

The Project

A Publication of The Miami Project To Cure Paralysis & The Buoniconti Fund To Cure Paralysis



The Miami Project To Cure Paralysis Research Review 2019

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Research Review 2019

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COVID-19 and the SCI community



Among those most seriously affected by COVID-19 are people with neurological injuries and diseases, as they are especially vulnerable to further challenges and health hazards. Our Miami Project scientists are collaborating with University of Miami researchers and lending their expertise in developing new strategies aimed at treating individuals suffering from COVID-19 and upper respiratory infections.

Our scientists are at the forefront in developing new rehabilitation, exercise, breathing, safety protocols, and resources targeting the spinal cord injured community. Miami Project clinical trials are continuing and being adapted to reflect physical distancing by remote therapy to improve neurological and pulmonary function, which are critical to people living with a spinal cord injury. Our laboratory scientists are continuing their critical experiments at all hours of the day and night to move our discoveries forward, while observing physical distancing. Virtual communications are bringing scientists, trainees, and community members together during this time of physical distancing, allowing our research programs to move forward.

The Miami Project is also providing equipment to partner organizations to assist in the testing of COVID-19. Our clinicians are ensuring the highest level of patient care while our critical research continues. While the repair and restoration of function of the nervous system is the hallmark of our scientific mission, we are proud to be contributing to ongoing COVID-19 efforts during this time.

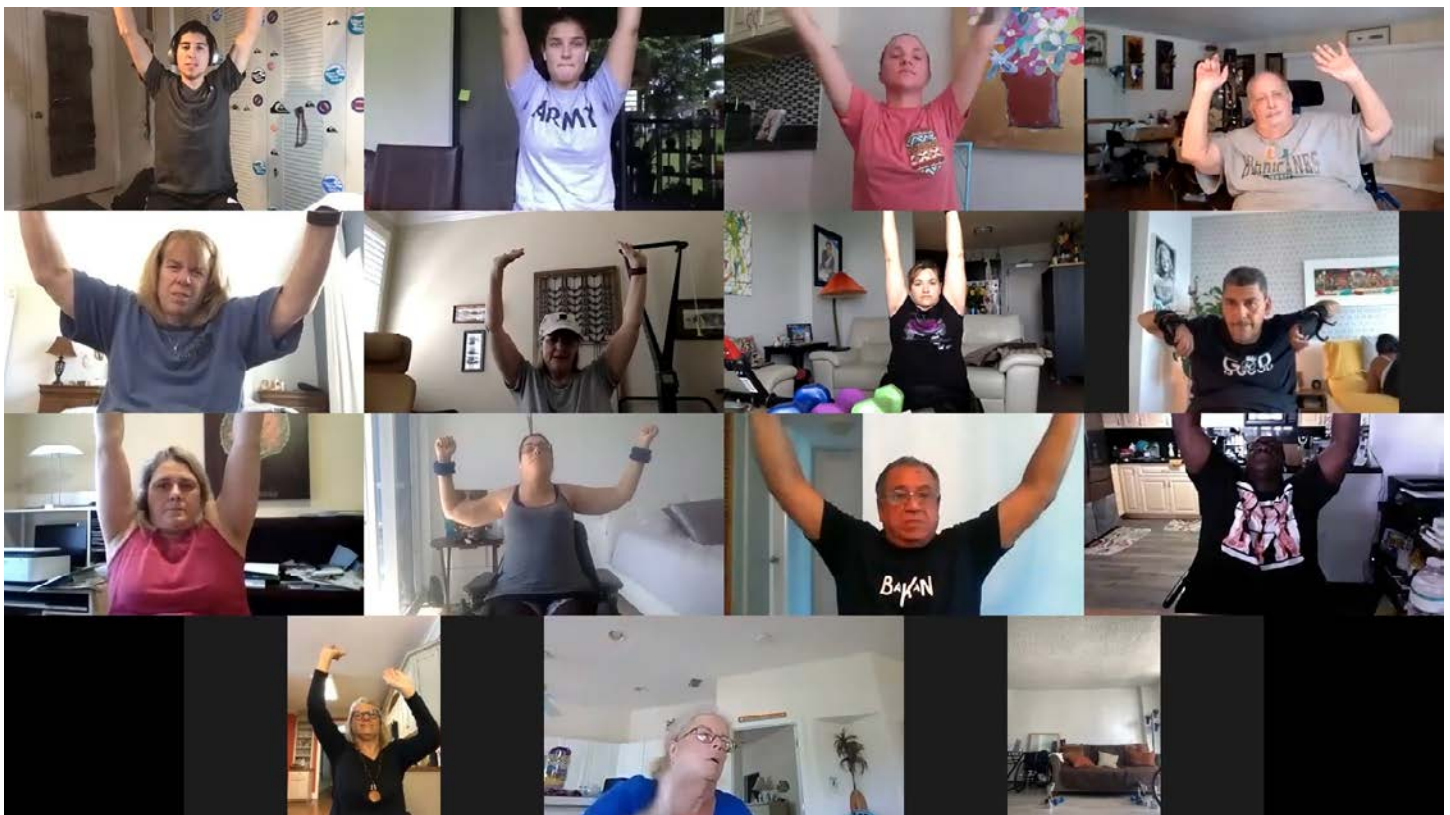


Respiratory Muscle Therapy for SCI

We're all staying safe at home, but now what? Watch one of the videos at <https://www.themiamiproject.org/respiratory-muscle-therapy/> to see a simple exercise that can help prepare your lungs to fight COVID-19. Because the virus makes it difficult to breathe, people with spinal cord injury (SCI) are at a greater risk of requiring emergency care if they contract the virus because many have underlying weakness in their breathing muscles. This video shows how you can train and strengthen the muscles that allow you to breathe. The stronger you make those muscles, the better you can move air in and out of your lungs, especially when it comes to coughing. This type of training has also been shown to decrease rates of pneumonia, a common side effect of COVID-19 and one of the leading causes of death for people with SCI. Training these muscles is important for people with SCI, but ANYONE can benefit because COVID-19 does not discriminate. Keep your breathing muscles strong and yourself healthy! #See10Breathe10Challenge



Dr. Annie Palermo explaining Respiratory Muscle Therapy for SCI.



The Miami Project virtual SCI circuit training session via Zoom.



Minimizing Secondary Damage In Spinal Cord Injuries



Dr. James Guest, clinical professor and expert in SCI clinical trials, as the principal investigator.

This clinical trial has the potential to affect the way clinicians treat people with acute SCIs in the future. With over 17,000 new SCI cases each year in the United States alone, an effective therapy has the potential to improve functional outcomes and quality of life for many people around the world.

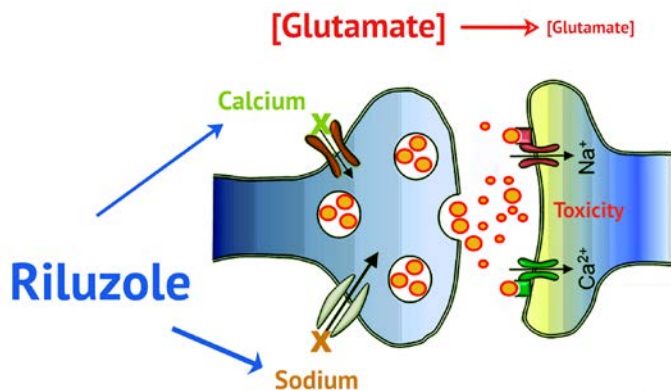
If you were to ask someone with a spinal cord injury (SCI), “How were you injured?” the response will probably describe the initial cause of the injury, such as a car accident, fall, dive, or violent event. However, there is another aspect of SCI that contributes to the damage within the spinal cord. After the initial trauma, or primary injury, the body signals for its natural defender, the immune system, to activate and clear out the debris (dead cells, blood, etc.) from the spinal cord, as well as preserve healthy tissue and cells. While these efforts are essential, they can also destroy healthy cells and leave behind irreversible additional damage. We call this “secondary damage”. Reducing secondary damage in spinal cord injuries could lead to better recovery and better functional outcomes, by preserving healthy cells within the spinal cord.

Scientists have been exploring different drugs that may improve survival of neurons in the central nervous system after SCI. SCI researchers identified a neuroprotective drug, Riluzole, which is approved by the United States Food and Drug Administration (FDA) and has been safely used in the treatment of amyotrophic lateral sclerosis (ALS) for over 20 years. Early Riluzole studies done with animals with spinal cord injuries showed that this drug preserves neurological tissue and improves neurological and functional recovery. In 2011, a phase 1 safety trial was completed, which evaluated the safety of efficacy of Riluzole in 30 participants with acute SCI. Based on those positive safety results, an exciting new study began in 2014 at over 20 sites around the world. The Miami Project to Cure Paralysis as one of the study sites, with Dr. James Guest, clinical professor





Dr. George Jimsheleishvili, the coordinator for this clinical trial, is on call 24/7.




Riluzole is a drug that can reduce the release of toxic glutamate after spinal cord injury. Amongst its mechanisms is to block sodium channels and calcium entry reducing the release of glutamate and thus reducing secondary injury.

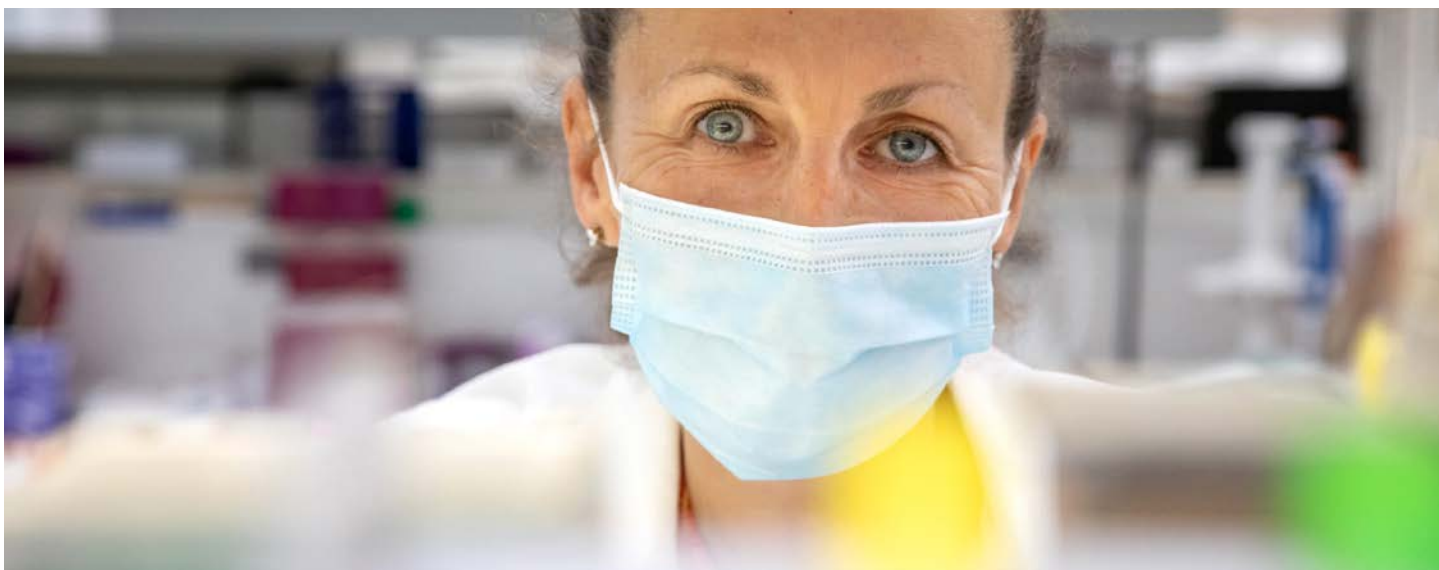
and expert in SCI clinical trials, as the principal investigator. This is a phase IIB/III randomized, double-blinded, multicenter trial, designed to evaluate the effectiveness of Riluzole in people with acute SCI. With a target enrollment of 350 participants, the study is expected to be completed in 2025.

Dr. George Jimsheleishvili, the coordinator for this clinical trial, is on call 24/7, since participants must be consented, screened, and provided the first dose of Riluzole within 12 hours of injury. Participants

must have a traumatic, cervical-level 4 (C4) to 8 (C8) SCI caused by blunt trauma with no other major injuries (such as traumatic brain injury). Subsequent doses of Riluzole are administered for the following 13 days after injury. From the first few hours after injury and for the following year, Dr. Jimsheleishvili follows up with the participants at various time points to track their recovery. During each follow-up visit, he assesses the participant's neurological function, quality of life, and functional outcomes. Since the study is double-blinded, neither the participant nor the researchers know whether Riluzole or a placebo was given, ensuring that the researchers, including Drs. Guest and Jimsheleishvili, are not biased during the evaluations.

This clinical trial has the potential to affect the way clinicians treat people with acute SCIs in the future. With over 17,000 new SCI cases each year in the United States alone, an effective therapy has the potential to improve functional outcomes and quality of life for many people around the world. The Miami Project is proud to be a part of this important study and to contribute towards the development of treatments and therapies aimed at improving the lives of people affected by SCI. 





