$78.96 million. Interest on unexpended funds rose to \$5.3 million, for a total of \$84.26 million since the inception of the Trust Fund. Total cash disbursements from the Trust Fund include: research contracts (\$62.8 million); peer review and strategic planning contracts (\$2.6 million); and administrative costs (\$5.2 million). Transfers to the General Fund accounted for \$13.5 million.

Beginning April 1, 2013, other state funds were made available for SCI research. The fiscal year (FY) 2013-14 state budget appropriated \$2 million and \$7 million was appropriated in FY 2014-15. By the close of 2014, \$9 million had been fully obligated to contracts for SCI research. In the 2014 calendar year, total cash disbursements include: \$1,432,919 for research contracts; and \$189,798 for administrative costs.

VI. MAJOR ACTIVITIES OF THE BOARD AND PROGRAM

During 2014, the program completed reimbursements in support of one contract that was executed prior to April 1, 2010. The program also supported 10 contracts, through a Request for Applications (RFA) known as, "Institutional Support for Spinal Cord Injury Research," which the Board recommended for award in late 2013 and early 2014. These new contracts supported previously peer reviewed research through:

- the purchase of equipment and upgrades shared among multiple investigators or institutions; and
- bridge funding to support the initiation or continuation of SCI research.

Eligibility for these funds was limited to organizations located within New York State that received SCI research funding from the SCIRB and/or the NIH since the beginning of federal FY 2010. Matching funds were not required.

At its meeting on January 28, 2014, the Board recommended funding for one final application from the “Institutional Support for Spinal Cord Injury Research” RFA (Round 1). The vote on this one application was postponed to 2014 due to a loss of quorum at the meeting of September 27, 2013, during which nine awards were recommended. With the approval of this application, the Board recommended a total of 10 awards pursuant to this RFA (see below).

Institutional Support for Spinal Cord Injury Research, Round 1
2013-2014 Equipment and/or Bridge Funding Awards

Institution	Category	Awarded Funds
Burke Medical Research Institute	Equipment	\$99,936
Columbia University Medical Center	Equipment	\$199,361
CUNY – City College of New York	Equipment	\$49,834
CUNY – College of Staten Island	Equipment and Bridge Funding	\$49,636
Health Research, Inc. - Helen Hayes Hospital	Equipment	\$49,837
Icahn School of Medicine at Mount Sinai	Bridge Funding	\$166,054
SUNY - Stony Brook University	Equipment and Bridge Funding	\$149,367
SUNY – Downstate Medical Center	Bridge Funding	\$31,250
University of Rochester	Equipment	\$196,783
Health Research, Inc. – Wadsworth Center	Equipment and Bridge Funding	\$174,895
Total		\$1,166,953

At its meeting on April 9, 2014, the Board authorized the Department of Health to issue in 2014 and in succeeding years, the “Collaborations to Accelerate Research Translation (CART) and Innovative, Developmental or Exploratory Activities (IDEA) in Spinal Cord Injury Research” RFA and the “Institutional Training and Postdoctoral Fellowships in Spinal Cord Injury Research” RFA. The Board also recommended that a scientific meeting be held to showcase the achievements of the New York State SCI research community.

In addition, the Board approved the issuance of the “Institutional Support for Spinal Cord Injury Research” RFA (Round 2). Using the eligibility criteria from Round 1, this Round 2 RFA required matching funds from each applicant organization above a certain funding threshold. The RFA was issued in June 2014 and only five of 11 applications passed administrative

review. This resulted in the release of Round 3 of this RFA in August 2014, from which eight applications were received.

During its meetings on October 1, 2014 and October 24, 2014, the Board recommended 13 awards of approximately \$4.79 million in program funds pursuant to Rounds 2 and 3 of the “Institutional Support for Spinal Cord Injury Research” RFA (see below). Additionally, six institutions pledged matching funds of approximately \$1.46 million for SCI research.

Institutional Support for Spinal Cord Injury Research, Round 2 and 3
2014 Equipment and/or Bridge Funding Awards

Institution	Category	Awarded Funds
Burke Medical Research Institute	Equipment and Bridge Funding	\$937,872
Columbia University – Morningside	Equipment	\$249,830
Columbia University Medical Center	Equipment	\$322,583
Cornell University	Equipment	\$275,000
CUNY – City College of New York	Equipment	\$544,158
CUNY – College of Staten Island	Equipment and Bridge Funding	\$238,044
Health Research, Inc. – Helen Hayes Hospital	Equipment	\$236,451
Icahn School of Medicine at Mount Sinai	Equipment and Bridge Funding	\$337,360
Rensselaer Polytechnic Institute	Equipment and Bridge Funding	\$250,000
SUNY – Stony Brook University	Equipment	\$294,111
SUNY – Downstate Medical Center	Equipment	\$119,677
University of Rochester	Equipment	\$740,784
Health Research, Inc. – Wadsworth Center	Equipment	\$245,930
Total		\$4,791,800

The Board also revised its plan for offering training fellowships to exclude the institutional training program and authorized release of an RFA for “Individual Predoctoral and Postdoctoral Fellowships in Spinal Cord Injury Research.” Further, the Board discussed the

status of peer review services. The Board advised the Department of Health to return with a plan to spend remaining FY 2014-15 funds as well as anticipated future funding.

At the November 24, 2014 meeting, the SCIRB approved a non-competitive fourth round of funding for “Institutional Support for Spinal Cord Injury Research.” Using the same eligibility criteria as in previous rounds, it authorized 15 contracts to allow for distribution of the remaining FY 2014-15 funds. Use of the funds was expanded to all customary SCI research expenses; funding supported items such as publications, supplies, travel, materials, fringe benefits, indirect costs, equipment and laboratory renovations (see below).

