

Changes In the Gut Morphology, Microbiota, and Metabolites: Roles in Health and Recovery After SCI

Course ID 101

Michelle Hook PhD, Texas A&M

Dr. Ceren Yazar-Fisher, PhD; Dr. Warren Alilain, PhD; Dr. Cedric Geoffroy, PhD

Number of Individuals Proposed: 4 Type of Course: Expert Panel Educational Objectives -To identify the consequences of a spinal cord injury on intestinal dysfunctions as they progress from an acute to chronic injury stage. -To examine how diet can impact recovery and metabolic health via modulating gut dysbiosis - To examine the changes in metabolites after SCI that result cardiometabolic dysfunction in a preclinical model of SCI -To appreciate the need for reverse translation of clinical findings into preclinical models. Summary This course will focus on the bedside to bench translation of the consequences of spinal cord injury on intestinal functions. The primary focus will be on SCI-induced changes in the microbiome and anatomical morphology of the digestive system, including the colon and ileum. The course will begin with a brief overview of the changes occurring in the digestive system (focusing on the small intestines and colon) following SCI that result in the typical chronic phenotype. Course content will include results of a clinical trial focused on how diet can impact metabolic function and neurological recovery via modulating the gut dysbiosis. Preclinical animal models that emulate clinical observations will be presented to demonstrate the effects of gut dysbiosis on respiratory functions. The course will conclude with results from preclinical work showing that targeting the gut acutely after SCI has potential to enhance functional recovery and metabolic functions. Funding Sources Department of Defense, CDMRP W81XWH-22-1-0522 (MH), Department of Defense, CDMRP (MR, MH), Mission Connect (#021-110), Texas A&M University Seedling Grant (MH), ISRT (MS, MH) R01 NS101105 (WJA), NIH R21 NS121966 (WJA). Craig H. Neilsen Foundation #598741 (WJA), Kentucky Spinal Cord & Head Injury Research Trust (WJA) Yazar-Fisher: 1R01NR016443-NIH/NINR; Niche Biomedical Inc. dba ANEUVO Woodnext Foundation (CGG, MH) PVA #3177, TIRR Foundation Mission Connect #020-101 (CGG), Craig Neilsen #882102 (CGG) Draft Agenda: 00:00-00:05 Moderator Opening – (Dr. Geoffroy) 00:05-00:15 The connection between gut microbiome, neurorecovery, nutrition, and metabolic function in people with SCI (Dr. Yazar-Fisher) 00:15-00:25 Gut dysbiosis and SCI - impact on respiratory functions and beyond (Dr. Alilain) 00:25-00:35 Gut metabolites as therapeutics for increasing metabolic and functional recovery after SCI (Dr. Geoffroy) 00:35-00:45 Targeting IGF-1 repairs the integrity of the gut-blood barrier and increases functional recovery (Dr. Hook) 00:45-00:60 Discussion / Q & A (Drs. Yazar-Fisher, Hook, Geoffroy, Alilain)

Learning Objective 1 To identify the consequences of a spinal cord injury on intestinal dysfunctions as they progress from an acute to chronic injury stage.

Learning Objective 2 To examine how diet can impact recovery and metabolic health via modulating gut dysbiosis

Learning Objective 3 To examine the changes in metabolites after SCI that result cardiometabolic dysfunction in a preclinical model of SCI.