Miami Project researcher Stanislava Jergova.

Miami Project Researchers Demonstrate Positive Results Using a Combination Strategy to Combat Chronic Pain Following SCI

Manuscript confirms benefits of the combination of intensive exercise and GABAergic neural progenitor cell transplants in reducing neuropathic pain in SCI.

Chronic pain is a major issue for many people living with spinal cord injury (SCI). This pain, often uncontrollable, can be debilitating, greatly reducing overall quality of life. Neuropathic pain is difficult to manage, and up to two thirds of people with chronic SCI do not have an effective treatment option. Clinically, rehabilitation is recommended following SCI to enhance recovery, prevent secondary health complications, and maximize independence. While some favorable effects of exercise on neuropathic pain following SCI have been observed in small clinical studies, results have been modest and inconsistent.

Previous research in the lab of Jacqueline Sagen, Ph.D., M.B.A., Professor, Department of Neurological Surgery and The Miami Project, has shown that exercise through intensive locomotor training (ILT) can reduce the development of new pain and partially reverse existing pain. Separate studies from her lab have shown that neuropathic pain can also be reduced in a preclinical model of SCI by transplanting GABAergic neural progenitor cells (NPCs) into the spinal cord. Encouraged by the positive results from these studies, Dr. Sagen and her colleagues, therefore, decided to combine the two treatment strategies, in the hopes of maximizing potential benefits.

Dr. Sagen and her team found that the combination of cell transplants and exercise resulted in significant reductions of neuropathic pain, beyond what either therapy achieved alone. They observed a reduction in detrimental inflammatory processes and restoration of disrupted inhibitory pathways in the injured spinal





Melissa Hernandez, Anjalika Eeswara and Stanislava Jergova working in the lab.




Dr. Jacqueline Sagen

“The development of combination therapies such as these hold great potential to help improve the overall quality of life for people with SCI.”

cord. These positive outcomes may underlie the functional benefits observed in pain-related behaviors following treatment. Results from this combination study, *Mutually Beneficial Effects of Intensive Exercise and GABAergic Neural Progenitor Cell Transplants in Reducing Neuropathic Pain and Spinal Pathology in Rats with Spinal Cord Injury*, were recently published in the journal of *Experimental Neurology*.

Dr. Sagen said, “We were pleased and somewhat surprised to find such a strong positive interaction between the two treatments. The study clearly demonstrated better overall cell transplant function in the spinal cord in conjunction with an exercise regimen.” Added Dr. Elizabeth Dugan, Ph.D.,

primary author on the paper, “The development of combination therapies such as these hold great potential to help improve the overall quality of life for people with SCI.”

The development of therapies that target multiple underlying pathological mechanisms following injury, such as the combination of exercise and cellular transplantation, has potential for improving the quality of life for the many people who experience uncontrollable pain following SCI. Future studies in Dr. Sagen’s lab will focus on developing and optimizing the components of this promising combination for eventual translation to clinically relevant treatments. 

Exosomes Show Promise as a Potential Strategy Targeting SCI



Jaime Said and Jordan Reid working in the lab.

“Exosomes, like the nano-sized vehicle of *Fantastic Voyage*, will allow us to deliver biomolecules or pharmaceuticals to specific areas of the body after injury to program damaged cells to survive and repair themselves”

Exosome-based therapy is an exciting development that has derived from research on how cells communicate with one another over distances within the body.

Exosomes are nanosized structures within a cell that can be released, such as in response to an injury, and then taken up by nearby cells or enter the circulation where they can be delivered to other tissues or organs. Exosomes act as shuttles for certain genetic information and proteins to other cells that are important regulators in the body that tell different cells what to do and how and when to react. This cell-to-cell communication is critical in the body's ability to maintain a healthy cellular environment. Exosomes play a key role in the regulation of these




intercellular communication processes. Exosomes also offer the capacity to be engineered to express a label, be targeted to a selective cell type or be loaded with specific cargo, such as pharmaceuticals for tissue or cell selective delivery.

The potential of this work is limitless as it relates to the repair of damaged cells in the spinal cord and other areas of the central nervous system. Damien D. Pearse, Ph.D., The John M. and Jocelyn H.K. Watkins Distinguished Chair in Cell Therapies, Professor, Department of Neurological Surgery and The Miami Project and his team, in collaboration with researchers led by Ms. Aisha Khan from University of Miami Interdisciplinary Stem Cell Institute, are investigating whether exosomes derived from Schwann cells and neural or mesenchymal stem cells have therapeutic benefit in neuroprotection and nerve regeneration. The goal is to transfer the valuable biological signals (exosomes) from the cells themselves and use them to protect neurons from dying or to direct nerves to regenerate after SCI.

Dr. Pearse and his team hope to answer the fundamental questions about feasibility, delivery and effectiveness of using exosomes from distinct cell sources for SCI. Additionally, they hope to determine if these exosomes can provide beneficial actions for protection, repair and recovery that compare to the transplantation of the parent cell, whether Schwann cell or stem cell.

The current studies underway in Dr. Pearse's lab hope to identify the most effective administration route for the delivery of cell-derived exosomes after SCI. This data will be compared with the more traditional transplantation of cells directly into the injured spinal cord to examine which technique proves more effective in repair and functional recovery following SCI.

These experiments will be performed in the same SCI paradigm to that Dr. Pearse and colleagues used in the initial Schwann cell research endeavor, which is a clinically relevant cervical spinal cord injury model. If this therapy is proven effective, it may provide an alternative or complimentary approach to cellular transplantation, because exosomes are very small and can be delivered systemically, such as through a person's vein. They can then travel to the injury site. This makes the therapy minimally invasive compared to a cell transplantation surgery.

Finally, the development of exosomes from human stem cells and Schwann cells will allow us to use the therapy for potential benefit in a wide range of diseases and conditions, from Multiple Sclerosis and Alzheimer's disease to rheumatoid arthritis and traumatic brain injury based upon their anti-inflammatory and reparative properties. 



Dr. Damien Pearse

STUDIES ACTIVELY RECRUITING PARTICIPANTS AT THE MIAMI PROJECT TO CURE PARALYSIS

Last update: January 8, 2020

SPINAL CORD INJURY:

1) A Lifestyle Intervention Targeting Enhanced Health and Function for Persons with Chronic SCI in Caregiver/Care-Receiver Relationships: Effects of Caregiver Co-Treatment

Purpose: To determine the effect in health and functional impact of a lifestyle intervention in people with chronic SCI and their caregivers. We are interested in seeing if the complementary caregiver intervention enhances health and functional benefits obtained by the SCI individual.

Criteria: SCI men and women and their caregivers (enrollment as a couple). SCI: motor complete or incomplete, C5-L1, traumatic or non-traumatic, non-progressive spinal injury; 18-65 years old; ≥ 1 year post-injury. Caregivers: healthy; 18-65 years old; who provide social and/or physical support to the SCI participants.

Duration: Approximately 14 months total, including a screening visit to assess cardiometabolic risk for the SCI individual. Additional testing periods at time of enrollment, baseline, and 6 and 12 months for SCI and caregivers.

Enrollment open until: September, 2020
Principal Investigator/Contact: Dr. Mark S Nash / Dr. Luisa Betancourt

2) Stakeholder Perceptions and Clinical Assessment of Cardiometabolic Disease/Syndrome after Spinal Cord Injury

Purpose: It is known that risks for heart and blood vessel disease (atherosclerosis) and abnormal sugar metabolism (diabetes) are elevated after SCI. The investigators don't know whether individuals were ever told by their physician if have these risks, or currently have these risks. We are interested to determine if individuals with SCI are overweight, have abnormal sugar metabolism (insulin resistance or diabetes), have blood pressure that is too high, or have blood fats that are outside of acceptable ranges. This information will be measured and compared with the individuals' clinical report of their physician's or other health care professionals (nurses or therapists) advice of having these risks. As these risks may change with time after SCI, the Investigators are also interested in seeing whether this information changes after one and two years of living with a SCI.

Criteria: Motor complete or incomplete, C5-L1, traumatic spinal injury; 18 - 70 years old; within 2 months of discharge from initial rehabilitation post-injury.

Duration: Approximately 24 months total, including a screening visit to assess risk for heart, blood vessel disease, and blood sugar metabolism for the individual with SCI. Testing periods at time of enrollment, 12 months, and 24 months after.

Enrollment open until: September, 2020
Principal Investigator/Contact: Dr. Mark S Nash / Dr. Luisa Betancourt

3) Statin Monotherapy for Treatment of Endocrine Metabolic Disease Risk

Purpose: Research study to determine the safety and efficacy of statin therapy (which is typically used to lower cholesterol and treat heart disease) for increasing bone mineral density (bone health) among adults with chronic motor-complete Spinal Cord Injury.

Criteria: Non-progressive spinal cord injury; SCI men and women. SCI 18 -60 years old; with a chronic motor complete SCI (C1-T10 AIS A/B);



2), traumatic spinal injury; ≥ 2 year post-injury; able to provide a contact number, and ability to attend the study visits and be able to take oral medications and swallow independently.

Duration: Approximately 12-16 months total, including a screening visit to assess eligibility. Additional testing period visits and phone calls scheduled throughout the course of the study

Enrollment open until: September, 2020
Principal Investigator/Contact: Dr. Mark S Nash / Dr. Luisa Betancourt

4) Postprandial Fat Metabolism Following an Acute Exercise Bout in Persons with Spinal Cord Injuries

Purpose: To determine the effect of spinal cord injury (SCI) on the metabolism of fats following feeding of a liquid “mixed meal” containing 50% carbohydrates, 35% fat, and 15% protein. Secondly, to determine the effect of pre-meal exercise on metabolism of fats from the meal.

Criteria: Men with and without SCI. SCI: motor complete or incomplete, C5-L1, traumatic or non-traumatic, non-progressive spinal injury; 18-60 years old; ≥ 1 year post-injury. Neurologically intact: healthy; 18-60 years old.

Duration: Approximately 3-4 weeks total, including a screening visit to assess body composition and cardiorespiratory fitness for the SCI individual. Following assessment, two experimental trials will occur separated by approximately 1 week. Each full trial requires ~8.5 hr of testing.

Enrollment open until: June, 2020
Principal Investigator/Contact: Dr. Kevin A Jacobs / Dr. Mark S Nash

5) Respiratory Performance and Predictive Factors in SCI

Purpose: To determine normative values and create predictive equations of respiratory performance for the SCI population. We also hope to find factors that predict respiratory compromise. Lastly we hope

to determine the effect of abdominal binders on breathing assessment measures.

Criteria: Men and women with SCI who are over 18 years old

Duration: After your first in-person visit you are invited to come back for an optional second in-person visit within one month. Our study team will follow up with you via phone or email contact at 1 month, 6 months, and 1 year after your initial visit.

Enrollment open until: Open-ended
Principal Investigator/Contact: Dr. Mark Nash / Dr. Katie Gant / Dr. Annie Palermo

6) Motor Plasticity, Intermittent Hypoxia, and Sleep Apnea

Purpose: The purpose of this study is to learn about the effect of sleep apnea and low oxygen on muscle strength and lung function in people with chronic spinal cord injury. You will be asked to briefly breathe in air with a lower than normal oxygen content (hypoxia) for 90 seconds at a time, several times during a 3-hour test (Acute intermittent hypoxia or AIH protocol). We will then measure your muscle strength and lung function after each test.

Criteria: To participate in this research study, all of the following must be true for a person: age greater than 18 years; have a spinal cord injury (SCI) for > 1 year. If you get invited back for the second part of the study you should be willing to participate in study measurements 3 days in a row and come back for follow-up on 2 additional visits

Duration: Initially we will require an at home sleep study to see if you are eligible for the second part of the study. Participation will require 6 visits over the course of approximately 18 days; between 1-3 hours required each visit to complete study measurements.

Enrollment open until: 30 people complete the study
Principal Investigator/Contact: Dr. Shirin Shafazand / Dr. Mark Nash



7) The Safety and Efficacy of the Use of a Brain-Computer Interface-Based Electromagnetic Field Treatment in the Management of Chronic Spinal Cord Injury (SCI) Patients – A Pilot Study

Purpose: To evaluate the safety and efficacy of non-invasive, low intensity and low frequency electromagnetic fields targeting the central nervous system (CNS). Application of electromagnetic fields will be administered as an adjunctive treatment along with physical therapy, with the goal of enhancing the recovery process in people with SCI.

Criteria: Incomplete, cervical-level spinal cord injury (AIS B-D); 12-30 months post-injury; 18-75 years old; GRASSP strength subscore of 5-35 on at least one side.

Duration: Approximately 34 weeks

Principal Investigator/Contact: Dr. Dalton Dietrich / Dr. Katie Gant

8) Fertility Evaluation

Purpose: To determine the cause of low sperm motility in men with SCI.

Criteria: Men; between 18- 45 years old; all levels of injury; any time post-injury.

Duration: Visit laboratory about once a month for 1 to 6 months.