Institutional Support for Spinal Cord Injury Research, Round 4
2014 Research Awards

Institution	Contract Amount
Albert Einstein College of Medicine of Yeshiva University	\$212,636
Burke Medical Research Institute	\$212,636
Columbia University – Medical Center	\$212,546
Columbia University – Morningside	\$212,636
Cornell University	\$212,636
CUNY – City College of New York	\$212,636
CUNY – College of Staten Island	\$212,636
Health Research, Inc. – Wadsworth Center	\$212,468
Icahn School of Medicine at Mount Sinai	\$212,633
Rensselaer Polytechnic Institute	\$212,636
Sloan Kettering Institute for Cancer Research	\$212,636
SUNY - Stony Brook University	\$211,920
SUNY – Downstate Medical Center	\$212,636
Syracuse University	\$212,636
University of Rochester	\$212,364
Total	\$3,188,291

The Board also authorized the addition of a one-time funding component to the “Collaborations to Accelerate Research Translation (CART) and Innovative, Developmental or Exploratory Activities (IDEA) in Spinal Cord Injury Research” RFA. These one-time funds were designated for use in the first year of the awards to accelerate and enhance the research projects.

The Board made recommendations for use of a standing peer review panel and a shortened peer review timeline. It also made a resolution to discuss the statute and legislative history of the SCIRB and its funding at a future meeting.

Presentations, Publications and Patents Resulting From SCIRB-Funded Research

During 2014, investigators funded in previous years reported their findings in three scientific journal articles (Appendix III, citations and abstracts).

VII. CONCLUSION

With the assistance and recommendations of the SCIRB, this very successful SCI research program continues to enable highly qualified New York State researchers to develop treatments, alleviate pain associated with SCI, restore function and search for a cure for SCIs.

Appendix I

Laws of New York State

Public Health Law, Title IV, § 250. Spinal Cord Injury Research Board.

1. A spinal cord injury research board is hereby created within the department for the purpose of administering spinal cord injury research projects and administering the spinal cord injury research trust fund created pursuant to section ninety-nine-f of the state finance law. The purpose of research projects administered by the board shall be neurological research towards a cure for such injuries and their effects. The members of the spinal cord injury research board shall include but not be limited to representatives of the following fields: neuroscience, neurology, neuro-surgery, neuro-pharmacology, and spinal cord rehabilitative medicine. The board shall be composed of thirteen members, seven of whom shall be appointed by the governor, two of whom shall be appointed by the temporary president of the senate, two of whom shall be appointed by the speaker of the assembly, one of whom shall be appointed by the minority leader of the senate, and one of whom shall be appointed by the minority leader of the assembly.
2. Board members shall be reimbursed for ordinary travel expenses, including meals and lodging, incurred in the performance of duties pursuant to section two hundred fifty-one of this title.
3. The terms of board members shall be four years commencing January first, nineteen hundred ninety-nine.
4. At the end of a term, a member shall continue to serve until a successor is appointed. A member who is appointed after a term has begun shall serve the rest of the term and until a successor is appointed. A member who serves two consecutive full four year terms shall not be eligible for reappointment for four years after completion of those terms.
5. A majority of the full authorized membership of the board shall constitute a quorum.
6. One member of the board shall be chosen by the governor to serve as chairperson.
7. Meetings of the board shall be held at least twice a year but may be held more frequently as deemed necessary, subject to call by the chairman or by request of a majority of the board members. Board meetings shall concern, among other things, policy matters relating to spinal cord injury research projects and programs, research progress reports, and other matters necessary to carry out the intent of this title.
8. Members of the board shall be indemnified pursuant to section seventeen of the public officers law.

Title IV, § 251. Powers and Duties.

The spinal cord injury research board created pursuant to section two hundred fifty of this title shall:

1. Formulate policies and procedures necessary to carry out the provisions of this title;
2. Solicit, receive, and review applications from public and private agencies and organizations and qualified research institutions for grants from the spinal cord injury research trust fund, created pursuant to section ninety-nine-f of the state finance law, to conduct research programs which focus on the treatment and cure of spinal cord injury. The board shall make recommendations to the commissioner, and the commissioner shall, in his or her discretion, grant approval of applications for grants from those applications recommended by the board.
3. Ensure that state funds, appropriated for spinal cord injury research are not diverted to any other use; and
4. Provide the governor and the legislature an annual report by January thirty-first of each year succeeding the year in which this title shall take effect setting forth the status of funds appropriated for spinal cord injury research and the progress of the Board in terms of the results of its spinal cord injury research efforts.

State Finance Law, Article 6 § 99-f. Spinal cord injury research trust fund.

1. There is hereby established in the joint custody of the state comptroller and the commissioner of taxation and finance a special revenue fund to be known as the "spinal cord injury research trust fund."
2. The fund shall consist of all monies appropriated for its purpose, all monies required by this section or any other provision of law to be paid into or credited to such fund, and monies in an amount not to exceed eight million five hundred thousand dollars collected by the mandatory surcharges imposed pursuant to subdivision one of section eighteen hundred nine of the vehicle and traffic law. Nothing contained herein shall prevent the department of health from receiving grants, gifts or bequests for the purposes of the fund as defined in this section and depositing them into the fund according to law.
3. Monies of the fund, when allocated, shall be available for administrative costs of the spinal cord injury research board established pursuant to title four of article two of the public health law and for funding spinal cord injury research projects administered by such board.
4. Monies shall be payable from the fund on the audit and warrant of the state comptroller on vouchers approved and certified by the commissioner of health.

