

The USC Center for Neurorestoration: Maximizing Unique Opportunities from Clinical Neurosciences for Human Nervous System Functional Restoration Research

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From the perspective of the clinical neurosciences, the treatment of nervous system disorders has largely been limited by the inability to restore lost neurological function, despite successful strategies to arrest or slow down the underlying processes. However, recent developments in the basic neurosciences and neural engineering are potentially expanding the horizons in this regard. The typical roadmap for translational application of basic discoveries to application to patients involves the progression from in-vitro experiments to animal models (including non-human primates) to human testing. In this sequence, the step from animal models to human work typically generates the most scrutiny, requires the most resources, and in many cases represents the barrier for ultimate benefit to patients. The USC Center for Neurorestoration has been established from the perspective of the clinical neurosciences to address this specific challenge. The vision is to create large scale clinical programs that run in parallel with collaborative research programs in engineering and neuroscience that take maximum advantage of opportunities for direct human recordings, or access to human neural tissue. The Center consists of an amalgam of clinical entities (USC Keck Hospital, LAC-USC Medical Center, and Rancho Los Amigos National Rehabilitation Center) and research entities (USC Keck School of Medicine, Viterbi School of Engineering, and California Institute of Technology) as the core resources. It is designed to synergize with other Centers and Institutes at each of the partner entities, providing a unique voice from the perspective of the clinical neurosciences of neurosurgery and neurology.