Enrollment open until: Open-ended

Principal Investigator/Contact: Dr. Emad Ibrahim / Sonny Aballa

9) Utility of MRS Brain Biomarkers of Pain Phenotypes after Traumatic Brain Injury

Purpose: To compare subjects with TBI and chronic pain (TBICP), subjects with TBI and no chronic pain (TBINoP), and matched pain-free controls (CNoP) on Magnetic Resonance Spectroscopy (MRS) and Diffusion Kurtosis Imaging (DKI) measures.

Criteria: Group I: TBI and chronic pain; fluent in English; 18-55 years old; non-penetrating head injury; TBI must have occurred at least 6 months prior to entering study; mild or moderate TBI with moderate chronic pain for minimum of three months.

Group II: Pain-free TBI; fluent in English; 18-55 years old; non-penetrating head injury; TBI must have occurred at least 6 months prior to entering study; mild or moderate TBI.

Group III: Pain-free controls; fluent in English; 18-55 years old.

Duration: 2 visits lasting 4 hours over a 2-4 week period.

Enrollment open until: Summer of 2020

Principal Investigator/Contact: Dr. Eva Widerström-Noga / Lorian Fleming

10) Altered body representation in people with spinal cord injury and its association with pain sensation

Purpose: To define changes in body ownership underlying compromised multisensory integration in spinal cord injury (SCI) individuals by using the rubber hand illusion procedure (RHI); ii) to determine the relation between compromised multisensory integration after SCI and its impact on pain.

Criteria: Group I: SCI and chronic pain (SCICP) group: Men or women, fluent in English, 18-50 years of age who have: (1) Incomplete, level of injury from (C2-T10); (2) persistent pain for a minimum of three months prior to entering the study that is at least moderate in severity, defined as ≥ 4 on an Numeric Rating Scale (NRS) ranging 0 to 10.

Group II: SCI no pain (SCINP) group: Same entry criteria as the SCICP group less the pain criterion.

Group III: Healthy control subjects group No Pain: Participants will be men or women, fluent in English, 18- 50 years of age who are non-injured and otherwise healthy



Duration: 1 visit lasting 1.5 hour

Enrollment open until: August, 2020

Principal Investigator/Contact: Dr. Eva Widerström-Noga / Dr. Roberta Vastano

11) Development of pain education for improving pain health literacy and quality of life after spinal cord injury

Purpose: To incorporate the perspectives from individuals with Spinal Cord Injury or SCI who experience neuropathic pain, their significant others, and SCI healthcare providers to develop a relevant, consumer- grounded educational resource regarding SCI-related pain for the SCI community, their families, and healthcare providers.

Criteria: Group I: People Who have SCI-related Pain for 6 months or longer Group II: People who are Close to a person with SCI-related Pain

Group III: Healthcare Providers who serve the SCI patient population (up to 75 years of age)

Duration: 3 visits lasting 30 minutes to 2 hours

Enrollment open until: December, 2020

Principal Investigator/Contact: Dr. Eva Widerström-Noga / Loriann Fleming

PERIPHERAL NERVE INJURY

The safety and efficacy of autologous human Schwann cell (ahSC) augmentation of nerve autografts after severe peripheral nerve injury

Purpose: to evaluate the safety of injecting one's own Schwann cells along with nerve autograft (eg. sural nerve - the sural nerve is a sensory nerve in the leg) after a severe injury to a major nerve has occurred. The secondary purpose of this research project is to evaluate whether transplanted Schwann cells can enhance recovery of sensory and motor function.

Criteria:

Subject inclusion criteria:

- 18 to 65 years old
- Severe sciatic nerve injury, brachial plexus injury, and/or major injury of the arm or leg with nerve loss within the previous year

Subject exclusion criteria:

- Unable to safely have an MRI
- Injury to legs that prevents the study doctor from being able to remove part of the sural nerve if needed
- Severe nerve injury with a gap length greater than 10 mm
- History of radiation or cancer in the area of your nerve injury, which includes primary tumors of the nerve
- Currently pregnant or test positive for pregnancy upon enrollment
- Disease that the study doctor believes will interfere with participant's safety or compliance in relation to the study procedures
- History of active substance abuse
- Allergy to gentamicin
- Positive for HIV or Hepatitis B or C virus

Principal Investigator/Contact: Dr. Allan Levi / Dr. Katie Gant



A Not-so-Happy Thanksgiving

I missed a holiday dinner with my family because of the inability to coordinate a trip properly, especially when I did everything I was supposed to on my end.



Emma Reyes


It was Thanksgiving Day 2018, and I was excited to celebrate the holiday with my family at my cousin's new home. I scheduled my pickup with the local shared-ride public transportation service well in advance, allowing for plenty of transit time, knowing that day would probably be busier than usual. That afternoon, the transport van surprisingly arrived 10 minutes early, which is rare on a regular day and unheard of on holidays. Pickups are often late by 30 minutes to an hour, resulting in delayed arrivals and missed appointments. I was especially thankful this Thanksgiving day for an on-time pickup, as I expected a great day with my family. Unfortunately, that was not to be the case. I ended up missing Thanksgiving dinner, thanks to a horrible ride experience provided by my local ride-share service.



Covering the 35 miles to my cousin's house usually takes about two hours on public transportation. This ride took over four and a half hours. Although the ride-sharing service is not the most efficient normally, I had never experienced anything like that. Aside from spending half of my day in a vehicle, there was also the issue of accommodation. Transportation vans are fitted for three wheelchairs, at most, yet there were four wheelchairs plus a rider in the passenger seat. When the four wheelchairs did not properly fit in the van, the driver had to rearrange two of the wheelchairs in front of me in order for all wheelchairs to fit. I was feeling like a package being loaded for a delivery. When I was two hours into the ride and my anger was not dissipating, I made a call to customer service to register my complaint. After describing the situation, I was shocked by the dispatcher's response. I was told that I shouldn't be complaining since I was "only two hours" in to my ride and that maybe I should have scheduled an earlier pickup time if I wanted to arrive earlier at my destination. I was also told that I needed to understand because this ride-share is a "public service."

What I hope is that the administrators of this service eventually understand that they are not delivering packages, but are instead providing a ride-sharing service to human beings who rely on their services to get to where they need to be when options are limited, some having this as their only form of transportation.

The problem is this: No matter how public this service might be, I, as a consumer, still have to pay for each trip, and the most important part, I missed a holiday dinner with my family because of the inability to coordinate a trip properly, especially when I did everything I was supposed to on my end. I'm fully aware that other pickups have to be made when using a ride-share service. However, I don't think it's reasonable to expect 35 miles of transit to take four and a half hours.

Unfortunately, I still have to rely on this service, because sometimes I have no other options. I know that I'm not the first or last person to complain about this type of treatment. For this reason, I made sure to file a proper verbal and written complaint about my experience, in order to give light to the issues of the system and to speak up for those who face this on a daily basis and cannot speak for themselves. I eventually did receive a formal letter of apology, which felt rehearsed. However, I have not seen any improvements in the system that suggests any major changes were executed based on my feedback. What I hope is that the administrators of this service eventually understand that they are not delivering packages, but are instead providing a ride-sharing service to human beings who rely on their services to get to where they need to be when options are limited, some having this as their only form of transportation. Changes need to be made. 

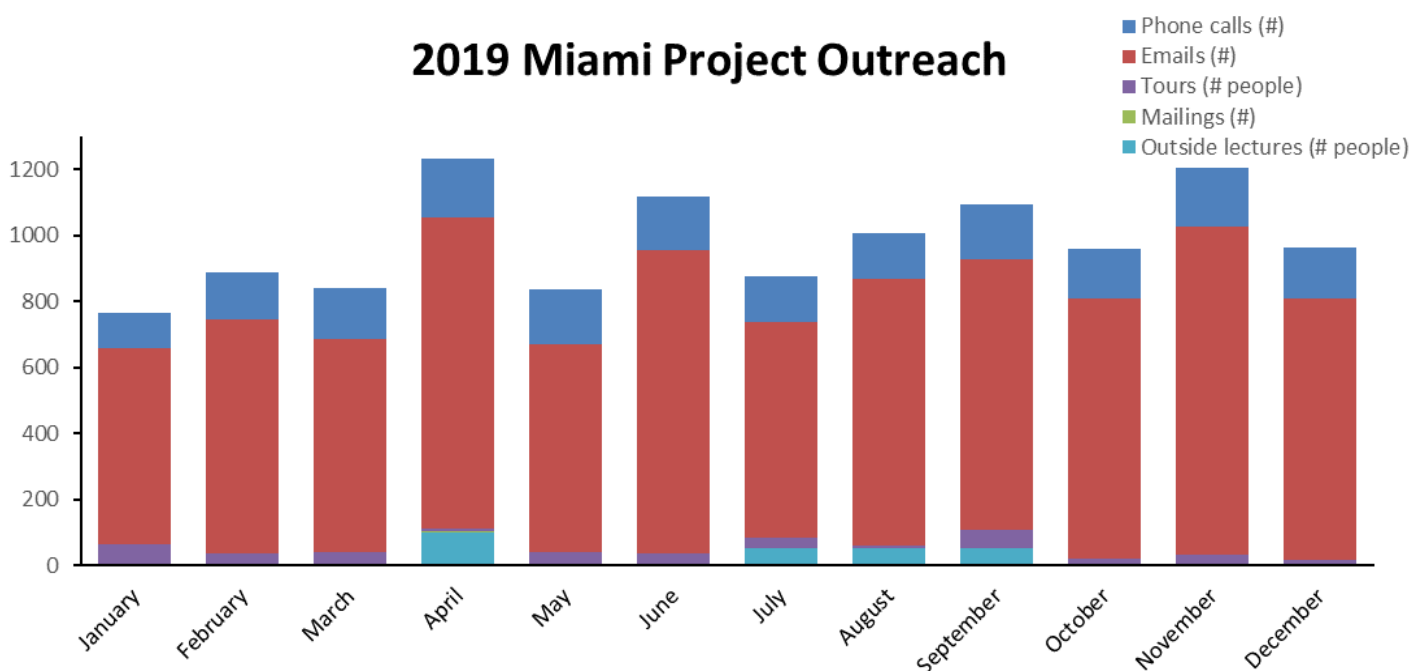


OUTREACH

TO THE COMMUNITY

The Miami Project to Cure Paralysis believes in working with our local community to develop and implement strategies that can improve quality of life through education.

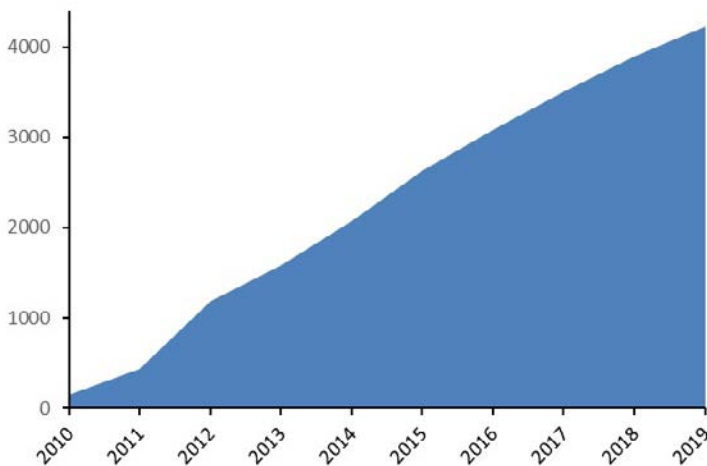
The Education department, directed by Katie Gant, Ph.D., together with her outreach team, Danielle Cilien and Maria Chagoyen, field thousands of calls and emails each year and serve as liaisons between the general public and the scientific community. The department provides information about research programs, clinical studies, resources for living with paralysis, rehabilitation resources, clinical care referrals, and advice on worldwide investigational treatments and research. They also offer educational tours, lectures and additional outreach events to promote scientific awareness. The graph below illustrates the total number of people the department interacted with each month during 2019 outreach activities.



A big thank you to all participants

In addition to their community outreach, the Miami Project Education office is also responsible for assisting the clinical research faculty with recruitment for their clinical studies and trials. Individuals interested in participating are asked to complete an intake form, which provides the education office with preliminary injury characteristics. Once your form is processed, the intake coordinator will call to discuss the studies that you may qualify for and determine whether you're interested in proceeding with any studies. Interested applicants will be scheduled for a neurologic exam ("ASIA") at our research center and given a tour of the facilities. The graph below shows the cumulative number of individuals since 2010 that have requested to participate in research studies. If you would like to be considered as a possible applicant for one or more of our current research studies, please complete the online intake form by visiting the following link: <https://redcap.miami.edu/surveys/index.php?s=P9T87MYKH4>. If you would prefer to complete the form later, please visit our homepage and click on the "Register now" tab on the top of the page. A big thank you to all participants, both past and present, for completing the on-site studies and remote surveys!

Research Volunteer Registry



Maria Chagoyen with attendees at the 2019 Brain Fair.



Nicole Wilson teaches kids about the spinal cord at the Brain Fair.