Appendix II

Bylaws of the New York State Spinal Cord Injury Research Board

I. OFFICERS

1. The officers of the Spinal Cord Injury Research Board (“Board”) shall be the Chair and Vice-Chair. The Chair is designated by the Governor. The Vice-Chair shall be selected by the Chair and shall serve for one year or until his or her successor has been selected.
2. The Chair may appoint a Board member to preside during the absence of the Chair and Vice-Chair from any meeting.

II. DUTIES

1. The officers of the Board shall perform the duties ordinarily associated with their respective offices.
2. The Chair shall be responsible for the general supervision of the work of the Board. The Chair shall represent the Board before the Governor, committees of the Legislature, or other public authorities, and may request any member or members to appear with him or her in his or her stead. The Chair shall preside at Board meetings.
3. The Vice-Chair, in the absence of the Chair, shall perform the duties of the Chair.

III. CODE OF ETHICS AND CONFLICT OF INTEREST

Section 1. Code of Ethics.

Members of the Board shall comply with Section 74 (Code of Ethics) of the Public Officers Law. No member of the Board should have any interest, financial or otherwise, direct or indirect, or engage in any business, transaction, or professional activity, or incur any obligation of any nature, which is in substantial conflict with the proper discharge of his or her duties as a Board member. Members should exercise their duties and responsibilities as Board members in the public interest of the inhabitants of the State, regardless of their affiliation with, or relationship to, any institution, organization, facility, agency, program, activity, category of provider, or interest group. The principles that should guide the conduct of Board members include, but are not limited to, the following:

- a) A Board member should endeavor to pursue a course of conduct that shall not raise suspicion among the public that he or she is likely to be engaged in acts that are in violation of his or her trust as a Board member.

- b) No Board member should permit his or her employment to impair his or her independence of judgment in the exercise of his or her duties as a Board member.

- c) No Board member should disclose confidential information acquired by him or her in the course of his or her duties as a Board member, or by reason of his or her position as a Board member, nor use such information to further his or her personal interests.

- d) No Board member should use, or attempt to use, his or her position as a Board member to secure unwarranted privileges or exemptions for himself or herself or others.

- e) No Board member should engage in any transaction as a representative or agent of the State with any business entity in which he or she has a direct or indirect financial interest that might reasonably tend to conflict with the proper discharge of his or her duties as a Board member.

- f) A Board member should not make personal investments in enterprises which may be directly involved in decisions to be made by him or her as a Board member or which shall otherwise create substantial conflict between his or her duty as a Board member to act in the public interest and his or her private interest.

- g) To preserve the public trust, Board members are prohibited during the tenure of their appointment from applying for or receiving support from the Spinal Cord Injury Research Trust Fund under Section 251 of the Public Health Law, or from having any role or interest (other than routine professional and collegial interest in the success of their institution or department) in proposals submitted for consideration by, or in research or proposals supported by, the Spinal Cord Injury Research Trust Fund.

Section 2. Conflict of Interest – Applications and other Pending Matters.

This section applies both to activities of the full Board and its committees.

a) **Absolute Disqualifications.**

When a Board or committee member, or his or her family has an interest, financial or otherwise, whether as owner, officer, director, fiduciary, employee, colleague, consultant, or supplier of goods or services, in an entity, institution, organization, facility, agency or program (hereafter collectively referred to as “entity”) whose application is before the Board or a committee of the Board for consideration or determination for a grant from the Spinal Cord Injury Research Trust Fund under Section 251 of the Public Health Law, that member shall (i) identify such interest to the Board or committee at any meeting when the application or request is to be considered, (ii) absent himself or herself from any portion of any meeting when such application is considered, and (iii) not participate in any vote of the Board or committee on such application. For purposes

of this Article, “family” shall include a spouse, children, sibling, and any relative living in the member’s household.

b) Disclosure and Possible Disqualification.

When a Board or committee member, or his or her family member has (i) any of the above-noted interests in an entity the status of which might reasonably be affected by another entity whose grant application is before the Board or a committee of the Board, or (ii) when a member has any other interest or association which might reasonably be construed as tending to embarrass the Board or elicit public suspicion that he or she might be engaged in acts in violation of his or her trust as a Board member, the member shall disclose such interest or association at the time the application or other matter is formally considered by the Board or committee, so that the Chair and, if necessary, the Board or committee can then determine whether the member’s participation in the discussion or the vote on the application by the Board or by the committee or on the other matter would be proper.

c) Procedure.

Prior to the discussion of a grant application, the Chair of the Board and the Chair of the Committee shall request that Board members and committee members disclose all actual or potential conflicts and, when appropriate, explain the conflicts. In the case of conflicts constituting Absolute Disqualifications, the members with such conflicts shall immediately leave the meeting and remain absent during the period when the application is under consideration. In the case of conflicts constituting possible disqualifications, the Chair of the Board or Committee shall rule upon such conflicts subject to appeal by motion to the Board or committee that may override the Chair’s decision by the affirmative vote of a majority of those present, excluding those members who are the subject of the vote.

d) Disclosure of Committee Interests to Board Meetings.

When the Chair of any committee reports the Committee’s deliberations and recommendations on a matter to the Board, the Committee Chair shall indicate in the report all interests or associations disclosed by the committee members and state how such members voted with respect to the committee’s recommendations.

e) Compliance with Public Officers Law.

Members of the Board shall comply with Sections 74 and 78 of the Public Officers Law as amended and the following rules governing conflicts of interest:

- i) No member shall receive compensation in return for services rendered in relation to matters before any State agency if compensation is contingent upon action or failure to act by such State agency.
- ii) No member of the Board who is also associated with any firm or association in which he/she has a specific interest shall sell any goods or services valued in excess of \$25 to any State agency unless pursuant to competitive bid.

- iii) No member of the Board shall accept any gift (in excess of \$75) under circumstances in which it could reasonably be inferred that the gift was intended to influence him/her as a member of the Board.
- iv) Members of the Board shall avoid any action which might result in or create the appearance of a conflict of interest.

f) Violation of Provisions.

