

EGCG Treatment on Ts65Dn Mice Suggests a Possible Correlation in Cognitive Development Deficit Reduction

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Down syndrome (DS) is caused by trisomy of human chromosome 21 (Ts21), affecting 1 in 700 live births. Ts21 results in about 80 phenotypes of which intellectual disability (ID) is one of the most debilitating. DYRK1A, found in 3 copies in individuals with Ts21 has been linked to alterations in morphology and function of the brain resulting in ID. Epigallocatechin-3-gallate (EGCG), a specific inhibitor of Dyrk1a activity has been hypothesized as a possible treatment for the overexpression of this gene, reducing the deficits caused by Dyrk1a. Using the Ts65Dn mouse model, we examined the effects on hippocampal dependent learning and memory in the novel object recognition task (NOR) using mice of 3-6 weeks of age (adolescent mice). They were given free access to EGCG (0.124 mg/mL) in their drinking water for 21 days. They were then tested for cognitive improvement through NOR. Ts65Dn and control mice (treated and untreated) were subjected to 3 days of testing with 15 minute sessions per day consisting of habituation, exposure, and test day. All procedures were recorded and analyzed to determine time spent exploring novel object in relation to familiar. Our current results suggest that Ts65Dn mice do not spend as much time exploring the novel object as euploid mice and there exists a genotype effect, but treatment is not correcting the learning and memory deficit. We hypothesize that continuous EGCG treatment may be needed in order to see cognitive deficit reduction in adolescent mice.

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