On February 9, 2019 the Education department was pleased to participate in the Miami-Dade STEAM (Science, Technology, Engineering, Art, and Mathematics) Expo as part of their annual Brain Fair. Our interactive spinal cord injury exhibit provided hands-on activities for people of all ages. Our goal was to teach students the connection that exists between the brain and the spinal cord as it relates to body control. In addition to the Miami Project Education team, University of Miami medical student, Nicole Wilson and Yasmin Ali, an undergraduate student from FIU, helped educate students about spinal cord injury.

In addition to the Brain Fair exhibition, the Miami Project also collaborated with the Miami SFN Chapter to host the local Brain Bee. Led by scientific staff from the University of Miami, Dr. Katie Gant and Dr. David Adaikkalasamy, the Brain Bee is a high school competition centered on neuroscience knowledge and related facts. Six Miami-Dade high schools participated with a total of 28 competitors. The winner was given the opportunity to receive mentoring sessions from University of Miami MD/ PhD students and participate in the USA National Brain Bee. This educational pipeline provided secondary students with the guidance and mentorship from our current medical and graduate students and in turn, gave our medical and graduate students the opportunity to develop their teaching skills.



Dr. Titus with Brain Bee winners.



High school students compete in the 2019 Brain Bee.

On April 27, 2019 the Education department hosted the 9th Annual Miami Project Community Open House. During this event, our facility was made available to the public with the purpose of fostering open lines of communication between our scientists and the local SCI community. The topics discussed included neuropathic pain after SCI, respiratory and metabolic health, developing a drug to promote axon regeneration, as well as an update on our clinical trials. In addition, several of the faculty participated in a panel discussion in which the public was given the opportunity to ask questions and have our scientists respond to them directly. If you have any questions or would like to contact our Education department, please email us at mpinfo@med.miami.edu or call us at 305-243-7108.



Dr. Katie Gant welcomes guests to the 2019 Open House.



David McMillan describes his research to Open House attendees.

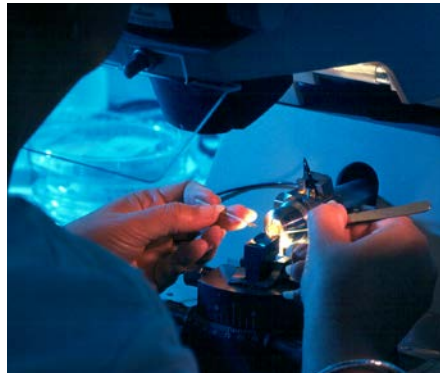


Photos from the 2019 Open House (clockwise): Dr. Annie Palermo describes The Miami Project's work with bionic exoskeletons. Dr. W. Dalton Dietrich, Scientific Director, welcomes guests to the Lois Pope LIFE Center. Researchers from the clinical pain laboratory explain some of their assessment techniques. Scientists and clinicians interact with attendees during a Q&A session. President Mark Buoniconti thanks attendees for their continued interest in and support of The Miami Project.

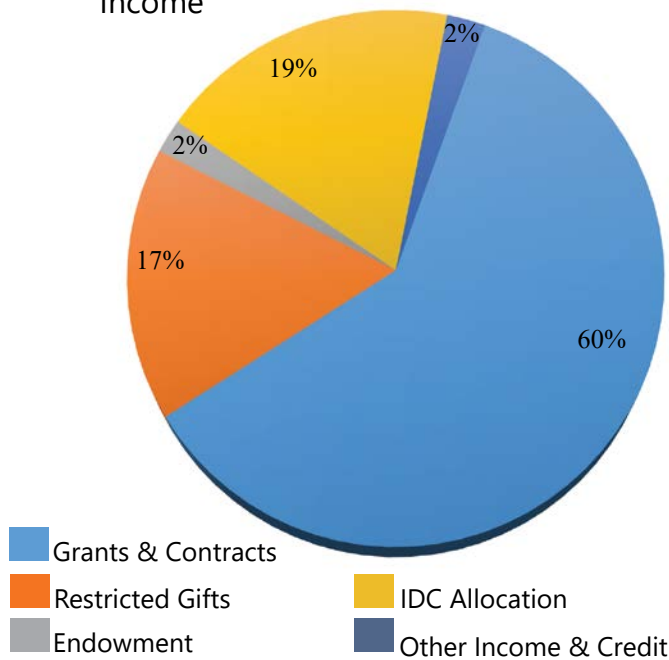
Research Funding

Each year, scientists at The Miami Project seek funding for their research by submitting proposals to the National Institutes of Health, the Department of Defense, and other funding agencies and foundations.

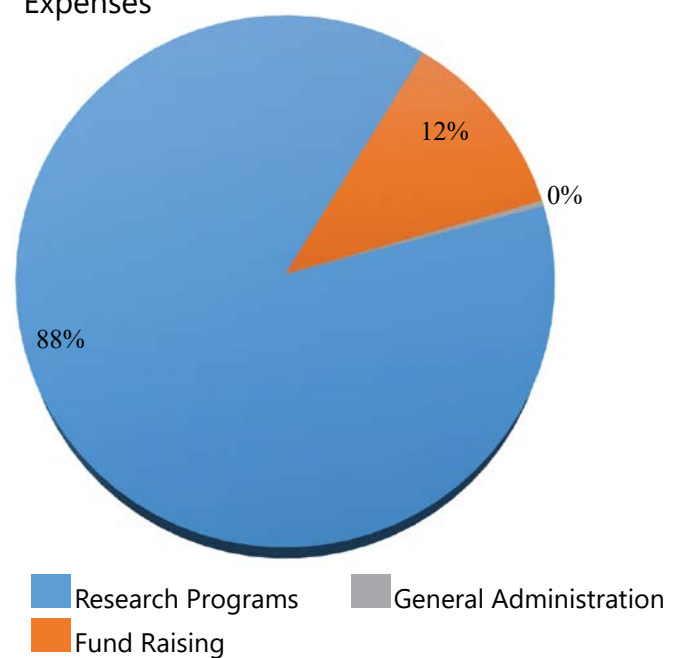
Their scientific peers rate the merits of the proposed experiments in a highly competitive process, and only the best projects are funded. The agencies and organizations listed here supported research at The Miami Project during 2019.



Income



Expenses

**Boston Scientific Inc.**

Dr. Jonathan Jagid (P.I.)

- Deep Brain Stimulation for Freezing of Gait in Parkinson's Disease

BrainScope Company, Inc.

Dr. Gillian Hotz (Site-P.I.)

- Evaluation and Validation of a Multimodal Brain Function Biomarker With NPC (BSC-CI-NPC)

BrainQ Technologies Ltd.

Dr. W. Dalton Dietrich (P.I.), Dr. Katie Gant (Co-I.)

- The Safety and Efficacy of a BCI-Based Electromagnetic Field Treatment in Chronic SCI – a Pilot Study

Bryon Riesch Paralysis Foundation

Dr. W. Dalton Dietrich (P.I.), Dr. Katie Gant (Co-I.)

- Final Participant in a Clinical Trial Investigating Schwann Cell Transplantation in People with Chronic Spinal Cord Injury

Christopher & Dana Reeve Foundation

Dr. James Guest (Center P.I.), Dr. Howard Levene (Co-I.)

- North American Clinical Trials Network
- Riluzole in Spinal Cord Injury

Consortium for Medical Marijuana Clinical Outcomes Research

Dr. Jacqueline Sagen (P.I.)

- Evaluation of Medical Marijuana for the Treatment of Chronic Spinal Cord Injury Pain Using a Rat Central Neuropathic Pain Model

Craig H. Neilsen Foundation

Dr. Nancy Brackett (P.I.), Dr. Charles Lynne (Co-I.), Dr. Emad Ibrahim (Co-I.)

- Management of Infertility in Men with SCI: An Educational Program for Practitioners and Clients

Dr. James Guest (P.I.)

- Neuroprotective Effects of Internal Decompression of the Spinal Cord

Dr. Vance Lemmon (P.I.), Dr. John Bixby (Co-P.I.), Dr. Hassan Al-Ali, (Co-I.)

- Novel and Potent Compounds that Promote Axon Growth

Dr. Mark Nash (P.I.)

- A Time-Course Study of Experimental Cardiometabolic Risk/Disease after SCI

Dr. Martin Oudega (P.I.)

- Mechanisms of 6-AN Facilitated Schwann Cell-Astrocyte Intermingling

Dr. Eva Widerström-Noga (Co-I.)

- Pain Education for Improving Pain Health Literacy and Quality of Life after Spinal Cord Injury

Department of Defense (DOD) Vision Research Program of the Office of the Congressionally Directed Medical Research Programs

Dr. Sanjoy Bhattacharya (P.I.), Dr. Kevin Park (Co-I.)

- Regenerative Lipids in Traumatic Glaucomatous Neuropathies

Dr. Kevin Park (P.I.)

- Novel Combinatorial Approaches to Repair Visual System after Optic Nerve Damage

Department of Defense (DOD) Orthopedic Research Program of the Office of the Congressionally Directed Medical Research Programs

Dr. Jacqueline Sagen (P.I.)

- Gene Therapy for Prevention of Phantom Limb Pain Following Extremity Injuries

Department of Defense (DOD) Peer Reviewed Medical Research Program of the Office of the Congressionally



Directed Medical Research Programs

Dr. Jacqueline Sagen (Co-I.), Dr. Stanislava Jergova (P.I.)
-Recombinant GABAergic Cells as a Therapy for Chronic Neuropathic Pain

Department of Defense (DOD) Psychological Health and Traumatic Brain Injury Program of the Office of Congressionally Directed Medical Research Programs

Dr. M. Ross Bullock (P.I.)
-Preclinical Evaluation of FDA Approved Human Neural Stem Cells in a Rat Model of Severe Traumatic Brain Injury

Dr. Eva Widerström-Noga (P.I.)
-Utility of MRS Brain Biomarkers of Pain Phenotypes after TBI

Department of Defense (DOD) Spinal Cord Injury Research Program (SCIRP)

of the Office of the Congressionally Directed Medical Research Programs

Dr. Cathy Craven (Co-P.I.), Dr. Mark S. Nash (Co-P.I.), Dr. Katie Gant (Co-I.)
-Effects of Statin Pleiotropisms on Cardioendocrine Functions after Spinal Cord Injury

Dr. W. Dalton Dietrich (P.I.), Dr. Michael Wang (Co-P.I.)
-Biomarkers for Spinal Cord Injury-Related Medical Complications

Dr. Jae Lee (Co-P.I.), Dr. Nagi Ayad (Co-P.I.)
-Epigenetic Pathways in Spinal Cord Injury

Dr. Allan Levi (P.I.)
-Systemic Hypothermia in Acute Cervical Spinal Cord Injury – A Prospective Case Controlled Study

Dr. Mark Nash (P.I.), Dr. Katie Gant (Co-I.)

-Selective Pharmacological Inhibition of Myostatin with SRK-015P in a Contusion Model of SCI: Effects on Obesity, Muscle, and Cardioendocrine Pathology

Dr. Brian Noga (P.I.), Dr. James Guest (Co-I.), Dr. Jonathan Jagid (Co-I.)
-Gait Ignition Using DBS Following SCI

Dr. Jacqueline Sagen (P.I.)
-Engineered Neural Progenitor Transplants in Combination with Exercise to Maximize Neuropathic Pain Reduction Following SCI

Dr. Jacqueline Sagen (P.I.)
-Developing Gene Therapies Targeting Cannabinoid Receptors for Treatment of Chronic SCI Pain



Dr. Shirin Shafazand (P.I.), Dr. Mark S. Nash (Co-P.I.)

-Neuro-cognitive Decline and Sleep-Disordered Breathing after SCI

Dr. Eva Widerström-Noga (P.I.), Dr. Alberto Martinez-Arizala (Co-I.)
-Perspectives in Management of Severe Neuropathic Pain after a Spinal Cord Injury

FISM Fondazione Italiana Sclerosi Multipla (Italian Multiple Sclerosis Foundation)

Dr. Roberta Brambilla (P.I.)
-Molecular Mechanisms of the Protective Function of Oligodendroglial TNFR2: A New Therapeutic Target in Neuro-immune Disease

Florida Department of Transportation

Dr. Gillian Hotz (P.I.)
-Transportation Alternative Program: School Age Pedestrian and Bicycle Education and Injury Prevention Program in MDC

-Safe Routes to School: WalkSafe & BikeSafe Pedestrian and Bicycle Safety Program in the State of Florida
-Transportation Alternative Program
-WalkSafe/BikeSafe 5 E Model

Mazor Robotics

Dr. Michael Wang (Site P.I.)
-ADDRESS: Adult Deformity Robotic vs. Freehand Surgery to Correct Spinal Deformity
-MIS ReFRESH: Robotic vs. Freehand Minimally Invasive Spinal Surgeries

Miami Dolphins Foundation Grant

Dr. Gillian Hotz (P.I.)