If any member knowingly and intentionally violates these provisions, the Board or its Chair shall refer the matter to the Commissioner of Health for appropriate action.

IV. EXECUTIVE SECRETARY

The Board shall request the Department of Health to designate a Department employee as the Board's Secretary.

The Secretary shall prepare and send official notices of actions of the Board and shall administer the daily business of the Board under the general direction of the Chair. The Secretary shall send a copy of the minutes of each meeting of the Board to each member of the Board ten business days prior to the next Board meeting. The minutes, as approved or corrected, shall serve as the official record of a meeting of the Board. Minutes shall be distributed or made available to the public after they have been approved by the Board. The Secretary shall make available records requested under the Freedom of Information Law and make announcements to the media and public of scheduled meetings as required by the Open Meetings Law.

V. MEETINGS OF THE BOARD

a) Regular Meetings.

The regular meetings of the Board shall be held at least two times per year but may be held more frequently as deemed necessary, subject to a call by the Chair or by request of a majority of the Board members, at a date, time and place approved by a majority of members, unless otherwise determined by the Board or by the Chair, who shall notify the Secretary at least ten business days in advance of the meeting.

b) Meeting Notification.

The Secretary shall notify each Board member of Board meetings and shall send an agenda to his or her usual address not less than ten business days before the meeting.

c) Quorum.

A majority (seven members) of the members of the Board (13 members) shall constitute a quorum for the transaction of any business or the exercise of any power or function of the Board and all matters requiring action shall be passed by a vote of a majority of the voting members of the Board. (A voting member abstaining from a vote shall be counted as present for the purpose of establishing a quorum.) Except as provided below, all meetings shall be conducted in accordance with Robert's Rules of Order Newly Revised, and a record of each vote shall be

maintained. The normal method of voting shall be by roll call. A roll call vote on any question shall be taken by ayes and noes, abstentions noted, and a record of how each member voted entered in the Minutes.

d) Open Meetings.

Meetings of the Board shall be noticed and conducted in accordance with the requirements of Article 7 (Open Meetings Law) of the Public Officers Law. Such meetings shall be open to the public except when otherwise provided by law. Guidelines for observers shall be adopted by the Board.

e) Public Comment Period.

At least some portion of every regular Board meeting shall be set aside for public comment.

f) Order of Business.

The order of business may be altered at the Chair's discretion or upon the request of a Board member. A portion of each Board meeting shall be set aside for the development of an agenda for the next Board meeting.

g) Absences.

Any member, who fails to attend three consecutive meetings of the Board, unless excused by formal vote of the Board, shall be deemed to have vacated his or her position.

VI. COMMITTEES

a. Standing Committees

There shall be the following Standing Committee:

A Scientific Review Committee for the scientific and technical merit review of requests for proposals (grant applications).

The Chair of the Board shall appoint the members of Standing Committee and designate its Chair. In appointing members to the Standing Committee, the Chair will, to the extent practicable, ensure that the Committee comprises national or international experts of the highest scientific and technical caliber appropriate to spinal cord injury-related research while minimizing the potential for real or apparent conflict of interest. The term of committee membership shall be three years from the date of appointment. The Chair of the Board shall prescribe duties of the Standing Committee with approval by a majority of Board members.

b. Ad hoc Committees

The Board may, at any time, appoint a special committee on any subject. All such special committees not previously discharged by the Board shall be considered discharged one year following their appointment, unless the Board shall move to continue them.

c. Committee Actions

All committee matters requiring action or a formal recommendation shall be passed by a vote of a majority of the members appointed to serve on the committee.

When making a report to the Board, a committee should, in addition to reporting any recommendations of the majority of the committee, summarize any significant deliberations leading to such recommendations as well as opinions or recommendations of committee members who did not support the majority recommendations.

VII. PROPOSAL REVIEW PROCESS

The Board shall establish merit review procedures to be used by the Scientific Advisory Committee which are modeled after the National Institutes of Health or the National Science Foundation as appropriate to the granting mechanisms the Board establishes.

VIII. OFFICE OF THE BOARD

The official headquarters of the Board (at which the official copies of its Minutes, records, documents and other papers shall be kept) shall be at the offices of the Commissioner of Health at Albany, New York. The Secretary shall be responsible for the safekeeping of all Minutes, records, documents, correspondence and other items belonging to the Board. Every member of the Board and any other person duly authorized by a member shall have access at all times during the ordinary office hours of the Department of Health to all such Minutes, records, documents, correspondence and other items belonging to the Board; provided, however, that persons authorized by members shall not have access to records, documents, correspondence or other items that are exempt from disclosure or confidential under the Freedom of Information Law, the Personal Privacy Protection Law, or any other state or federal law. The Secretary shall designate some person to be in charge of all such Minutes, records, documents, correspondence and other items belonging to the Board during his or her absence from the office.

IX. AMENDMENT OF BYLAWS

These Bylaws may be amended by the affirmative vote of the majority of the voting members of the Board at any regular or special meeting, provided that notice of the proposed amendment has been given at a prior meeting and that a copy of the proposed amendment has been sent by the Secretary to each member of the Board at least ten business days prior to the vote.

Appendix III

Publications Resulting from Funded Projects

Publications based on SCIRB-funded research not appearing in previous reports

Contract C023690 – College of Staten Island; Maria Knikou, Principal Investigator

- 1) **Knikou M**, Mummidisetty CK. Locomotor training improves premotoneuronal control after chronic spinal cord injury. *J Neurophysiol* June 2014, 111:2264-75.

