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Implications of alpha-Cedrene on impulsivity

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Abstract

Impulsive behavior is associated with poor health outcomes and studies suggest a heritable component to impulsivity levels. Recent research has begun to identity genomic and transcriptomic differences between high and low levels of impulsivity in a rat model, and several differences suggest a role for primary neuronal cilia. These organelles exist on most mammalian cells, sit on the plasma membrane and act as an antenna (Martin-Hurtado et al., 2020). Numerous receptors are located on cilia, and it is possible that administration of specific agonists or antagonists might modify cilia function and possibly impulsivity. Alpha-Cedrene is an antagonist to ADCY3, a transmembrane enzyme found on primary neuronal cilia (Barroso, 2018). Due to alphas-cedrene's ability to affect the receptors on primary cilia, this study looked to examine if alpha-Cedrene had any effects on impulse behavior in rats in the hopes of finding potential drug therapies to treat impulsivity. Impulsivity was quantified by assessing delay discounting where the relative preference for smaller, sooner rewards over larger, later rewards was analyzed.12 rats (6 males, 6 females) completed 52 days of non-drug delay discounting sessions with an 8 second delay followed by 25 days of drug test days on the same delay. During the drug test days, rats were injected subcutaneously with different concentrations of alpha-Cedrene (placebo: sesame oil, low: 75 mg/mL, and high: 200 mg/mL) and 30 min later the relative preference for the smaller sooner reward was measured. Statistical analyses indicated that relative preference for the smaller, sooner reward (impulsivity) was unaffected by alpha-Cedrene administration, nor were there differences in the latency to respond at the beginning of a trial or the time to select the smaller, sooner or larger, later reward during a trial. Based on the results of this study alpha-Cedrene does not appear to be a good drug candidate for modifying impulsivity.

References

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