-MDCPSB: Countywide Concussion Injury Surveillance System

National Center for Advancing Translational Science

Dr. Hassan Al-Ali (P.I.)
-Developing a Novel Platform for Rapid Identification of Drug Targets and Anti-Targets

National Eye Institute

Dr. Ivanov Dmitri (P.I.), Dr. Kevin Park (Co-I.)
-Mechanisms of Toll-like Receptor-mediated Neurotoxicity in the Ischemic Retina

Dr. Abigail Hackam (P.I.), Dr. Kevin Park (Co-I.)
-Mechanisms of Optic Nerve Regeneration

Dr. Kevin Park (Co-P.I.), Dr. Sanjoy Bhattacharya (Co-P.I.), Dr. Vance Lemmon (Co-P.I.)
-Novel Targets to Promote RGC Axon Regeneration: Insights from Unique RGC Cohorts

Dr. Kevin Park (P.I.)
-Regeneration and Reconnection of Damaged Optic Nerve

National Institute of Child Health and Human Development

Dr. Vance Lemmon (Co-P.I.), Dr. John Bixby (Co-P.I.)
-Novel Gene Targets for CNS Axonal Regeneration

National Institutes of Health (NIH)

National Institute of Neurological Disorders and Stroke (NINDS)
Dr. Allan Levi, Dr. Dalton Dietrich, Dr. Ross Bullock
-The University of Miami Neurosurgery eEducation Strategy (UMINDS), Education Project

Dr. Allan Levi (P.I.)
-Schwann Cell Delivery via Enhanced Collagen-Glycosaminoglycan Tubes to Improve Outcome from Critical Length Nerve Gap Repairs, Exploratory/Developmental Research

National Institute of Neurological Disorders & Stroke

Dr. Coleen Atkins (Co-P.I.), Dr. W. Dalton Dietrich (Co-P.I.)
-Cyclic Nucleotide Regulation in Traumatic Brain Injury

Dr. Coleen Atkins (Co-P.I.), Dr. W. Dalton Dietrich (Co-P.I.)
-Cyclic Nucleotide Regulation in Traumatic Brain Injury and Alzheimer's Disease

Dr. Coleen Atkins (P.I.), Dr. Thomas Sick (Co-I.)
-Rehabilitation Strategies for Memory Dysfunction after Traumatic Brain Injury

Dr. Nagi Ayad (P.I.)
-Epigenetic and Kinase Pathway Interactions in Medulloblastoma

Dr. Roberta Brambilla (P.I.), Dr. Juan Pablo de Rivero Vaccari (Co-I.)
-Molecular Mechanisms of the Protective Function of Oligodendroglial TNFR2: A New Therapeutic Target in Neuro-immune Disease

Dr. Helen Bramlett (P.I.), Dr. W. Dalton Dietrich (Co-P.I.), Dr. Daniel Liebl (Co-I.)
-A Novel Combination Strategy for Protection and Repair After TBI

Dr. W. Dalton Dietrich (P.I.), Dr. Helen Bramlett (Co-I.), Dr. Juan Pablo de Rivero Vaccari (Co-I.)
-The Importance of Temperature on the Inflammatory and Microvascular Consequences of Mild TBI

Dr. Edelle Field-Fote (P.I.), Dr. Eva Widerström-Noga (Co-I.)
-Dose-response Effects of Whole Body Vibration on Spasticity and Walking in SCI



Dr. Eva Widerström-Noga (Site P.I.)
EPPIC-Net Clinical Pain Trial Network

Dr. Weiyong Gu (P.I.), Dr. Howard Levene (Co-I.)

-Modeling of Intervertebral Disc Degeneration

Dr. James Guest (P.I.), Dr. Brian Noga (Co-I.)

-Can Spinal Cord Epidural Stimulation Increase the Efficacy of Midbrain Excitation of Locomotor Circuits?

Dr. Gillian Hotz (Site-P.I.), Dr. Ross Bullock (Site Co-P.I.)

-Transforming Research and Clinical Knowledge in Traumatic Brain Injury

Dr. Robert Keane (Co-P.I.), Dr. Juan Pablo de Rivero Vaccari (Co-P.I.)

-The Role of ASC in TBI-Mediated Systemic Inflammation

Dr. Jae Lee (P.I.)

-Targeting Lipid Clearance Pathways to Promote Repair After SCI

-Assessment of NOVO-118 as a Regenerative Therapeutic in Acute Spinal Cord Injury

Dr. Vance Lemmon (Co-P.I.), Dr. John Bixby (Co-P.I.), Dr. Hassan Al-Ali (Co-I.), Dr. Jae Lee (Co-I.)

-Targeting Multiple Kinases to Treat Experimental Spinal Cord Injury

Dr. Daniel Liebl (P.I.)

-Stabilizing the Tripartite Synaptic Complex Following TBI

-Modulating Post-Injury Gliotransmitter Levels Leads to Improved Synaptic Function (Fellowship)

Dr. Brian Noga (P.I.), Dr. James Guest (Co-P.I.), Dr. Jonathan Jagid (Co-I.)

-Gait Ignition after SCI

National Multiple Sclerosis Society

Dr. Roberta m (P.I.), Dr. Hassan Al-Ali (Co-I.)

-Developing Selective TNF-TNFR2 Binding Stabilizers to Promote Remyelination and Repair in Multiple Sclerosis

New Jersey Commission on Spinal Cord Research

Dr. Ki Bum Lee (P.I.), Dr. Jae Lee (Co-I.)

-A Biodegradable Nanoscaffold for the Co-Delivery of Patient Derived Neural Stem Cells and BET Inhibitor for Anti-Inflammation and Synaptic Restoration Post-SCI

National Institute on Disability, Independent Living, and Rehabilitation Research

Dr. Mark Nash (P.I.), Dr. Eva Widerström-Noga (Co-I.), Dr. Katie Gant (Co-I.)

-A Lifestyle Intervention Targeting Enhanced Health and Function for Persons with Chronic SCI in Caregiver/Care-Receiver Relationships: Effects of Caregiver Co-Treatment

Dr. Elizabeth Felix (Co-P.I.), Dr. Mark Nash (Co-P.I.), Dr. Eva Widerström-Noga (Co-I.)

-South Florida Spinal Cord Injury Model Systems

Dr. Heather Taylor (P.I.), Dr. Eva Widerström-Noga (Co-I.)

-The Relations among Pain, Depression, and Resilience and their Prediction of Life Satisfaction in Men and Women with Spinal Cord Injury

National Institute of Heart, Lung, and Blood

Dr. Stephan Schurer (P.I.), Dr. Vance Lemmon (Co-I.)

-Data Coordination and Integration Center for LINCS-BD2K

Paralyzed Veterans of America

Dr. Mark Nash (P.I.), Dr. Katie Gant (Co-I.)

-A PVA Consumer Guide Addressing Identification and Management of Cardiometabolic Risk

Robert J. Dampsey, MD, Cerebrovascular Research Award

Dr. Juan Pablo de Rivero Vaccari (P.I.)

- Inflammatory Biomarkers in Acute Ischemic Stroke

Pfizer, Inc.

Dr. Michael Wang (Site P.I.)

-STRIVE: Staphylococcus Vaccine Trial for Elective Spinal Surgery

Scythian Biosciences

Dr. Gillian Hotz (P.I.)

-The Effects of Cannabinoids on MTBI

Stanley J. Glaser Foundation Award

Dr. Hassan Al-Ali (P.I.)

-Using Machine-Learning and Cell-Based Screening to Identify Lymphoma-Selective Drug Targets

Dr. Juan Pablo de Rivero Vaccari (P.I.)

-Contribution of the Inflammasome to Imflammaging

State of Florida

Dr. Jacqueline Sagen (P.I.)

-Reducing Opioid Abuse Liability Using Gene Therapy

Dr. Dalton Dietrich (Study P.I.), Dr.

Damien Pearse (Project P.I.), Dr.

Moushumi Ghosh (Co-I.)

-The Microglial Transcriptome after Spinal Cord Injury

State of Florida, James and Esther King Biomedical Research Program

Dr. W. Dalton Dietrich (P.I.)

-The Therapeutic Effect of P7C3-A20 on Stroke

Dr. Helen Bramlett (P.I.), Dr. W. Dalton Dietrich (Co-I.)

-Whole Body Vibration Improves Stroke Outcome



State of Florida Brain and Spinal Cord Injury Program, Department of Health, and Red Light Camera Fund

-These three state funds contribute to several research programs within The Miami Project to Cure Paralysis

Sylvester Comprehensive Cancer Center Pilot Award

Dr. Hassan Al-Ali (Co-I.) and Jonathan Schatz (Co-I.) -Developing a Small-Molecule Lymphoma Drug with Potent, Efficacious, and Tumor-Specific Activity

The Childhood Brain Tumor Foundation

Dr. Nagi Ayad (P.I.)
-A Novel CK1δ/Brd4 Pathway for the Treatment of Medulloblastoma

University of Miami Dean's Bridge Funding Program

Dr. Nagi Ayad (P.I.)
-Epigenetic and Kinase Pathway Interactions in Medulloblastoma

Dr. Daniel Liebl (P.I.)
-A Novel Mechanism of Cell Death in the Traumatic Injured Brain

University of Miami Equipment Funding Program

Dr. Daniel Liebl (P.I.)

-Stabilizing the Tripartite Synaptic Complex Following TBI

University of Miami Scientific Awards Committee Award

Dr. Jonathan Jagid (P.I.)
-Deep Brain Stimulation for Freezing of Gait in Parkinson's Disease

Dr. Kevin K. Park (Co-P.I.), Dr. Hassan Al-Ali (Co-P.I.)

-In Vivo Screening to Identify Neuroprotective Compounds for Treating Optic Neuropathy

University of Miami Scientific Awards Committee, Interdisciplinary Team Science Pilot Program Co-Sponsor: Boston Scientific Investigator Sponsored Research

Dr. Jonathan Jagid (P.I.), Dr. Brian Noga (Co-P.I.)

-Deep Brain Stimulation of the Cuneiform Nucleus for Levodopa-Resistant Freezing of Gait in Parkinson's Disease

Veterans Affairs Rehabilitation Research & Development

Dr. Christopher Cardozo (P.I.), Dr. Helen Bramlett (Co-I.)

-Role of Ryanodine Receptor Dysfunction

Dr. Mousumi Ghosh (P.I.), Dr. Damien Pearce (Co-P.I.), Dr. Jacqueline Sagen (Co-P.I.)

-Modulating Microglial Phenotype to Prevent SCI-induced Central Neuropathic Pain

Dr. Martin Oudega (Co-P.I.), Dr. Monica Perez (Co-P.I.)
-Maximizing Spike Timing-Dependent Plasticity after Spinal Cord Injury

Dr. Damien Pearce (P.I.), Dr. Mousumi Ghosh (Co-I.)

-Enhancing the Reparative Efficacy of Schwann Cells Following Chronic SCI

Dr. Weiping Qin (P.I.), Dr. Helen Bramlett (Co-I.)

-Novel Pharmacological and Non-pharmacological Interventions for Bone Loss in SCI

Wallace H. Coulter Foundation

Dr. Hassan Al-Ali (P.I.), Dr. John L. Bixby (Co-I.), Dr. Vance P. Lemmon (Co-I.)

-Developing a Multi-Target Small-Molecule Drug for Treating CNS Injuries

ZyVersa Therapeutics, Inc.

Dr. Robert Keane (Co-P.I.), Dr. Juan Pablo de Rivero Vaccari (Co-P.I.)

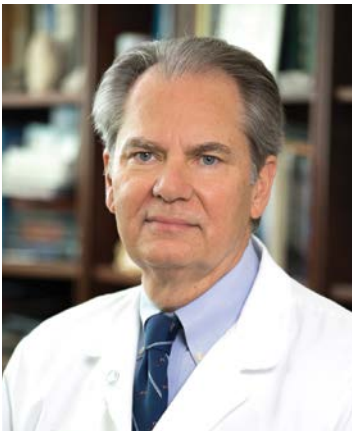
-Evaluation of IC100 Potency and Mechanism of Action



The Miami Project To Cure Paralysis

Faculty

The faculty of The Miami Project are a talented multidisciplinary team. In the following profiles, each faculty member describes their specific research focus and highlights of recent progress.



W. DALTON DIETRICH, PH.D.

Scientific Director

Kinetic Concepts Distinguished Chair in Neurosurgery

Senior Associate Dean for Discovery Science

Professor, Departments of Neurological Surgery, Neurology, and Cell Biology

Neuroprotection and Improved Recovery of Function following CNS Trauma

My research interest is the pathobiology and treatment of CNS injury in both the acute and chronic setting. Animal models of spinal cord injury, traumatic brain injury, and stroke are utilized to investigate the cellular and molecular mechanisms of tissue injury. The ultimate goal is to target secondary injury processes for various interventions that may protect vulnerable cell types or promote reparative processes to enhance neuroprotection, circuit plasticity, and recovery of function.

The use of therapeutic hypothermia and targeted temperature management in preclinical and clinical settings is currently a focus of discovery and clinical investigations in the laboratory.



ALLAN D. LEVI, M.D., PH.D., F.A.C.S.