Abstract

Spinal inhibition is significantly reduced after spinal cord injury (SCI) in humans. In this work, we examined if locomotor training can improve spinal inhibition exerted at a presynaptic level. Sixteen people with chronic SCI received an average of 45 training sessions, 5 days/wk, 1 h/day. The soleus H-reflex depression in response to low-frequency stimulation, presynaptic inhibition of soleus Ia afferent terminals following stimulation of the common peroneal nerve, and bilateral EMG recovery patterns were assessed before and after locomotor training. The soleus H reflexes evoked at 1.0, 0.33, 0.20, 0.14, and 0.11 Hz were normalized to the H reflex evoked at 0.09 Hz. Conditioned H reflexes were normalized to the associated unconditioned H reflex evoked with subjects seated, while during stepping both H reflexes were normalized to the maximal M wave evoked after the test H reflex at each bin of the step cycle. Locomotor training potentiated homosynaptic depression in all participants regardless the type of the SCI. Presynaptic facilitation of soleus Ia afferents remained unaltered in motor complete SCI patients. In motor incomplete SCIs, locomotor training either reduced presynaptic facilitation or replaced presynaptic facilitation with presynaptic inhibition at rest. During stepping, presynaptic inhibition was modulated in a phase-dependent manner. Locomotor training changed the amplitude of locomotor EMG excitability, promoted intralimb and interlimb coordination, and altered cocontraction between knee and ankle antagonistic muscles differently in the more impaired leg compared with the less impaired leg. The results provide strong evidence that locomotor training improves premotoneuronal control after SCI in humans at rest and during walking.

- 2) Smith AC, Mummidisetty CK, Rymer WZ, **Knikou M**. Locomotor Training Alters the Behavior of Flexor Reflexes During Walking in Human Spinal Cord Injury. *J Neurophysiol* November 2014, 112:2164-75.

Abstract

In humans, a chronic spinal cord injury (SCI) impairs the excitability of pathways mediating early flexor reflexes, and increases the excitability of late, long-lasting flexor reflexes. We hypothesized that in individuals with SCI, locomotor training will alter the behavior of these spinally-mediated reflexes. Nine individuals who had either chronic clinically motor complete or incomplete SCI received an average of 44 locomotor training sessions. Flexor reflexes, elicited via sural nerve stimulation of the right or left leg, were recorded from the ipsilateral tibialis

anterior (TA) muscle before and after body weight support (BWS) assisted treadmill training. The modulation pattern of the ipsilateral TA responses following innocuous stimulation of the right foot were also recorded in 10 healthy subjects while they stepped at 25 % BWS, in order to investigate whether body unloading during walking affects the behavior of these responses. Healthy subjects did not receive treadmill training. We observed a phase-dependent modulation of early TA flexor reflexes in healthy subjects with reduced body weight during walking. The early TA flexor reflexes were increased at heel contact, progressively decreased during the stance phase, and then increased throughout the swing phase. In individuals with SCI, locomotor training induced the reappearance of early TA flexor reflexes and changed the amplitude of late TA flexor reflexes during walking. Both early and late TA flexor reflexes were modulated in a phase-dependent pattern after training. These new findings support the adaptive capability of the injured nervous system to return to a pre-lesion excitability and integration state.

3) Smith AC, Rymer WZ, **Knikou M**. Locomotor training modifies soleus monosynaptic motoneuron responses in human spinal cord injury. *Exp Brain Res* 10 September 2014 *Online* DOI 10:1007/s00221-014-4094-7.

Abstract

The objective of this study was to assess changes in monosynaptic motoneuron responses to stimulation of Ia afferents after locomotor training in individuals with chronic spinal cord injury (SCI). We hypothesized that locomotor training modifies the amplitude of the soleus monosynaptic motoneuron responses in a body position-dependent manner. Fifteen individuals with chronic clinical motor complete or incomplete SCI received an average of 45 locomotor training sessions. The soleus H-reflex and M-wave recruitment curves were assembled using data collected in both the right and left legs, with subjects seated and standing, before and after training. The soleus H-reflexes and M-waves, measured as peak-to-peak amplitudes, were normalized to the maximal M-wave (M_{max}). Stimulation intensities were normalized to 50 % M_{max} stimulus intensity. A sigmoid function was also fitted to the normalized soleus H-reflexes on the ascending limb of the recruitment curve. After training, soleus H-reflex excitability was increased in both legs in AIS C subjects, and remained unchanged in AIS A-B and AIS D subjects during standing. When subjects were seated, soleus H-reflex excitability was decreased after training in many AIS C and D subjects. Changes in reflex excitability coincided with changes in stimulation intensities at H-threshold, 50 % maximal H-reflex, and at maximal H-reflex, while an interaction between leg side and AIS scale for the H-reflex slope was also found. Adaptations of the intrinsic properties of soleus motoneurons and Ia afferents, the excitability profile of the soleus motoneuron pool, oligosynaptic inputs, and corticospinal inputs may all contribute to these changes. The findings of this study demonstrate that locomotor training impacts the amplitude of the monosynaptic motoneuron responses based on the demands of the motor task in people with chronic SCI.

Appendix IV

Spinal Cord Injury Research Board Members

Lorne Mendell, Ph.D., Chair

Stony Brook University

Lorne Mendell, Ph.D. is a Distinguished Professor at Stony Brook University, and his laboratory focuses on the functional effects of neurotrophins in pain and segmental reflex pathways. Specifically, his research centers on the physiology of neurotrophins, and their action in modifying well-delineated circuits in the intact and injured spinal cord, including sensory input and motor output. His group is investigating the effects of neurotrophins on nociceptors and nociception in rats. In previous work, the team determined that administration of the neurotrophin nerve growth factor (NGF), known to be normally upregulated in skin during inflammation, produces hyperalgesia, and now is studying the basis for the peripheral component of this hyperalgesia. Another focus in his research is the action of neurotrophins such as NT-3 and BDNF on spinal reflexes and pathways in the neonatal rat. Dr. Mendell is the author of numerous journal articles and a past president of the Society of Neuroscience.

