Neural Prosthesis Live Webinar

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Neuromodulation Focused Therapeutics for Cardiac Disease: Structure/Function Foundations

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MetroHealth

Physical Medicine
and Rehabilitation

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Reception immediately following
Wolstein Research Building, Room 1413
Case Western Reserve University

Live stream, interaction, and archives available at **FEScenterWebinar.org**

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The cardiac nervous system, composed of the intracardiac ganglia, intrathoracic extracardiac ganglia, spinal cord, brainstem, and higher centers, coordinates regional cardiac function on a beat-to-beat basis. Globally, the cardiac nervous system is optimized to handle physiological stressors (e.g. orthostatic changes, exercise). However, it has not evolved a mechanism to adequately deal with catastrophic events such as myocardial infarction and the longer-term evolution of congestive heart failure. Imbalances within this neural network lead to excessive and stochastic activity, and underlie the mechanisms responsible for arrhythmias and heart failure.

Autonomic Regulation Therapy (ART) is a rapidly emerging therapy in the management of congestive heart failure and cardiac arrhythmias. Modulation of the cardiac neuronal hierarchy can be achieved with bioelectronic modulation of the spinal cord, cervical vagus, baroreceptors, or renal nerve ablation. With appropriate neuromodulation therapy, myocytes are rendered stress resistance, autonomic responsiveness for control of the heart is preserved, and the potential for fatal arrhythmias is reduced.

Innovations in the field of Neurocardiology requires evolving new interfaces and analytics to evaluate neural network activity and cardiac electrical and mechanical function concurrently in normal and disease states. Understanding mechanistically what is being stimulated within the autonomic nervous system by such device-based therapy and how the system reacts to such stimuli is essential for optimizing stimulation parameters and for the future development of closed-loop ART.

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