

Scientific/Educational Workshop

Workshop title

Therapeutic Intermittent Hypoxia: From Mechanisms to Treatment

Workshop organizer

William Zev Rymer (Shirley Ryan Ability Lab)

Speakers

Gordon Mitchell,
Gillian Muir,
Monica Perez,
Randy Trumbower

Workshop goals

1. Understand effects and mechanisms of therapeutic (low dose) intermittent hypoxia on breathing and limb motor function after chronic, incomplete spinal cord injury.
2. Understand possible therapeutic roles of AIH in clinical rehabilitation.
3. Discuss the benefits of combinatorial treatment strategies using AIH in clinical trials.

Abstract

An increasing number of studies support the view that repetitive exposure to “low dose” acute intermittent hypoxia (AIH) affects the damaged central nervous system, triggering recovery of motor function in humans with partial paralysis due to spinal cord injury. Therapeutic AIH is emerging as a simple, safe and effective strategy to supplement conventional neurorehabilitation approaches. This symposium will discuss: 1) neural mechanisms contributing to the beneficial effects of AIH in animal models and humans, and 2) the use of AIH in clinical rehabilitation. Dr. Mitchell will review the effect of repetitive exposure to “low dose” AIH on breathing and walking in rodent models of chronic, incomplete spinal cord injury, including its mechanisms of action. Dr. Muir will focus on combined AIH treatment with task-specific training on reach-to-grasp performance. Dr. Perez will describe AIH effects on synaptic plasticity in the human corticospinal system with and without spinal cord injury with special emphasis on its underlying mechanisms, spasticity and voluntary motor outcomes related to upper-limb function. Dr. Trumbower will focus on the use of AIH to improve walking and lower-limb rehabilitation, and ongoing clinical trials of functional recovery with chronic spinal injury. Available evidence demonstrates that AIH combined with over-ground walking training improves walking speed and endurance after incomplete chronic spinal injury. We will highlight advances and limitations in this research area.