Donald S. Faber, Ph.D., Vice Chair

Albert Einstein College of Medicine at Yeshiva University

Donald S. Faber, Ph.D. is the Florence and Irving Rubenstein University Professor Emeritus at the Albert Einstein College of Medicine in the Bronx. Dr. Faber served as the chair of the Dominick P. Purpura Department of Neuroscience from 1999 to 2013, and he also was the Director of the Rose F. Kennedy Center for most of that time. He is a world-renowned neuroscientist who has made major contributions to understanding of both the regulation and plasticity of synaptic transmission, the role of intrinsic membrane properties in both normal and abnormal operation of neural networks, as well as the physiological consequences of nerve cell responses to injury.

Dr. Faber earned his Ph.D. in physiology in 1968 from SUNY at Buffalo. After completing a postdoctoral fellowship with Nobel Laureate John Eccles, he worked as a research associate at the Max Planck Institute for Brain Research in Frankfurt and at the Hospital Salpetriere in Paris, before returning to the U.S. to join the faculty of the University of Cincinnati in 1972. He moved to the Department of Physiology at Buffalo in 1974, where he was named an associate professor and director, Division of Neurobiology in 1978 and rose to professor in 1981. In 1992, he moved to Medical College of Pennsylvania Hahnemann School of Medicine as chair of the Department of Neurobiology and Anatomy and a member of the School's Spinal Cord Injury Program, until he moved to Albert Einstein in 1999. Dr. Faber has served as a consultant to the National Institutes of Health (NIH) and the National Science Foundation (NSF), as well as on the editorial boards of three major journals. His extensive professional recognition includes appointment as a Javits Investigator of the NIH National Institute of

Neurological Diseases and Stroke and election as a fellow of the American Association for the Advancement of Science.

Thomas N. Bryce, M.D.,

Icahn School of Medicine at Mount Sinai

Thomas N. Bryce, M.D. is a professor of rehabilitation medicine at the Icahn School of Medicine at Mount Sinai. He is an attending physiatrist and has been the medical director of the Spinal Cord Injury Program at the Mount Sinai Medical Center since 2001. He received his undergraduate degree from Johns Hopkins University and his medical degree from Albany Medical College. He received specialty training in Rehabilitation Medicine at Thomas Jefferson University Hospital. Dr. Bryce is involved with research related to spinal cord injury especially as it relates to the assessment of pain after spinal injury. Dr. Bryce has been involved in several international taskforces related to outcome measures for pain after spinal cord injury, the International Dataset Project, and the classification of pain after spinal cord injury. He is the author of numerous journal articles and book chapters related to spinal cord injury.

David A. Carmel

Carmel Asset Management, LLC

David A. Carmel is co-founder and principal of Carmel Asset Management, an investment partnership where he leads all life sciences investments. Previously, he led all corporate development efforts for StemCyte, a cell therapeutics company. In 2004, he worked on the California Stem Cell and Cure Initiative that was approved by voters for \$3 billion in research funds. Prior to that campaign, he worked in the top U.S strategy group at Pfizer. In 2002, Carmel was selected as a White House Fellow and was awarded the Secretary's Honor Award, the Treasury Department's highest honor. He is a founding board member of the New York Stem Cell Foundation, a member of the New York State Spinal Cord Injury Research Board, and a Henry Crown Fellow of the Aspen Institute. Carmel earned a B.A. degree, magna cum laude, from Harvard and an M.B.A. from the Stanford Graduate School of Business.

Jeffrey D. Ehmman

Gannett Co. Inc.

Jeffrey Ehmman is a survivor of a 2005 climbing accident that left him a paraplegic. Mr. Ehmman continues to work full time for the media conglomerate Gannett, parent company of USA Today and six New York newspapers. Gannett is based in McLean, Virginia; Mr. Ehmman telecommutes from his home in Kingston, NY. Mr. Ehmman performs household chores, drives and exercises, hoping to reach his pre-accident fitness level. Mr. Ehmman is married to wife Meg and has three college-aged children.

Brooke M. Ellison, M.A.

The Brooke Ellison Project

Brooke Ellison has worked as an advocate for stem cell research for nearly a decade. In 1990, at the age of 11, Brooke was stricken in an accident that left her paralyzed from the neck down and dependent on a ventilator to breathe. However, Brooke never let her physical condition stand in the way of what she could achieve, and she graduated with honors from Harvard University in 2000 and from Harvard's Kennedy School of Government in 2004. In 2002, Brooke published an autobiography, *Miracles Happen*, which was later made into a movie directed by Christopher Reeve.

For more than a decade, Brooke has worked across the country as a public speaker, delivering her message of hope, optimism and strength in the face of obstacles, with her own experiences as a vehicle to convey the message. In 2006, Brooke ran as a candidate for the New York State Senate, focusing on the need for New York State to commit funding to stem cell research. Brooke has continued her work in the field of stem cell research, and in July 2007 formed a non-profit organization, The Brooke Ellison Project, to educate and mobilize the public on behalf of stem cell research. Moreover, working with leading scientists and advocates in the field, Brooke is now working on a documentary to disseminate the necessary information to advance stem cell research.

Michael E. Goldberg, M.D.

Columbia University College of Physicians and Surgeons

Michael E. Goldberg, M.D. is the David Mahoney Professor of Brain and Behavior in the Departments of Neuroscience, Neurology, Psychiatry and Ophthalmology at Columbia University College of Physicians and Surgeons, and Director of the Mahoney Center for Mind and Brain. He is also a member of the Kavli Institute for Brain Science at the Columbia University. He is a research scientist at the New York State Psychiatric Institute, and senior attending neurologist at New York Presbyterian Hospital. Dr. Goldberg served as president of the Society for Neuroscience from 2009 through 2010.

