

Name of Organizer: Beth Fisher

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Title of Symposium: From Bench to Bedside to Community: Activity-Dependent Brain and Behavioral Recovery in Parkinson's Disease

Description of submitted symposium: Parkinson's disease (PD) is a progressive neurodegenerative disorder affecting over 1.5 million people in the US. While epidemiological studies have suggested that physical activity over a lifespan protects against PD, new data reveal that exercise can also positively impact patients living with PD. In this symposium we will present a bench to bedside trilogy from animal models, to clinical studies, to community care. For example, animal models of dopamine depletion are revealing the underlying molecular mechanisms in activity-dependent neuroplasticity, synaptogenesis, and the establishment of new motor circuits including those that link cognitive and motor regions. Clinical studies in PD utilizing a variety of different interventions show improvement in motor performance and motor learning leading to improved function and reduced disability. We will present findings in both approaches that demonstrate key ingredients of different forms of exercise that have the greatest impact on disease symptomology and possibly modify disease progression. Finally, we will address the challenges and barriers associated with integrating exercise in daily life among those with PD. Importantly, we will share results from a recent trial providing evidence regarding strategies to overcome these barriers to facilitate long-term engagement in exercise. This evidence-based symposium seamlessly integrates data from animal models, clinical and community studies – providing a strong basis for the integration of exercise into the standard care of patients with PD.

Length of time required for symposium?: 90 minutes

Additional Presenters: Michael Jakowec, PhD; mjakowec@surgery.usc.edu Beth Fisher, PT, PhD, FAPTA; bfisher@usc.edu Terry Ellis, PT, PhD, NCS; tellis@bu.edu

What is the role of each presenter?: Michael Jakowec, PhD, will present recent findings on basic research in animal models of PD and discuss how specific forms of exercise influence the interactions between cognitive and motor circuits and the underlying molecular mechanisms that link brain health and physical activity. Beth Fisher, PT, PhD, FAPTA, will present current research that demonstrates activity-induced neuroplasticity in individuals with Parkinson's disease. Evidence is emerging that establishes beneficial brain changes concomitant with behavioral improvement following skill training in individuals with PD. Understanding the 'key ingredients' that induce brain repair and behavioral recovery in PD is critical for developing intervention strategies that effectively minimize if not resolve the symptoms of PD. Terry Ellis, PT, PhD, NCS will present recent findings from a large cross-sectional study and a community-based randomized controlled trial to discuss barriers to exercise and effective strategies to promote long-term engagement in exercise in persons with PD.

Objective 1: Understand how basic research provides evidence of underlying mechanisms important for restoration of function through physical activity

Objective 2: Translate research evidence of activity-induced neuroplasticity from animal models of dopamine depletion to humans with Parkinson's disease and describe key training/exercise parameters for inducing plasticity in this population

Objective 3: Identify barriers to exercise in patients with PD and discuss strategies to facilitate long-term engagement in exercise