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**The effects of a proprietary spearmint extract on neurogenesis rates in rat hippocampal neurons**

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**Abstract:**

Decreases in cognitive performance due to aging, stress and/or sleep deprivation can often be associated with specific changes in the brain. An area of the hippocampus known as the dentate gyrus is one of the few areas in the adult human brain that can produce new neurons throughout the lifespan, a process called neurogenesis. Aging, stress and/or sleep deprivation are suggested to decrease the rate of neurogenesis through reduced activity in the dentate gyrus resulting in a corresponding reduction in cognitive performance in healthy adults. Neumentix™ Phenolic Complex K110-42 is a natural extract derived from spearmint containing greater than 66 phenolic constituents that has been shown to improve working memory after 90 days of supplementation in healthy adults with age associated memory impairment. One reason for the observed improvements with Neumentix was hypothesized to be an increase in the rates of neurogenesis in the dentate gyrus of the hippocampus. Therefore, the purpose of this study was to determine if Neumentix could enhance neurogenesis in rat hippocampal cells at physiologically relevant concentrations in a cell culture assay. Four concentrations of Neumentix were tested on primary hippocampal cells treated with the test item, vehicle, or fibroblast growth factor, for a total of 48 h. Digital images were analyzed for the % of Bromdesoxyuridine (BrdU) positive neurons compared to the total number of neurons. Cells, which were labeled by BrdU, NeuN and 4',6-diamidino-2-phenylindole (Dapi), were classified as proliferating neurons. Neurons were defined as cells positive for NeuN and Dapi. Analyses showed that primary embryonic hippocampal neurons responded differentially to various concentrations of Neumentix. Overall, there was a treatment effect as determined by one-way ANOVA ( $p=0.0169$ ).

A Fisher's LSD pairwise comparison showed the treated cultures in the lowest dose group (0.02083 mg/L Neumentix) displayed significantly greater levels of neurogenesis than vehicle treated cultures ( $p=0.0228$ ) indicating that Neumentix may support working memory by acting to increase rates of neurogenesis in the adult hippocampus.

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