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Hello members.

We are continuing our focus of Neuroplasticity this week. Clinical Points of View are added at the end each week. Also, follow us on Instagram, click link below!!

This week let's focus on the wave of the future and information one should know if you are involved in stroke rehabilitation.

GENETICS.

Genetic Variation and Neuroplasticity: Role in Rehabilitation After Stroke

Campbell Stewart Jill, Cramer S. Genetic Variation and Neuroplasticity: Role in Rehabilitation After Stroke. *JNPT*.2017; 41:S17-S23

No PDF available for this, but if you are a member of ANPT and Neurology section, this is a JNPT article.

Abstract:
Background and Purpose: In many neurologic diagnoses, significant interindividual variability exists in the outcomes of rehabilitation. One factor that may impact response to rehabilitation interventions is genetic variation. Genetic variation refers to the presence of differences in the DNA sequence among individuals in a population. Genetic polymorphisms are variations that occur relatively commonly and, while not disease-causing, can impact the function of biological systems. The purpose of this article is to describe genetic polymorphisms that may impact neuroplasticity, motor learning, and recovery after stroke.
Summary of Key Points: Genetic polymorphisms for brain-derived neurotrophic factor (BDNF), dopamine, and apolipoprotein E have been shown to impact neuroplasticity and motor learning. Rehabilitation interventions that rely on the molecular and cellular pathways of these factors may be impacted by the presence of the polymorphism. For example, it has been hypothesized that individuals with the BDNF polymorphism may show a decreased response to neuroplasticity-based interventions, decreased rate of learning, and overall less recovery after stroke. However, research to date has been limited and additional work is needed to fully understand the role of genetic variation in learning and recovery.
Recommendations for Clinical Practice: Genetic polymorphisms

should be considered as possible predictors or covariates in studies that investigate neuroplasticity, motor learning, or motor recovery after stroke. Future predictive models of stroke recovery will likely include a combination of genetic factors and other traditional factors (eg, age, lesion type, corticospinal tract integrity) to determine an individual's expected response to a specific rehabilitation intervention.

CLINICAL POINT OF VIEW:
Terms(s):
--Genetic Polymorphisms-relatively frequent variations in DNA-not disease causing but impact different systems especially when interacting with different genetic variants and environmental conditions.
--Single-nucleotide polymorphism- (SNP) a common polymorphism-variation where one nucleotide is exchanged for another. These can lead to biological variations that may have functional consequences.

1. Genetic polymorphisms may impact neuroplasticity, learning and recovery after a neurological event. Some people with different SNP(s) may respond differently to interventions that would engage neuroplastic processes.

1. Polymorphisms for BDNF, dopamine, apolipoprotein E (ApoE) can impact neuroplasticity. A response to a therapeutic intervention may be impacted if the mechanism of action of the intervention involves these neuroplastic pathways.

1. BDNF release is activity dependent, plays crucial role in enhancing synaptic transmission and supports learning. Increases have been seen in response to a period of skill learning and acute bout of exercise. A BDNF polymorphism may result in increased time for motor, skill and generalized learning. Could this be why some of our patients/clients need more time for motor task than would be expected than similar patients/clients with similar neurological insults, age and other factors?

1. Dopamine is the neurotransmitter involved with mood, movement, learning and reward, impulse control with receptors in basal ganglia and cortex. Interruption of these pathways interferes with motor learning. Dopamine polymorphism would be important for management of PD-and could impact memory and executive function for these patients.

1. More research is needed! Motor recovery is not predicted by polymorphisms, but this may explain why some patients/clients learn differently and do we need to think about our dose response and interventions for some patients that are not responding as we would expect? Stay tuned as more research is done in this exciting area! We may be checking SNP(s) as we look at lab values and imaging now!

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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