



Foundation Alumna Featured Speaker on Topic of Regenerative Medicine and Lifelong Learning at National Student Conclave



Fabrisia Ambrosio, PT, PhD, 2008 Foundation Research Grant recipient, will be leading two sessions at the American Physical Therapy Association's National Student Conclave (NSC) in Louisville, Kentucky later this month. The first will focus on the topic of regenerative medicine, and the second session, given on behalf of the Foundation, will be on the topic of the importance of lifelong learning as a physical therapist. As an investigator focusing within the evolving science of regenerative medicine, lifelong learning will certainly be key in her career.

Regenerative medicine, a multidisciplinary field that uses cell, tissue and/or organ substitutes to restore function lost as a result of aging, injury or disease, is likely to be the key in making progress battling issues such as diabetes, Parkinson's disease, heart failure and traumatic injuries. In recent years, scientists have been attempting to combine the regenerative medicine approach to injury with the rehabilitation approach more typically seen in the physical therapy field to achieve the maximum benefits of treatment for patients with skeletal muscle injuries or deficiencies.¹ Dr. Ambrosio, currently an assistant professor in the Department of Physical Medicine & Rehabilitation with secondary appointments in the Departments of Physical Therapy, Orthopaedic Surgery and Molecular Genetics and faculty member of the McGowan Institute for Regenerative Medicine at the University of Pittsburgh, successfully leveraged her Foundation funding to create a groundbreaking line of research focusing on regenerative medicine.

The 2008 Foundation Research Grant Ambrosio received as a junior faculty member early in her career was crucial in building a strong underpinning for her work. Her Foundation supported research looked at the effect of neuromuscular electrical stimulation (NMES) on the transplantation potential

of stem cells into dystrophic muscle, or muscle affected by muscular dystrophy. With this study, Dr. Ambrosio discovered that the stem cells were in fact sensitive to electrical stimulation. She found that this method could be used to improve the outcomes of transplanting stem cells into dystrophic muscle to in turn enhance the cells' contribution to muscle regeneration and the functional capacity of the muscle.²

The findings from this study launched a line of research funded by agencies such as the National Institutes of Health examining how rehabilitation could synergize with regenerative medicine technologies to promote better functional outcomes. After discovering that rehabilitation methods such as NMES could dictate the way donor stem cells behave after transplantation, Ambrosio began to wonder if a similar outcome was possible with endogenous stem cells, or cells that already exist in the human body- what she calls "stem cell therapy without stem cell transplantation". She pursued this thought, looking at the effect of NMES on the regeneration capacity of acutely injured aged skeletal muscle, and used the findings from her Foundation funded study to propose more answers to seek. With the rapid pace of knowledge advancement within regenerative medicine, more discoveries lead to more questions and the continuum of learning spins on.

Dr. Ambrosio has high hopes that the technologies she is researching will eventually make their way to the clinical setting.

"We aspire for the investigations we pursue, even those that are in a culture dish or using pre-clinical models, to ultimately help direct rehabilitation care plans," she notes. "By understanding the cellular and molecular mechanisms behind tissue regeneration and how those mechanism can be manipulated through the application of rehabilitation approaches, we intend to identify more targeted rehabilitation programs that will make our treatment protocols more efficient."

It is predicted that Dr. Ambrosio's sessions at NCS will be extremely popular judging by the profession's interest and aptitude for both regenerative medicine and lifelong learning.

According to Ambrosio, it is important for physical therapists to continuously seek new knowledge as a physical therapist and not consider their education complete after graduation. Even for those in the clinical setting, it is imperative to stay up to date on current physical therapy research, ongoing clinical trials and new technologies, and she will be giving advice on how to do this effectively at NSC.

Dr. Ambrosio takes this advice seriously and her recommendation to emerging researchers is to learn as much as you can about a various topics of interest, even if they are outside one's "comfort area". Get a grasp of the existing literature, and then begin to form questions. She has come up with some great questions herself and, upon delving deeper into the field of regenerative rehabilitation, she is only beginning to find some exciting answers.

Dr. Ambrosio's research career has rocketed since her 2008 Foundation grant and, after hearing her talk about her passion for this field, it's obvious that she is just getting started.

"The thing that I enjoy most is that I never know where I'm going to be in the next year in terms of my research," Ambrosio notes. "The work I do on a day to day basis is always fresh, always exciting, and always interesting."

Help researchers like Dr. Ambrosio make an impact.



1. Ambrosio F, Russell A. *Journal of Rehabilitation Research and Development*. Regenerative rehabilitation: a call to action. 2010;47(3):xi-xv.
2. Distefano G, Ferrari RJ, Weiss C, Deasy BM, Boninger ML, Fitzgerald GK, Huard J, Ambrosio F. *PLoS One*. Neuromuscular electrical stimulation as a method to maximize the beneficial effects of muscle stem cells transplanted into dystrophic skeletal muscle. 2013;8(3):e54922.