

April 2018 Abstract 2



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Hello members.

We are hoping you have read the first abstract of April related to neuroplasticity. That article was focused on defining neuroplasticity and providing examples of how we can capitalize on neuroplasticity (generally).

This week how can we increase neuroplasticity.

[Exercise and Environmental Enrichment as Enablers of Task-Specific Neuroplasticity and Stroke Recovery.](#)

Livingston-Thomas J, Nelson P, Karthikeyan S, et al. Exercise and Environmental Enrichment as Enablers of Task-Specific Neuroplasticity and Stroke Recovery. *Neurotherapeutics : the journal of the American Society for Experimental NeuroTherapeutics*. 2016;13(2):395-402.

Abstract:

Improved stroke care has resulted in greater survival, but >50% of patients have chronic disabilities and 33% are institutionalized. While stroke rehabilitation is helpful, recovery is limited and the most significant gains occur in the first 2-3 months. Stroke triggers an early wave of gene and protein changes, many of which are potentially beneficial for recovery. It is likely that these molecular changes are what subserve spontaneous recovery. Two interventions, aerobic exercise and environmental enrichment, have pleiotropic actions that influence many of the same molecular changes associated with stroke injury and subsequent spontaneous recovery. Enrichment paradigms have been used for decades in adult and neonatal animal models of brain injury and are now being adapted for use in the clinic. Aerobic exercise enhances motor recovery and helps reduce depression after stroke. While exercise attenuates many of the signs associated with normal aging (e.g., hippocampal atrophy), its ability to reverse cognitive impairments subsequent to stroke is less evident. It may be that stroke, like other diseases such as cancer, needs to use multimodal treatments that augment complimentary neurorestorative processes.

CLINICAL POINT OF VIEW:

TERM: Pleiotropic, Describing a gene that has multiple, often unrelated effects

1. Behavioral experience alters properties of neurons and molecular processing in the normal rodent brain (this is neuroplasticity) and results in behavioral modification. One way to achieve this is alteration of the environment and exercise.

Specifically, introduction of novel objects to promote physical and cognitive activity.

2. An enriched environment “enhances sensorimotor behaviors, learning and memory, and other cognitive and psychosocial functions”, but alone it does not provide task-specific training, e.g. skilled motor movements (grasp/reach).
3. Physical exercise improves general neurological function, strength, balance, CV fitness, but is not specific to dexterity.
4. “Pleitropic interventions such as exercise and enriched environment to enhance motor recovery following stroke appear to hold great promise...”.
5. Identify ways you can provide your patients with an enriched (novel, challenging, interesting) and physically activity (exercise) environment to promote neuroplasticity.

Stay tuned for a video clinical pearl next week, to see this in action with a patient.

We are seeking volunteers interested in assisting with the Stroke SIG while we are growing and developing. If you are interested, please contact heather.hayes@hsc.utah.edu Heather Hayes
Thank you.

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