Robert. Buck Distinguished Chair in Neurological Surgery

Professor, Departments of Neurological Surgery, Orthopedics, and Physical Medicine & Rehabilitation

Chairman, Department of Neurological Surgery

Chief of Neurosurgery, Jackson Memorial Hospital

Cellular Transplantation Strategies after SCI/Systemic Hypothermia after Acute SCI

My clinical research interests currently focus on developing cellular transplantation strategies to repair injuries within both the human central and peripheral nervous system. I am currently Co-PI on our clinical trials involving the transplantation of autologous human Schwann cells (SCs), which represent first-in-man studies of autologous human SCs for patients with sub-acute and

chronic SCI. We are also conducting a phase I trial evaluating SCs for peripheral nerve injuries with long segmental defects, which follows up on our previous two single patient experiences. Hypothermia continues to show promise in a variety of acute central nervous system injuries. There are various factors that need to be considered with systemic cooling of the SCI patient, including methods of cooling, window from injury to initiation, duration and depth of hypothermia, rate of re-warming, etc. While profound levels of hypothermia (<32°C) can be difficult to administer and are subject to increased complication rates, mild (modest) levels of hypothermia (32-34°C) have been shown to provide significant protection against traumatic and ischemic neuronal cell death. I am currently the PI of our institutional protocol as well as a multi-center Department of Defense funded randomized trial studying systemic hypothermia induced via an intravascular catheter and continued for 48 hours after acute cervical SCI.




BARTH A. GREEN, M.D., F.A.C.S.

**Professor of Neurological Surgery, Neurology, Orthopedics, and Rehabilitation
Co-Founder and Chairman, The Miami Project to Cure Paralysis
Executive Dean for Global Health and Community Service**

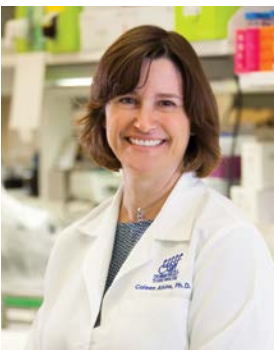
Translational Interventions

Over the recent years my research efforts have mainly involved taking the cutting edge basic neuroscience work product and data created by our Miami Project team from the bench to our UM affiliated clinics and hospitals. A good example of such translational research efforts has included the use of modest hypothermia for neuroprotection both in cases of acute spinal cord injury and for use in the operating room for patients undergoing high risk spinal cord surgery. I am also privileged to be able to collaborate with The Miami Project cellular transplantation programs and have been working on projects involving adult mesenchymal stem cells, as well as being part of the major effort transforming our successful Schwann cell laboratory model into clinical trials. Other areas of research and clinical interest include the diagnosis and treatment of tethered cord syndrome, spinal cord cysts and Chiari I malformation.

SCIENTIFIC FACULTY MEMBERS:
HASSAN AL-ALI, PH.D.

**Research Assistant Professor, Department of Neurological Surgery
Drug Discovery for CNS Repair**

As a chemical and computational biologist, my lab focuses on identifying pharmacological targets that can induce robust axon regeneration in the injured central nervous system. To accomplish this, my lab developed a unique drug discovery platform that combines phenotypic screening, target-based profiling, and sophisticated machine learning algorithms. The approach identified a promising drug candidate that is now in preclinical development. We continue to develop these methodologies to advance drug discovery in spinal cord injury, as well as in other therapeutic areas including cancer and kidney disease.


COLEEN ATKINS, PH.D.

Associate Professor, Department of Neurological Surgery

Developing Novel Therapies for Traumatic Brain Injury and Spinal Cord Injury

The research in my laboratory focuses on developing novel therapeutic interventions for traumatic brain injury (TBI) and spinal cord injury (SCI). The research goal of my laboratory is to enhance rehabilitation and recovery by manipulating synaptic plasticity at specific levels of the neuroaxis following TBI and SCI. We have found that specific synaptic plasticity signaling pathways are altered after TBI, and we are currently using pharmacotherapies to target those pathways to improve behavioral recovery after TBI.

**NAGI AYAD, PH.D.****Associate Professor, Department of Neurological Surgery****Epigenetic and Kinase Pathways in the Developing and Diseased Nervous Systems**

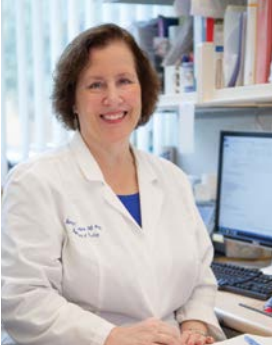
The main research objective of the Ayad laboratory is to identify therapeutic combinations for nervous system disorders. These include brain cancers such as glioblastoma and medulloblastoma, as well as spinal cord injury and traumatic brain injury. We are working closely with chemists to generate novel brain/spinal cord penetrant epigenetic enzyme and kinase inhibitors. We are also working with the LINCS consortium to identify small molecules that target epigenetic and kinase pathways simultaneously. We collaborate with a large group of basic scientists and clinicians to move our small molecules into clinical trials. These include Dr. Ricardo Komotar, Dr.

Michael Ivan, Dr. Antonio Omuro, Dr. Macarena de la Fuente, Dr. Nori Kasahara, Dr. Claes Wahlestedt, Dr. Stephan Schürer, Dr. Mary E. Hatten, Dr. Martine Roussel, and Dr. Jann Sarkaria for the brain tumor work, and Drs. Jae Lee, Vance Lemmon, and John Bixby for the spinal cord injury studies. Interestingly, we find that the same small epigenetic/kinase molecule inhibitors we are developing for brain cancer are effective in spinal cord injury as they reduce inflammation.

**JOHN BIXBY, PH.D.****Professor, Departments of Molecular & Cellular Pharmacology and Neurological Surgery, Center for Computational Science, Hussmann Institute for Human Genomics, Sylvester Cancer Center****Vice Provost for Research****VANCE LEMMON, PH.D.****Walter G. Ross Distinguished Chair in Developmental Neuroscience****Professor, Department of Neurological Surgery, Center for****Computational Science, Hussmann Institute for Human Genomics, Sylvester Cancer Center****High Content Screening and Functional Genomics of the Nervous System**

Our laboratory has developed methods to test thousands of genes or chemicals in hundreds of thousands of neurons each week to obtain quantitative information about cell morphology and gene expression. This "high throughput" capability allows us to tackle questions about axon growth and regeneration using systems biology approaches, and to query the results in animal models of injury. The Lemmon-Bixby lab has several ongoing projects related to axon regeneration. One project is to test the roles of known signaling proteins called protein kinases. In this screen we have tested >1600 kinase inhibitors, dozens of which strongly promote neurite growth in vitro. Using bioinformatics, biochemistry, and machine learning we can identify key kinases and their signaling networks as well as potential lead therapeutic compounds, one of which has proven active in two different models of spinal cord injury. A second project is based on the observation that injured peripheral sensory neurons initiate a genetic program appropriate for axonal regeneration. Our laboratory has combined next-generation sequencing with cell-based phenotypic screening to identify genes, especially transcription factors, that appear to mediate this genetic program, and is testing them in vitro and in vivo. The last project is to test several hit compounds identified in a screen testing 440 million different small molecules to see if the hits promote axon regeneration.

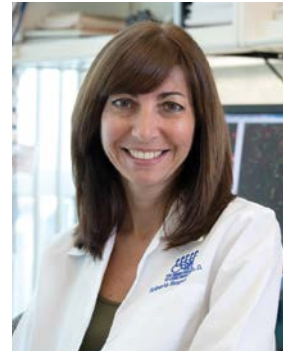


**NANCY L. BRACKETT, PH.D., H.C.L.D.****Voluntary Professor, Departments of Neurological Surgery and Urology****Male Fertility following Spinal Cord Injury**

Our research is focused on understanding and improving impairments to male fertility which occur following SCI. A major aim is to determine the cause of impaired semen quality in men with SCI. Our recent evidence indicates that the problem is related to the seminal plasma. Our current research is investigating inflammatory factors, including semen cytokine levels, as contributors to the problem. Our ultimate goal is to develop therapies to normalize semen quality in men with SCI, so that chances of biological fatherhood are increased.

ROBERTA BRAMBILLA, PH.D.**Associate Professor, Department of Neurological Surgery****Modulation of the Neuro-Immune Response in Neurologic Disease**

The main focus of my research is to understand the role of neuroinflammation in the pathophysiology of neurodegenerative disorders (e.g., multiple sclerosis, spinal cord injury and stroke), with a specific interest in the contribution of glial cells. We study astrocytes and microglia for their involvement in the neuro-inflammatory response to injury, and oligodendrocytes and oligodendrocyte precursor cells for their role in axon myelination, metabolic support of neurons and myelin repair. Currently, our primary lines of research in the area of neuroimmunology are centered on: (1) investigating the role of tumor necrosis factor and its receptors in the processes of neuroinflammation, demyelination and remyelination, and (2) understanding how mitochondrial dysfunction in oligodendrocytes may be involved in the etiopathology of multiple sclerosis.

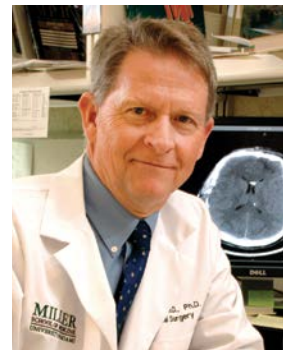
**HELEN M. BRAMLETT, PH.D.****Professor, Departments of Neurological Surgery and Psychology, Undergraduate Neuroscience Program Director, and Health Scientist Veterans Affairs****The Pathophysiology and Treatment of CNS Injury**

The focus of my neurotrauma laboratory is to investigate both acute and long-term consequences of brain and spinal cord trauma. My current research interests are on the pathophysiology of traumatic brain and spinal cord injury with an emphasis on the pathogenesis of progressive white matter damage as well as the benefits of therapeutic hypothermia. My laboratory is also investigating mechanistic events leading to the development of posttraumatic epilepsy. Additionally, our current work is also focusing on complex traumatic brain injury models that mimic polytrauma as this type of injury

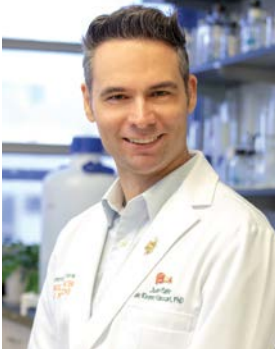
has become more prevalent in combat areas.

M. ROSS BULLOCK, M.D., PH.D.**Emeritus Professor, Department of Neurological Surgery****Preclinical Mechanistic and Neuroprotection Research in Traumatic Brain Injury and Clinical Trials, and Neuromonitoring Techniques in the Injured Brain**

We recently completed an extensive series of studies funded by the Department of Defense (DoD) to evaluate the neuroprotective effect of Perfluorocarbons in four rodent models of traumatic brain injury (penetrating brain injury, closed traumatic brain injury with secondary hypoxia, tissue culture with stretch injury, and mechanistic and safety studies). These oxygen carriers have shown benefit in previous studies involving fluid percussion injury and subdural hematoma models. Unfortunately, we could not



demonstrate efficacy with 3 of the PFC's tested. We are also evaluating hypothermia neuroprotection, in humans and animals, using novel biomarkers. We are currently funded by the DoD to obtain efficacy and safety data with FDA approved human stem cells, transplanted into the rat brain, as therapy for penetrating TBI.



JUAN PABLO DE RIVERO VACCARI, PH.D.

Research Assistant Professor, Department of Neurological Surgery

Underlying Mechanisms of the Immune Response and Contributions to Various CNS Diseases

My research focuses on understanding early inflammatory events in central nervous system (CNS) injury and disease, as well as aging. Currently, my laboratory studies how natural-aging produces inflammation in the brain, a phenomenon known as brain inflammaging, which potentially precedes the onset of age-related neurodegenerative diseases. In addition, we are studying the mechanism by which brain injury causes systemic inflammation such as acute lung injury. Moreover, we also study the prognostic and diagnostic potential of inflammasome proteins as biomarkers of CNS injury and disease, including brain and spinal cord injury, stroke, multiple sclerosis, mild cognitive

impairment and depression.

KATIE GANT, PH.D.

Research Assistant Professor, Department of Neurological Surgery

Director of Education and Outreach, The Miami Project to Cure Paralysis

Clinical Trials in Spinal Cord Injury and Peripheral Nerve Injury and Neuroengineering

My current research focuses on enhancing neuroplasticity in the central nervous system, with the goal of improving function for people with spinal cord injuries. I am also very interested in enabling the translation of basic science discoveries toward clinical trials.

I manage The Miami Project's FDA-regulated clinical trials related to Schwann cell transplantation in spinal cord injury and severe peripheral nerve injury. I also oversee the education and outreach programs at The Miami Project, which recruit individuals with spinal cord injury for our clinical research programs and provide information

about our research to the community. Our primary goal is to encourage interactions between the spinal cord injury community, researchers, and clinicians to ensure that The Miami Project's scientific efforts translate to meaningful improvements.



DAVID R. GATER, M.D., PH.D.