In 1963, Dr. Goldberg received an A.B. degree, *magna cum laude*, from Harvard College. From 1963 to 1964, he was a graduate fellow at Rockefeller University, and earned a medical degree from Harvard Medical School, *cum laude*, in 1968. He was Medical House Officer at Peter Bent Brigham Hospital from 1968-1969, Research Associate in the Laboratory of Neurobiology and the National Institute of Mental Health from 1969-1972, and Resident in Neurology in the Harvard Longwood Program from 1972-1975.

Dr. Goldberg's research on cognitive systems and neuroscience focuses on the psychophysics and physiology of cognitive processes in the monkey, using single unit recording, iontophoresis, and careful behavioral measurements. Current projects include elucidation of the cortical representation of oculomotor proprioception, using saccadic adaptation to understand the coordinate system of neurons in the lateral intraparietal area (LIP), the role of prestriate cortex in visual search, and the role of inhibition in the response of

parietal neurons. Recent discoveries in Dr. Goldberg's laboratory include the demonstration of a predictive relationship of parietal activity to both saccadic reaction time and visual attention; the demonstration that the lateral parietal area acts as a linear summing junction for at least three independent signals: a saccadic signal, and undifferentiated visual signal, and a cognitive signal; and the proprioceptive representation of eye position in monkey area 3a of primary somatosensory cortex.

Keith Gurgui

Resource Center for Accessible Living

Two weeks before he planned to start college, Keith Gurgui sustained a spinal cord injury while diving, leaving him permanently paralyzed below the neck. After leaving the hospital, he underwent six months of rigorous physical therapy to maintain muscular, orthopedic, respiratory and cardiovascular health as well as to learn how to use assistive technology and a wheelchair.

With Mr. Gurgui's accident and rehabilitation came an understanding of disability and rehabilitation, and a personal desire to advocate for issues, knowledge, concerns, needs and rights of people with disabilities. As the system advocate for the New York Statewide Systems Advocacy Network at the Resource Center for Accessible Living in Kingston, New York, he works with a network of community members who advocate for the needs of the disability community. He is also very interested in stem cell research and the field of regenerative medicine and attended the 2010 World Stem Cell Summit in Detroit, Michigan, hosted by the Genetics Policy Institute. Mr. Gurgui received his Associates in Individual Studies from Ulster County Community College in August of 2014.

Nancy A. Lieberman

Skadden, Arps, Slate, Meagher & Flom, LLP

Nancy A. Lieberman is a partner in the global law firm of Skadden, Arps, Slate, Meagher & Flom, LLP where she concentrates on mergers and acquisitions and corporate governance matters. Ms. Lieberman, a quadriplegic, is also a co-founder and director of New Yorkers to Cure Paralysis, an umbrella organization designed to educate New York legislators and the executive branch of the need for funding spinal cord injury research in New York State. She is also a director of the Pacific Council on International Policy, based in Los Angeles, a Trustee of the University of Rochester, from which she received a B.A. degree, and a member of the Council on Foreign Relations in New York City. Ms. Lieberman is a graduate of the University of Chicago Law School and received a graduate law degree from New York University.

Gary D. Paige, M.D., Ph.D.

University of Rochester Medical Center

Gary D. Paige, M.D., Ph.D., received his undergraduate education in 1970 at the University of California at Irvine in the biological sciences. He then attended the University of Chicago's Medical Scientist Training Program, where he completed medical school (M.D., 1980) and

graduate training in Physiological and Pharmacological Sciences (Ph.D., 1981). He followed with an internship at Michael Reese Hospital in Chicago and a residency in Ophthalmology at the University of California at San Francisco in 1985. Dr. Paige then joined the faculty of Washington University in St. Louis in the Department of Otolaryngology, where he established and directed the Vestibular and Oculomotor Laboratory. In 1990, he was recruited by the University of Rochester, Department of Neurology, as chief of the Sensory-Motor Neurology Unit, as well as director of the Balance and Eye Movement Laboratory and the Balance Disorders Clinic. In 1998, he was appointed Kilian J. and Caroline F. Schmitt Professor and Chair of the Department of Neurobiology and Anatomy at the University of Rochester, a term ending in 2015. He was also founder (2002) and Director of the Center for Navigation and Communication Sciences for twelve years.

Dr. Paige's research on multisensory interactions underlying spatial orientation focuses on how the brain integrates sensory inputs from the outside world (vision and audition) with the internal senses (vestibular and somatosensory) to accurately depict spatial orientation and to guide navigation and other relevant behavior. Equally important is how plastic mechanisms register errors and adaptively adjust or restore performance in response to the challenges of development, disease and natural aging. In addition to research and clinical responsibilities, academic activities include medical and graduate education, peer review for NIH and other agencies, and journal review and editorial duties. Dr. Paige has served on the governing boards of the Association of Medical School Neuroscience Department Chairs (President) and currently serves as President of the Society for the Neural Control of Movement.

Paul Richter

Spinal Cord Society

Paul Richter is responsible for the 1998 legislation that created the Spinal Cord Injury Research Board. He was serving as a State Trooper Zone Sergeant 34 years ago when he was shot three times and was left with a spinal cord injury.

Mark M. Stecker, M.D., Ph.D.

