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THE EFFECTS OF METHYLPHENIDATE ON SUSTAINED ATTENTION IN RATS: A BEHAVIORAL AND NEUROCYTOSTRUCTURAL ANALYSIS

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The visual discrimination task (VST) is a sustained attention task that signals the formation of a habit (by taking into account hits, misses, false alarms, and correct rejections) therefore, animals that are trained in this task are very reluctant to unlearn the behavior (Himmelbemer et al. 1997). Damos & Parker (1994) showed that high-false alarm rates might indicate recreational drug use in humans. In addition, ecstasy users have done poorly when compared to non-users in attention, memory-learning tasks (Gouzoulis-Mayfrank et al. 2000). Recently, it was shown that cocaine had effects on sustained attention processing in children that had been prenatally exposed to cocaine (Bandstra et al., 2001). Methylphenidate (MP) has increased accuracy in visual sustained attention tasks (Jonkman et al. 1997). In a rat condition position responding (CPR) discrimination task, MP had similar effects to d-amphetamine (Mayorga et al. 2000) and cocaine, which increased accuracy in rats during a sustained attention task (Grilly et al. 1989). The present study assessed the behavioral effects MP had on sustained attention accuracy using a VST and spontaneously hypertensive (SHR) rats. SHR rats are an excellent rodent model for ADHD because they have behavioral and neurochemical characteristics similar to ADHD. Preadolescent (age 2weeks) male SHR (n=36) and Wistar (n=36) rats were tested on a food VST [using four shaping cue-light intervals (1-s, 500 ms, 50 ms, and 25 ms)] and after baseline criteria were exposed to either: a) 2 mg/kg MP b) 1 mg/kg MP or c) vehicle for 2 weeks. Finally we assessed the histomorphometric effects of MP on these rats using the Golgi-Cox staining method, which demonstrates dendritic density, and branching. This work was supported by the NIDA, DA06891-06, Batelle, & the US Department of Energy DE-AC02-98CH10886

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