Chair and Professor, Department of Physical Medicine & Rehabilitation

Medical Director of Rehabilitation, Jackson Memorial Hospital

Effects of Diet and Exercise Training on Energy Metabolism

My research efforts focus on cardiometabolic health after spinal cord injury, and my current projects evaluate the effects of exercise and nutrition interventions in people with spinal cord injury. I am board certified in physical medicine and rehabilitation, electrodiagnostic medicine, and the subspecialty of spinal cord injury medicine. As medical director of the Christine E. Lynn Rehabilitation Center, my goal is to unite the inpatient and outpatient clinical services offered by UHealth and Jackson Memorial Medical Center with the clinical trials and research groups from The Miami Project to Cure Paralysis.



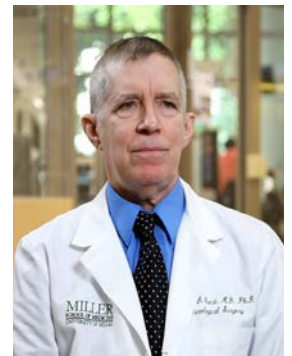
**MOUSUMI GHOSH, PH.D.****Research Assistant Professor, Department of Neurological Surgery****Altering Host Glial Responses following CNS Injury and Disease to Promote Repair**

My research interests are focused on altering the hostile environment of the injured or diseased CNS to one that is conducive to repair through altering inflammation. Specifically, our work focuses on delineating the intrinsic and extrinsic signals present after injury that antagonize the conversion of activated microglia and macrophages to a reparative phenotype in experimental models of CNS injury and disease. We are also interested in understanding how altering the immunophenotypical profile of macrophages and microglia can modulate spinal cord injury induced central neuropathic pain, affect host glial responses, including glial scar formation, as well as influence the

ability of transplanted cells, such as Schwann cells and stem cells, to mediate neurorepair.

JAMES D. GUEST, M.D., PH.D., F.A.C.S.**Clinical Professor, Department of Neurological Surgery****The Preclinical to Clinical Spectrum in Spinal Cord Injury Therapeutics. The Path to Clinical Testing and Establishing Clinical Evidence**

Our SCI research spans preclinical proof-of-concept studies of therapeutics into early Phase, and pivotal clinical trials of SCI. We are translational scientists using a variety of clinically-relevant tools within the complex process of determining which potential human therapeutics have a probability of success in clinical trial testing. We use our experience and expertise to test combinations of cellular, molecular, tissue engineering and neuromodulatory therapeutics in large animal models. We have expertise in tissue physiologic monitoring, neurophysiology and kinematic analysis of gait. In addition, we have experience in device development and testing. The lab group has members and colleagues ranging from senior medical faculty to postdoctoral students, medical students, neurosurgery residents, and undergraduate students. This is a good setting for those trainees who aim for careers in neurologic therapeutics both in academia and industry and with an interest in how medical evidence is developed. We are simultaneously involved with animal and human studies across the translational spectrum including Phase 1-3 studies.

**GILLIAN A. HOTZ, PH.D.****Research Professor, Department of Neurological Surgery****Director, KiDZ Neuroscience Center; Director, Concussion, WalkSafe™ & BikeSafe™ Programs**

As a behavioral neuroscientist my clinical interests have always been investigating the neurocognitive deficits of those individuals that have sustained a traumatic and acquired brain injury. I have co-authored two neurocognitive tests, The Brief Test of Head Injury for adults and the Pediatric Test of Brain Injury for children. My research has focused on developing evidence based injury prevention programs in order to prevent brain and spinal cord injuries in children. In 2003, our team developed the WalkSafe program, which has been shown to decrease the number of elementary school age children that get hit

by cars, and in 2009 we developed the BikeSafe program which educated middle school age children on bicycle safety skills. As the Director of the Concussion Program, we have spent many years developing and implementing a comprehensive countywide high school sports concussion care program, which includes neurologic evaluation, neuroimaging, neuropharmacological management, neuropsychological testing, and baseline test with ImPACT, a computerized neurocognitive screening measure. We also have developed a Concussion Injury Surveillance system. Our program is multidisciplinary and assesses and treats athletes from all levels of play. I am also the PI on many local and federal grants: Safe Routes to School initiatives, Transportation Alternative Programs, GE/NFL MRI Phase 2 study, Brainscope EEG study, one of the TRACK TBI sites, and a new project that will study the Effects of Cannabinoids on Mild TBI.



**JONATHAN R. JAGID, M.D.**

Clinical Associate Professor, Department of Neurological Surgery, Neurology, Orthopedics, Rehabilitation Medicine

Interventions in SCI and TBI

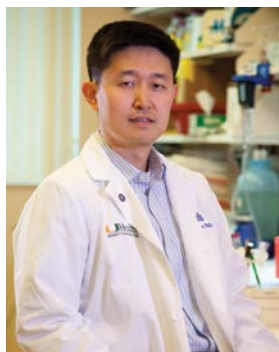
My research includes projects investigating the use of Deep Brain Stimulation for spinal cord injury, novel brain machine interfaces to improve quality of life in spinal cord injury, as well as hypothermia for traumatic brain injury. Presently, we are looking at the use of a novel Deep Brain Stimulation device modified to act as a brain machine interface in an effort to bypass spinal cord injury and restore cortically controlled limb movement.

ROBERT W. KEANE, PH.D.

Professor, Departments of Physiology & Biophysics, Neurological Surgery, and Microbiology and Immunology

Regulation of Innate Immunity after CNS Trauma

Innate immunity is the first line of defense against pathogens and host-derived signals of cellular stress. My research focuses on investigating mechanisms that direct normal innate immunity and its dysregulation in central nervous system injury and disease, including (1) agonists and activation mechanisms of inflammasomes, (2) regulatory mechanisms that potentiate or limit inflammasome activation after injury, and (3) emerging data linking inflammasome proteins as biomarkers for CNS injury.

**JAE K. LEE, PH.D.**

Associate Professor, Department of Neurological Surgery

Promoting Proper CNS Wound Healing Response to Enhance Regeneration

The long-term research goal in my laboratory is to elucidate the mechanisms of cellular interactions in the injured CNS that create an environment inhibitory to cellular regeneration. Similar to other tissue, injury to the CNS triggers a wound healing response characterized by inflammation, cellular proliferation, and matrix remodeling. Sometimes this wound healing response is incomplete and leads to tissue cavitation, while other times it is excessive and leads to scar formation (both gliotic and fibrotic). A better understanding of this scarring process will help identify novel therapeutic targets that can promote a more permissive environment for CNS regeneration.

HOWARD B. LEVENE, M.D., PH.D., F.A.A.N.S., FACS

Clinical Assistant Professor, Department of Neurological Surgery

Phosphodiesterase Inhibitors and Schwann Cell Transplantation after SCI

Secondary injury after spinal cord injury remains an active area for proposed therapy. With my co-PI Dr. Damien Pearce, we are investigating the effect of novel phosphodiesterase inhibitors after SCI. Phosphodiesterase inhibitors are proposed to sustain cAMP to abate cytotoxic processes during secondary injury, resulting in neuroprotection. Our work involves both murine and porcine models. Another proposed therapy for spinal cord injury is to introduce cells to the injury site to help repair, restore, or support existing neurons. I worked with my colleagues on a large animal model to study the effect and behavior of transplanted autologous Schwann cells. I have been involved in the refinement of this animal model. This approach allows for the scientific



study of the behavior of implanted cells and generates the groundwork for clinical trials. Research utilizing this model is done in collaboration with clinicians and scientists at the Miami Project such as Drs. Guest, Solano, Pearce, Levi, Wood, Bunge, and many more. I am also collaborating with the University of Miami, School of Engineering, Drs. Charles Huang and Weiyong Gu, studying the nutritional factors in spinal disc degeneration

Growth Factors in Restorative Spine Surgery

Degenerative spine disease and back pain remain ubiquitous problems. With my co-PI Dr. Charles Huang we have begun a pilot study in creating disk degeneration in a rabbit model and subsequently treating with growth factors. This project is a collaboration with the University of Miami, School of Engineering and is funded by a private donor.



DANIEL J. LIEBL, PH.D.

Professor, Department of Neurological Surgery

Molecular Mechanisms that Regulate Cellular Dysfunction and Death Following CNS Injury, and Mechanisms to Promote Regeneration and Recovery

The goal of my laboratory is to identify the mechanisms that lead to CNS pathophysiology and its regenerative potential. We focus on growth and guidance molecules, which play important roles in the developing, regenerating, and injured nervous systems. Specifically, we are currently interested in areas of adult neurogenesis, neuroprotection, apoptotic cell death, synaptic plasticity, angiogenesis, regeneration, and therapeutic strategies. Overall, our approach is to develop novel strategies to minimize CNS damage and maximize regeneration/tissue repair, which can be best achieved

through a comprehensive mechanistic approach.

ALBERTO MARTINEZ-ARIZALA, M.D., F.A.A.N.

Clinical Associate Professor, Departments of Neurology, Neurological Surgery, and Orthopedics and Rehabilitation Medicine

Pathophysiology and Treatment of Secondary Complications in Spinal Cord Injury

My research interests focus on common complications that are seen following spinal cord injury: pain, spasticity, syringomyelia, and tethered cord syndrome. My interests include investigating the basis for the development of the different spasticity and pain profiles in the spinal cord injured population and to study potential novel treatments for those conditions.



MARK S. NASH, PH.D., F.A.C.S.M.

**Associate Scientific Director for Research, The Miami Project to Cure Paralysis
Professor, Departments of Neurological Surgery, Physical Medicine & Rehabilitation,
Physical Therapy, and Kinesiology & Sports Sciences**

Physiological Assessment of Secondary Complications following SCI: Electrical Stimulation, Cardiometabolic and Vascular Physiology, Cardioendocrine Pathology and Intervention, and Exercise and Nutritional Biochemistry

One of the enduring goals of The Miami Project has been to test and then translate strategies that optimize health of persons with SCI. A significant target for this strategy has focused on physical activity to lessen secondary risks of SCI associated with physical deconditioning. We also examine complementary themes to optimize exercise prescription after SCI, identify optimal nutritional intake, and use prescription and non-prescription agents that reduce hazards of fasting and postprandial lipid disorders, dysglycemia, and vascular inflammatory stress.

**BRIAN R. NOGA, PH.D.**

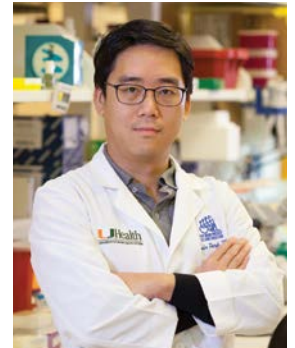
Research Associate Professor, Department of Neurological Surgery
Brain and Spinal Mechanisms Controlling Walking

Neuromodulation technologies are increasingly looked at as potential treatment options for paralysis associated with spinal cord injury (SCI). Deep brain stimulation is one such method that so far has had little or no application in persons with SCI even though most new and chronic injuries are incomplete. Recent work in our laboratory has pointed to a brain target for controlling walking. We are currently investigating the usefulness of stimulating this site to enhance walking in a translational large animal model of SCI.

KEVIN K. PARK, PH.D.

Associate Professor, Department of Neurological Surgery
Promoting Neural Regeneration and Survival

My lab is interested in understanding mechanisms that account for axon growth, guidance and circuit formation in the central nervous system (CNS). Previously, I and others have identified several key proteins that regulate axon regeneration, which are present in mature CNS neurons. In my current research, I seek to better understand the cellular and molecular mechanisms governing axon growth and connectivity during development and in adults after injury, and to explore the potential of developing therapeutic strategies for spinal cord injury and other neurodegenerative conditions.

**DAMIEN D. PEARSE, PH.D.**

John M. and Jocelyn H.K. Watkins Distinguished Chair in Cell Therapies
Professor, Department of Neurological Surgery, Health Scientist Veterans Affairs
Exploration and Translation of Therapeutic Strategies to Repair the Injured Spinal Cord and Brain

My laboratory focuses on several key aspects of CNS injury repair, including (1) the utility and clinical translation of exogenous and endogenously harnessed cell therapeutics (particularly when used in combinatory approaches), (2) understanding the role of, and developing therapies for, altered cyclic AMP (adenylyl cyclase, phosphodiesterases, and PKA) and MAPK signaling in neurons and glia after CNS injury, (3) the use of nanotherapeutics for multifunctional and site-directed gene/drug targeting to the injured CNS, and (4) the application of methodologies for improved

imaging of axonal regeneration and cell integration within the injured CNS such as 3D ultramicroscopy and diffusion tensor imaging.

**JACQUELINE SAGEN, PH.D., M.B.A.**

Professor, Department of Neurological Surgery

Cellular Implants and Gene Therapy for the Alleviation of Chronic Pain and CNS Injury

Our laboratory is exploring novel and more effective strategies in the therapeutic management of chronic debilitating pain. Our recent research is focused on (1) identification of more effective analgesic agents and combinations for alleviating pain using SCI and peripheral neuropathic pain models and (2) development of emerging therapeutic interventions, including cell transplantation and gene therapy, which have the potential to provide long-term alleviation in people with intractable pain, overcoming the need for repeated pharmacologic administration.



