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Hello members.

The Stroke SIG is dedicated this year to meeting the ANPT objective of the new strategic plan.
Translating evidence into practice to ensure high value care with input from practitioners to inform future research.

Thus, we will be providing you with abstracts, fact sheets, clinical points of view providing clinical pearls (Facebook/Twitter), and awarding research poster prizes at CSM 2019. We hope you will follow us on Facebook and Twitter, via email. We hope you will contribute to the learning and discussions.

To make this successful we are seeking volunteers to help with the work, please contact Heather Hayes at heather.hayes@hsc.utah.edu if you wish to help. Our intent is to have tangible projects, and with lots of people on-board no one will get overwhelmed.

Topics will be disseminated based on the wonderful feedback we received from our members about their interests. The first, NEUROPLASTICITY. Always a fun topic. We will start with defining what is it?

Harnessing neuroplasticity for clinical applications.

Cramer SC, Sur M, Dobkin BH, et al. Harnessing neuroplasticity for clinical applications. Brain : a journal of neurology. 2011;134(Pt 6):1591-1609.

https://www.ncbi.nlm.nih.gov/pubmed/21482550

Abstract

Neuroplasticity can be defined as the ability of the nervous system to respond to intrinsic or extrinsic stimuli by reorganizing its structure, function and connections. Major advances in the understanding of neuroplasticity have to date yielded few established interventions. To advance the translation of neuroplasticity research towards clinical applications, the National Institutes of Health Blueprint for Neuroscience Research sponsored a workshop in 2009. Basic and clinical researchers in disciplines from central nervous system injury/stroke, mental/addictive disorders, paediatric/developmental disorders and neurodegeneration/ageing identified cardinal examples of neuroplasticity, underlying mechanisms, therapeutic implications and common

denominators. Promising therapies that may enhance training-induced cognitive and motor learning, such as brain stimulation and neuropharmacological interventions, were identified, along with questions of how best to use this body of information to reduce human disability. Improved understanding of adaptive mechanisms at every level, from molecules to synapses, to networks, to behaviour, can be gained from iterative collaborations between basic and clinical researchers. Lessons can be gleaned from studying fields related to plasticity, such as development, critical periods, learning and response to disease. Improved means of assessing neuroplasticity in humans, including biomarkers for predicting and monitoring treatment response, are needed. Neuroplasticity occurs with many variations, in many forms, and in many contexts. However, common themes in plasticity that emerge across diverse central nervous system conditions include experience dependence, time sensitivity and the importance of motivation and attention. Integration of information across disciplines should enhance opportunities for the translation of neuroplasticity and circuit retraining research into effective clinical therapies.

Brief Clinical Point of View

This article by Cramer, Sur, Dobkin, O'Brien, Sanger, et al. provides a current update of neuroplasticity.

Key points in the article.

1. *Definition of neuroplasticity*. "…broadly defined as the ability of the nervous system to respond to intrinsic and extrinsic stimuli by reorganizing its structure, function and connections; can be described at many levels from molecular to cellular to systems to behavior; and can occur during development, in response to the environment, in support of learning, in response to disease, or in relation to therapy."
   a. For stroke therapists, we want to improve the nervous system (the site of the original problem) when we are treating, not just the muscles (peripheral). Thus think beyond strength. For example, improving strength does not necessarily make me a better baseball player.

2. *Adaptive plasticity*, associated with functional gain. Adaptive plasticity is not a compensatory behavior, "which are behviours that arise from mechanisms different from those operative in the distributed neural networks that typically support behavior prior to disease onset".

3. "…Plasticity after injury is often **experience dependent**. Thus, interventions that aim to promote plasticity can be expected to have maximum impact when coupled with optimal training and experience." Stay tuned this month for clinical pearls describing experience dependent.

4. "Note that measuring the impact of such experiences on behavioural outcomes might require use of domain-specific measures." We need to measure!

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