BME Seminar Series

Thursday, August 29, 2019
10:00 am, Room 218, Whitaker Hall

Christine E. Schmidt, PhD

Pruitt Family Professor
Department Chair
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University of Florida

"Engineering Natural-Based Materials for Functional Nerve Regeneration"

Abstract:
Damage to peripheral nerve tissue can have a devastating impact on the quality of life for individuals suffering from nerve injuries. Our research is focused on analyzing and designing natural-based biomaterials that can interface with neurons and specifically stimulate and guide nerves to regenerate. These biomaterials can ultimately be used for facial and hand reconstruction or in trauma cases, and potentially could be used to aid the regeneration of damaged spinal cord as well. This presentation will focus on peripheral nerve applications and successes to date.

In one approach, we have focused on the development of advanced hyaluronan-based scaffolds for nerve regeneration applications. Hyaluronic acid (HA; also known as hyaluronan) is a non-sulfated, high molecular weight, glycosaminoglycan found in all mammals and is a major component of the extracellular matrix in the nervous system. HA plays a significant role in wound healing and tissue regeneration, and is also a versatile biomaterial that has been used in a number of applications including tissue engineering scaffolds, clinical therapies, and drug delivery devices. Our group has devised novel techniques to process HA into forms that can be used in therapeutic wound healing applications. For example, we are using advanced laser-based processes and magnetic particle templating to create microarchitecture within the hyaluronan materials to mimic the native basal lamina of nerve and thus to provide physical and chemical guidance features for regenerating axons. In a parallel approach to foster nerve regeneration, our group has developed natural "acellular tissue grafts" created by chemical processing of normal intact nerve tissue to preserve the microarchitecture but to eliminate the immune response. These engineered, biological nerve grafts are currently used in the clinic for peripheral nerve injuries.

Bio:
Christine E. Schmidt is the J. Crayton Pruitt Family Endowed Chair and founding Department Chair of the J. Crayton Pruitt Family Department of Biomedical Engineering at the University of Florida. Dr. Schmidt received her B.S. degree in Chemical Engineering from the University of Texas at Austin and her Ph.D. in Chemical Engineering from The University of Illinois at Urbana-Champaign. She conducted postdoctoral research at MIT as an NIH Postdoctoral Fellow, joining the University of Texas at Austin Chemical Engineering faculty in 1996, until December 2012, when she moved to become the Chair of Biomedical Engineering at the University of Florida.

Dr. Schmidt is a Fellow of the National Academy of Inventors (NAI), the American Institute for Medical and Biological Engineering (AIMBE), the International Academy of Medical and Biological Engineering (IAMBE), the American Association for the Advancement of Science (AAAS), the Biomedical Engineering Society (BMES), and a Fellow of Biomaterials Science and Engineering (FBSE) of the International Union of Societies of Biomaterials Science and Engineering. She is currently the President for AIMBE (2018-2020).

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