**THOMAS J. SICK, PH.D.****Professor Emerita, Departments of Neurology and Physiology & Biophysics****Cellular and Neuronal Circuit Alterations after Traumatic Brain Injury That Contribute to Cognitive Decline and Epilepsy**

My laboratory is conducting electrophysiological assessments of neuron and brain circuit alterations that occur after traumatic brain injury. Long-term clinical consequences of brain injury include declines in cognitive function and in many cases the development of epilepsy. We are trying to understand how circuits in the brain change over time after injury and how these changes might lead to alterations of brain function and behavior.

PANTELIS TSOULFAS, M.D.**Associate Professor, Departments of Neurological Surgery and Cell Biology & Anatomy**
Neurotrophins: Specificity of Action

My laboratory is interested in two areas of neurobiology that are significant for developing new strategies for spinal cord injury repair. Over the past years, we have worked to modify neurotrophins that are better suited for use in SCI. We are also interested in understanding the processes involved in maintaining and differentiating neural stem cells.

**MICHAEL Y. WANG, M.D., F.A.C.S.****Professor, Departments of Neurological Surgery and Physical Medicine & Rehabilitation**
Director of Neurosurgery, University of Miami Hospital**Spinal Cord Injury Outcomes**

My primary research has been in the investigation of SCI Outcomes. I work with Miami Project researchers Drs. Allan Levi and Barth Green in studying the clinical effects of Hypothermia. Currently, a multi-center randomized, prospective study on the effects of hypothermia in SCI is underway. In addition, I am studying the clinical application of SCI biomarkers to predict the effects of both injuries as well as therapeutic interventions with Drs. Dalton Dietrich and Ross Bullock.

EVA WIDERSTRÖM-NOGA, D.D.S., PH.D.**Research Professor, The Miami Project to Cure Paralysis, the Departments of Neurological Surgery and Physical Medicine & Rehabilitation****Interdisciplinary Research Approaches to Improve Neuropathic Pain Management after Neurotrauma**

My research program is interdisciplinary and includes the identification of clinical correlates of underlying mechanisms of neuropathic pain associated with neurological trauma as a way to facilitate the translation of basic research findings to treatments tailored to specific mechanisms. A recent line of research in my program aims to better understand cortical mechanisms of multisensory integration and how to manipulate these mechanisms by visual illusion and transcranial electrical stimulation to reduce pain. In addition, we have examined SCI stakeholders (people with SCI and neuropathic pain, their significant others and SCI healthcare providers) perspectives on barriers and facilitators to optimal management of neuropathic pain. Based on this work we have developed a preliminary pain education tool that is now further refined based on structured stakeholder feedback. My research program is highly collaborative and includes extensive interdisciplinary protocols for a multimodal evaluation of self-reported pain symptoms and its psychosocial impact, quantitative assessment of neurological function, and biomarkers including non-invasive brain imaging and electrophysiology.



SAVE THE DATES

20/20 VISION FOR SCI: THE MIAMI SUMMIT

Diagnostic Treatment Center (DTC) at Jackson Memorial Hospital
1080 NW 18th St. Miami, FL 33136



October 29-31, 2020

Join the spinal cord injury community of clinicians, researchers, and persons with SCI for a fast-paced two-day conference showcasing the latest SCI research and clinical care advances. You'll benefit from invited speakers who are nationally-recognized experts in SCI, including those from The South Florida Spinal Cord Injury Model System, the Department of Physical Medicine & Rehabilitation, and The Miami Project to Cure Paralysis at the University of Miami Miller School of Medicine; Jackson Memorial Medical Center; and the Miami VA. A half-day expo, with tours of the state-of-the-art Christine Lynn Rehabilitation Center, and demonstrations and presentations of adaptive recreation, community activities, and other resources for persons with SCI will add to the exceptional slate of educational and networking opportunities of the summit.

info and registration:

<https://na.eventscloud.com/ehome/502162>

South Florida
Spinal Cord Injury
Model System

UHealth Jackson
Rehabilitation Care

THE MIAMI PROJECT
TO CURE PARALYSIS

Miami VA
Healthcare System
★★★★★

Spinal Cord Injury Summit Rescheduled for the Fall

Originally scheduled in the spring, the Spinal Cord Injury Summit has been rescheduled to the fall of 2020 due to COVID-19. The South Florida Spinal Cord Injury Model System, along with The Miami Project to Cure Paralysis, University of Miami Health System, Jackson Memorial Medical Center, and Miami Veterans Affairs, will be hosting a spinal cord injury (SCI) conference on October 29-31, 2020.

The SCI conference will highlight the new Christine E. Lynn Rehabilitation Center for The Miami Project to Cure Paralysis at the University of Miami/Jackson Memorial Medical Center, which opened in the midst of COVID-19 in the spring of 2020. Presentations, discussion opportunities, and facility tours will provide attendees with the opportunity to learn about the latest updates in SCI research and clinical care. Sessions will be targeted towards the SCI community, scientists, clinicians, trainees, and the general public. We hope you will consider joining us for this event. More information is available at themiamiproject.org.



Gail F. Beach

Memorial Lecture Series

Once again, The Miami Project was honored to have renowned neuroscientists visit the campus as part of The Gail F. Beach Memorial Visiting Lectureship Series. The lectureship series, dedicated to Gail F. Beach, a prominent Florida educator and fellow SCI advocate, provides outstanding educational opportunities for The Miami Project researchers and our neuroscience colleagues at the University of Miami. Although this year our lecture series was cut short, our speakers gave insightful presentations on numerous topics and were enthusiastic to share their research with us!



December 4, 2019

Philip J. Horner, PhD

Weill Cornell Medical College
Houston, Texas

January 8, 2020

Cagla Eroglu, PhD

Duke University Medical Center
Durham, North Carolina

February 5, 2020

Rajiv R. Ratan, MD., PhD

Weill Cornell Medicine
White Plains, New York

March 4, 2020

Marie-Ève Tremblay, PhD

Laval University
Quebec, Canada



Drs. Marie-Ève Tremblay and host Coleen Atkins



Drs. Rajiv R. Ratan and host Jae Lee

Scientific Publications

Published studies that have passed the test of peer review are the benchmark of scientific progress. Listed here are the 2019 research publications by Miami Project scientists and colleagues.

Aimetti AA, Kirshblum S, Curt A, Mobley J, Grossman RG, Guest JD. (2019). Natural history of neurological improvement following complete (AIS A) thoracic spinal cord injury across three registries to guide acute clinical trial design and interpretation. *Spinal Cord*. 57(9):753-762.

Bankston AN, Forston MD, Howard RM, Andres KR, Smith AE, Ohri SS, Bates ML, Bunge MB, Whittemore SR. (2019). Autophagy is essential for oligodendrocyte differentiation, survival, and proper myelination. *Glia*. 67(9):1745-1759.

Basil GW, Kolcun JPG, Wang MY. (2019). Modularized implant assembly for spinal fusion - a means for managing adjacent level disease: technical report. *World Neurosurgery*. 130:231-234.

Basil GW, Kolcun JPG, Wang MY. (2019). The farmer and the hunter: a longitudinal philosophy of spine surgery. *Journal of Neurosurgery Spine*. 6:1-2.

Basil GW and Wang MY. (2019). Trends in outpatient minimally invasive spine surgery. *Journal of Spine Surgery*. 5(Suppl 1):S108-S114.

Bennett C, Mohammed F, Álvarez-Ciara A, Nguyen MA, Dietrich WD, Rajguru SM, Streit WJ, Prasad A. (2019). Neuroinflammation, oxidative stress, and blood-brain barrier (BBB) disruption in acute Utah electrode array implants and the effect of deferoxamine as an iron chelator on acute foreign body response. *Biomaterials*. 188:144-159.

Bermudez CI, Jermakowicz WJ, Kolcun JPG, Sur S, Cajigas I, Millan C, Ribot R, Serrano EA, Velez-Ruiz N, Lowe MR, Tornes L, Palomeque M, Kanner AM, Jagid JR, Rey GJ. (In press). Cognitive outcomes



following laser interstitial therapy for mesiotemporal epilepsies. *Neurology: Clinical Practice*.

Betz R, Biering-Sørensen F, Burns SP, Donovan, Graves DE, Guest J, Jones L, Kirshblum S, Krassioukov A, Mulcahey M, Schmidt Read M, Rodriguez GM, Rupp R, Schuld C, Tansey K, Walden K. (2019). The 2019 revision of the international standards for neurological classification of spinal cord injury (ISNCSCI)—what's new? *Spinal Cord*. 57(10):815-817.

Bhatia N, Palispis WA, Urakov T, Gruskay J, Haghverdian J, Yang DS, Uong J, Albert T, Vaccaro A, Levi AD, Gupta R. (2019). Establishing validity of the fundamentals of spinal surgery (FOSS) simulator as a teaching tool for orthopaedic and neurosurgical trainees. *The Spine Journal*. S1529-9430(19)31104-0.

Blaya MO, Wasserman JM, Pieper AA, Sick TJ, Bramlett HM, Dietrich WD. (2019). Neurotherapeutic capacity of P7C3 agents for the treatment of traumatic brain injury. *Neuropharmacology*. 145(Pt B):268-282.

Blight AR, Hsieh J, Curt A, Fawcett JW, Guest JD, Kleitman N, Kurpad SN, Kwon BK, Lammertse DP, Weidner N, Steeves JD. (2019). The challenge of recruitment for neurotherapeutic clinical trials in spinal cord injury. *Spinal Cord*. 57(5):348-359.

Brambilla R. (2019). Neuroinflammation, the thread connecting neurological disease: Cluster: "Neuroinflammatory mechanisms in neurodegenerative disorders". *Acta Neuropathologica*. 137(5):689-691.

Brambilla R. (2019). The contribution of astrocytes to the neuroinflammatory response in multiple sclerosis and experimental autoimmune encephalomyelitis. *Acta Neuropathologica*. 137(5):757-783.

Bray ER, Yungheer BJ, Levay K, Ribeiro M, Dvoryanchikov G, Ayupe AC, Thakor K, Marks V, Randolph M, Danzi MC, Schmidt TM, Chaudhari N, Lemmon VP, Hattar S, Park KK. (2019). Thrombospondin-1 mediates axon regeneration in retinal ganglion cells. *Neuron*. 103(4):642-657.e7.

Brooks NP and Wang MY. (In press). New technologies in spine surgery. *Neurosurgery Clinics of North America*.

Brusko GD, Cox EM, Wang MY. (2019). 3-dimensional printing a novel framework for spinal cord injury repair. *Neurosurgery*. 85(2):E192-E193.

Brusko GD, Kolcun JPG, Heger JA, Levi AD, Manzano GR, Madhavan K, Urakov T, Epstein RH, Wang MY. (2019). Reductions in length of stay, narcotics use, and pain following implementation of an enhanced recovery after surgery program for 1- to 3-level lumbar fusion surgery. *Neurosurgical Focus*. 46(4).

Brusko GD, Luther E, Levi AD. (2019). Use of cervical disc arthroplasty to treat non-contiguous cervical disc herniations: a case report. *World Neurosurgery*. 133:163-166.

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SPECT imaging as a tool for surgical planning in patients with axial neck and back pain. *Neurosurgical Focus*. 47(6):E19.

Brusko GD and Wang MY. (2019). Endoscopic lumbar interbody fusion. *Neurosurgery Clinics of North America*. 31(1):17-24.

Brusko GD and Wang MY. (2019). Towards the connectome - inching closer along the frontiers of neuroscience. *Neurosurgery*. 85(2):E180-E181.

Brusko GD, Yoon JW, Wang MY. (2019). Can identification of genetic polymorphisms associated with neurologic disease guide future treatment strategies? *Neurosurgery*. 84(1):E1-E2.

Brusko GD, Yoon JW, Wang MY. (2019). Through the eyes of a neurosurgeon - how binocular disparity translates into surgical performance. *Neurosurgery*. 84(3):E142-E143.

Burks JD, Gant KL, Guest JD, Jamshidi AG, Cox EM, Anderson KD, Dietrich WD, Bunge MB, Green BA, Khan A, Pearse DD, Saraf-Lavi E, Levi AD. (2019). Imaging characteristics of chronic spinal cord injury identified during screening for a cell transplantation clinical trial. *Neurosurgical Focus*. 46(3):E8.

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- Chan AK, Bisson EF, Bydon M, Glassman SD, Foley KT, Potts EA, Shaffrey CI, Shaffrey ME, Coric D, Knightly JJ, Park P, Wang MY, Fu KM, Slotkin JR, Asher AL, Virk MS, Kerezoudis P, Alvi MA, Guan J, Haid RW, Mummaneni PV. (2019). A comparison of minimally invasive transforaminal lumbar interbody fusion and decompression alone for degenerative lumbar spondylolisthesis. *Neurosurgical Focus*. 1;46(5):E13.
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For those who can't

The Miami Project to Cure Paralysis was established in 1985 to develop new therapies to improve function in paralyzed individuals. We are very enthusiastic about our current accomplishments and multi-disciplinary research programs. In addition, we are most eager about the future as we continue to move new treatments forward to treat paralysis.