Nicotine treatment improves neural and cognitive measures of memory in adults with Down syndrome: An open-label pilot study.

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Introduction

Adults with Down Syndrome (DS) are at higher risk for age-related cognitive changes and dementias, and experience age-related cognitive changes up to 20 years earlier than normally developed individuals. The heightened risk of Alzheimer’s disease (AD) in DS is conferred by a partial or full duplication of chromosome 21, which includes the amyloid precursor protein, APP. Cognitive symptoms of AD are associated with progressive damage to the cholinergic receptor system, thus cholinergic receptors and projections decrease as cognitive status worsens. Prior studies in our lab have shown that activation of remaining nicotinic receptors with chronic transdermal nicotine has positive cognitive effects on adults with mild-cognitive impairment (MCI), a prodromal disorder to AD (Newhouse et al, Neurology 78: 91-101).

We hypothesized that treatment with nicotine may have similar benefits in middle-aged adults with DS, by improving memory and attention with chronic treatment.

Methods

We administered 4 weeks of nicotine via transdermal patch (7-14 mg) to adults 25 years+ with DS.

Participants were tested on a cognitive battery to assess working memory, attention, and visual event-related potentials (ERP) at Baseline, Day 14, Day 28, and a post-treatment follow-up at Day 42.

Safety and tolerability measures were assessed at all visits, to monitor side-effects of the drug.

Conclusions

• Evidence for a positive effect of drug
• Heterogeneity of response to nicotine may warrant individual dosing in the future
• Nicotine treatment was well tolerated

This study provides evidence that chronic administration of nicotine may have the potential for beneficial CNS effects on attention and memory processes in adults with DS.