MEDIUM TERM CURCUMIN TREATMENT ENHANCES NEUROGENESIS AND GENES RELATED TO GROWTH AND SYNAPTIC PLASTICITY IN AGED RATS

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Introduction: Curcumin has been shown to have neuroprotective and pro-cognitive effects in animal disease models (Xu et. al., 2006).

Aims: We hypothesized that neuroprotection is related to enhanced neurogenesis via increased synthesis of growth and synaptic plasticity factors.

Methods: We assessed hippocampal cell proliferation and mRNA expression via microarray in the aged Sprague-Dawley rats after 6- and 12-week curcumin (12 mg/d) treatments. The microarray results were analyzed using reverse causal reasoning (RCR), a patented algorithm (Genstruct) which pinpoints underlying mechanistic pathways such as protein expression, protein phosphorylation, and kinase activity.

Results: Twelve, but not 6 weeks of dietary curcumin enhanced neurogenesis in the dentate gyrus. The microarray mRNA expression patterns were most active in terms of neurotransmission and signal transduction proteins such as Adenylyl cyclase I and Wnt2. Quantitative real-time PCR analysis showed that the trends of the changes of the top 18 genes were similar to those observed in the microarray data. RCR analysis strongly inferred that increased protein expression of CPEB1, retinoate and GDF2 may be inducing increased proliferation in the hippocampus in response to the curcumin treatment.

Conclusion: Thus curcumin treatment enhances growth and synaptic plasticity, which confers protection against natural aging.