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SPECT Imaging in Adults with Nicotine-Related Disorders

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Objective: The study examined whether nicotine disorders affect cerebral blood flow at baseline and while concentrating. Method: Two hundred and sixty two individuals with a diagnosis of a nicotine disorder and 94 healthy controls were given a single photon emission computed tomography (SPECT) scan as part of a comprehensive evaluation. Participants included 119 females, 236 males, and one unknown ranging from ages 18 to 84 with an average age of 35.7 ($SD = 13.86$). Baseline SPECT and SPECT while taking the Connors CPT (activation) were generated. Results: An independent *t*-test was conducted, indicating a statistically significant ($p < .001$) increase in blood flow for individuals with nicotine disorders in the cerebellum, the occipital lobe, and the inferior, anterior region of the temporal lobe as well as the temporal pole at baseline. During the CPT, findings were consistent with baseline for the cerebellum and the temporal lobe, but not the occipital lobe. Conclusion(s): The SPECT imaging reveals that long-term nicotine use may activate the cerebellum and sections of every lobe, with the entire occipital lobe being stimulated; thus, nicotine appears to have a greater effect on the posterior and the inferior regions. The increased blood flow in the inferior region of the brain is more than likely due to the activation of the nicotinic receptors. This result suggests that chronic nicotine exposure may have an effect on the binding properties of nicotinic acetylcholine receptors. In addition, because of the increased amount of activation in the temporal lobe, these results indicate that nicotine may affect semantic processing.

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