**Name of Organizer:** Grace S. Griesbach

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**Title of Symposium:** Enhancing TBI and Stroke Rehabilitation by Applying Lessons from Preclinical and Clinical Research.

**Description of submitted symposium (please limit to 2000 characters):** The ultimate goal of rehabilitation research is improving functional outcome and life quality after brain injury. Preclinical research has provided information on how TBI and stroke have distinct pathological responses that should be taken into account within the rehabilitative setting. This session will focus on how we can enhance rehabilitation by applying research findings regarding acute and chronic pathophysiological responses to TBI and stroke. Material presented at this session will range from the laboratory to the clinical practice. Dr. Amy Wagner will open the session by discussing how genetic variation in dopamine systems can influence cognitive and behavioral outcomes after brain injury. She will present both experimental and clinical findings and literature supporting possible neurotransmitter derangements associated with DA pathway genetic variants that are likely to have an impact in cognitive rehabilitation. Dr. Lisa Kreber will present findings regarding chronic hormonal dysfunction after TBI and discuss the impact that this will have on post-acute recovery. The incidence of growth hormone deficiency after TBI and stroke will be discussed. In addition, the relationships between hormonal deficiencies and disability will be addressed. Dr. Grace Griesbach will present research findings on the interaction between TBI neuropathology and responsiveness to aerobic exercise. Neuroendocrine and metabolic responses to TBI and exercise will be addressed. She will also present findings on how neuroplasticity can be enhanced within the rehabilitative setting by implementing exercise. Finally, Dr Dorothy Kozlowski will provide data to demonstrate that neuroplasticity may be limited following a traumatic brain injury in the rat, compared to a rodent of model of stroke. In addition, data will be presented that demonstrates the need for more intensive and combinatorial approach to rehabilitation in the rat following TBI compared to the rat following stroke.

**Length of time required for symposium?:** 20 minutes

**Additional Presenters:** Amy Wagner - wagnerak@upmc.edu Lisa Kreber -lkreber@neuroskills.com Dorothy Kozlowski - DKOZLOWS@depaul.edu Grace Grieesbach ggriesbach@neuroskills.com

**What is the role of each presenter?:** Dr. Wagner will present both animal and human research demonstrating how injury dependent variations in neurotransmitters have an impact on cognitive outcome. Derrangements in neurotransmission in TBI patients will be compared with cardiac arrest survivors. Dopamine genetics will also be addressed. Dr. Kreber will discuss neuroendocrine changes after brain injury and the impact that these have on cognitive outcome as well as responsiveness to rehabilitation. Studies comparing the prevalence of growth hormone deficiencies between TBI and stroke patients will also be addressed. Dr. Griesbach will present animal data showing how neuroplasticity responses to exercise are dependent on the post-injury time. Ongoing metabolic and pathological responses to TBI will be addressed as mechanisms dictating neuroplasticity responses. This

will then be supported by exercise findings in TBI patients. Dr. Kozlowski will then present data describing neuroplasticity responses after TBI and stroke.

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**Objective 1:** The participant will have insight into performing translational research and will learn that translational findings can provide information on the timing to test for particular biological targets as well as the value that these measures offer as outcome predictors
**Objective 2:** The participant will better understand how neuroplasticity of the injured brain and neuroplastic changes to interventions after brain injury may differ between TBI and stroke.
**Objective 3:** The participant will learn about distinct TBI and stroke pathological responses and how these have an impact on activity dependent rehabilitation and cognitive outcome.