

Cardiometabolic Disease Following Spinal Cord Injury Preclinical and Translational Evidence of Both Risk and Treatment Benefit

People surviving spinal cord injuries (SCI) frequently experience component and coalesced health risks of the cardiometabolic syndrome (CMS). The CMS hazards of overweight/obesity, insulin resistance, hypertension, and dyslipidemia - the latter as depressed high-density lipoprotein cholesterol and elevated triglycerides - are strongly associated with physical deconditioning and ill-advised nutrition, which are common after SCI and worsen the prognosis for all-cause cardiovascular disease throughout the post-injury lifespan.

Evidence and recent SCI population-specific guidelines define a role for physical activity after SCI as an effective countermeasure to CMS risks. High-intensity exercise may be the preferred activity for this intervention. Otherwise, a lifestyle intervention incorporating exercise and nutritional modification represents a preferred strategy for overall health management. Other approaches such as anti-inflammatory pharmacotherapy and maintenance of sublesional muscle mass may also be useful in lessening CMS risks.

The presentation will identify CMS risks reported after SCI in both pre-clinical and human studies. It will further present evidence describing exercise deconditioning and imprudent nutrition after SCI, and evidence that their management is associated with improvement in cardiometabolic component risks. Alternative approaches being tested in current pre-clinical studies will be described.

Mark S. Nash, Ph.D., FACS received his Doctoral Degree in Applied Physiology and Clinical Anatomy (1984) from the University of Toledo and Medical College of Ohio at Toledo. He spent his final year of training as a Doctoral Fellow studying the rehabilitation of ischemic heart diseases, and after that joined the faculty of the University of Miami - Miller School of Medicine. His current faculty rank and affiliation is as Professor of Neurological Surgery and Physical Medicine & Rehabilitation (with the award of tenure), and co-joined appointments in the Departments of Physical Therapy, and Kinesiology & Sports Sciences. When the Center of Excellence on Spinal Cord Injury (the Miami Project to Cure Paralysis) was established in 1985, he was named a Founding Principal Investigator and Director of the Applied Physiology Research Program, a position he still holds today.

Professor Nash currently serves as Director of Research in the Department of Physical Medicine & Rehabilitation and is Co-Director of the National Institute for Disability, Independent Living, and Rehabilitation Research (NIDILRR) SCI Model System for the U.S. Department of Health and Human Services. He is a longstanding Fellow of the American College of Sports Medicine (1995), has published more than 130 peer-review manuscripts, scholarly monographs, and chapters, and has co-authored the leading textbook on *Spinal Cord Medicine*. Professor Nash has received grant awards from the U.S. Department of Defense, the NIDILRR, and the Craig H. Nielsen Foundation, which have examined causes for, and interventions on cardiometabolic disease after SCI. His work has been the focus of more than 200 national/international lectures and invited presentations, including 20 keynote addresses at National and International Conferences. He has been a grant reviewer for the U.S. National Institutes of Health (NIH), the U.S. Centers for Disease Control and Prevention, the U.S. Department of Education, the U.S. Department of Defense, and the U.S. Department Health and Human Services. Professor Nash sits on the Research Advisory Boards of 5 medical foundations and advises federal and foundation grant agencies in four foreign countries. He has trained 17 graduate students, has hosted 23 national/international in-service research trainees and has mentored 5 Post-doctoral Fellows who have gone on to academic prominence.

Professor Nash was recently the Chair of the Cardiometabolic Clinical Guideline Panel for the U.S. Paralyzed Veterans Association Consortium on Spinal Cord Medicine, which under his leadership developed the inaugural evidence-based guidelines for diagnosis and treatment of cardioendocrine disease after SCI. Since 2015 he has chaired the Research and Awards Committee of the American Spinal Injury Association (ASIA) and also the expert panel developing the extended dataset on voluntary exercise after SCI for the International Spinal Cord Society (ISCoS). He is currently on the Board of Directors of ASIA, received the 2012 ASIA David Apple, MD Award for excellence in publishing, and in 2018 was awarded the John Stanley Coulter Award by the American Congress of Rehabilitation, which recognizes lifetime achievements in rehabilitation.