Winthrop University Hospital

Mark M. Stecker, M.D., Ph.D. is the chairman of the Department of Neuroscience at Winthrop University Hospital. Dr. Stecker completed his graduate training in physics at the University of Pennsylvania (Ph.D., 1980), and completed medical school (M.D., 1984) at Harvard Medical School. He followed with a neurology residency and fellowship at the Hospital of the University of Pennsylvania and he was an attending at the University of Pennsylvania for 10 years. He started the neurophysiologic monitoring program in the Department of Neurology and was a member of the Complex Aortic Surgery Program. Dr. Stecker then moved to the Geisinger Medical Center, where he ran the electroencephalography (EEG) and intraoperative monitoring programs from 2000-2008. From 2008-2011, he served as associate chair for neurology at Marshall University where he developed the epilepsy and stroke programs.

Dr. Stecker moved to Winthrop University Hospital in 2011, where his research in peripheral nerve has focused on the negative role of high glucose concentrations on the ability of the peripheral nerve to tolerate anoxia. He is the author of numerous articles on this and related problems.

Adam B. Stein, M.D.

The North Shore-Long Island Jewish Health System

Adam B. Stein, M.D. is professor and chairman of the Department of Physical Medicine and Rehabilitation at Hofstra North Shore-Long Island Jewish School of Medicine as well as the chairman of Physical Medicine and Rehabilitation at North Shore University Hospital and Long Island Jewish Medical Center.

Dr. Stein completed his medical degree in 1987 at New York University School of Medicine. His residency training in physical medicine and rehabilitation took place at New York University School of Medicine-Rusk Institute for Rehabilitation Medicine, and was successfully completed in 1991. In his final year of residency, Dr. Stein was elected chief resident and ultimately honored with the Highest Overall Performance Award. Dr. Stein has been board certified in physical medicine and rehabilitation since 1992. He is also board certified in spinal cord injury medicine since 2003.

After residency, Dr. Stein joined the faculty at the Mount Sinai School of Medicine in the Department of Rehabilitation Medicine; he remained at Mount Sinai until 2008. At Mount Sinai, Dr. Stein directed the Spinal Cord Injury Unit and developed the department's program for ventilator dependent individuals. He served as the residency program director for the Residency Training Programs in Physical Medicine and Rehabilitation and Spinal Cord Injury Medicine, respectively. Dr. Stein coordinated all educational programs provided by the department to the Mount Sinai School of Medicine and was able to incorporate physical medicine and rehabilitation into each of the four years of the medical school's curriculum; a rarity in U.S. medical schools.

Dr. Stein began his chairmanship at North Shore-Long Island Jewish Health System in July, 2008. In this capacity, he oversees the delivery of rehabilitation services for the health system for its many hospitals and outpatient therapy centers as well as helping to oversee the Residency Training Program in Physical Medicine and Rehabilitation. Dr. Stein also facilitates the education of medical students at Hofstra North Shore-Long Island Jewish School of Medicine. He directs the PM&R portion of Advanced Clinical Experience and has contributed as a content leader for "The Human Condition", one of the core courses at the school. Further, he is a member of the Admissions Committee, a core faculty member of the communication portion of the school's first course, CPR: Challenges, Privileges and Responsibilities and serves as a coach and assessor for the medical students during Reflection, Integration and Assessment periods.

Dr. Stein serves as a member of the Board of Trustees for the Association of Academic Physiatrists and is a member of the Board of Directors of the American Spinal Injury Association.

Robert D. Trotta, Esq.

Davis and Trotta, Attorneys-at-Law

Mr. Trotta is a graduate of Hobart College in Geneva, New York and Syracuse University College of Law. He is admitted to the New York State Bar and has worked with Davis and Trotta since 1966. He served in the Dutchess County Public Defender's Office from 1968 to 1981, and worked as Town Attorney for the Town of Northeast for 16 years and School Attorney for the Webutuck (New York) Central School District for three years. He became interested in finding a cure for spinal cord injury after his son, David, was paralyzed from the neck down as the result of a motorcycle accident.

Jonathan R. Wolpaw, M.D.

Wadsworth Center, New York State Department of Health

Dr. Wolpaw is a board-certified neurologist who has worked at the Wadsworth Center for more than 25 years. He received a medical degree from Case Western Reserve University in 1970, and then completed a residency in neurology at the University of Vermont and a fellowship in neurophysiological research at the NIH. He is chief of Wadsworth's Laboratory of Neural Injury and Repair and a professor in the Department of Biomedical Sciences, University at Albany's School of Public Health.

Dr. Wolpaw's major research interest is developing and using operant conditioning of spinal reflexes as a new model for studying learning and memory in the vertebrate nervous system. These methods are now being applied to the study of spinal cord injury and development of new treatment methods. Dr. Wolpaw is also designing electro-encephalograph-based brain-computer interface technology as a new communication and control channel for those with severe motor disabilities. He is the author of numerous journal articles and holds several NIH grants.

APPENDIX V
Abbreviations Key

A.B.	Bachelor's degree	M.B.A.	Master of Business Administration
AIS	axon initial segment	M.D.	Doctor of Medicine
B.A.	Bachelor of Arts	M_{max}	maximal muscle response
BDNF	Brain Derived Neurotrophic Factor	M-wave	muscle response
BWS	body weight support	NSF	National Science Foundation
CUNY	City University of New York	NGF	nerve growth factor
Dr.	Doctor	NIH	National Institutes of Health
EEG	Electroencephalography	NT-3	Neurotrophin-3
EMG	electromyography	Ph.D.	Doctor of Philosophy
FY	fiscal year	PM&R	Physical medicine and rehabilitation
H-reflex	Hoffman's reflex	SCI	spinal cord injury
Hz	hertz	SCIRB	New York State Spinal Cord Injury Research Board
FY	fiscal year	SUNY	State University of New York
LIP	Lateral Intraparietal Cortex	TA	tibialis anterior
M.A.	Master of Arts		