No association between striatal dopamine transporter binding and body mass index: A multi-center European study in healthy volunteers

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A B S T R A C T

Introduction: Dopamine is one among several neurotransmitters that regulate food intake and overeating. Thus, it has been linked to the pathophysiology of obesity and high body mass index (BMI). Striatal dopamine D2 receptor availability is lower in obesity and there are indications that striatal dopamine transporter (DAT) availability is also decreased. In this study, we tested whether BMI and striatal DAT availability are associated.

Methods: The study included 123 healthy individuals from a large European multi-center database. They had a BMI range of 18.2–41.1 kg/m² and were scanned using [123]FP-CIT SPECT imaging. Scans were analyzed with both region-of-interest and voxel-based analysis to determine the binding potential for DAT availability in the caudate nucleus and putamen. A direct relation between BMI and DAT availability was assessed and groups with high and low BMI were compared for DAT availability.

Results: No association between BMI and striatal DAT availability was found.

Conclusion: The lack of an association between BMI and striatal DAT availability suggests that the regulation of striatal synaptic dopamine levels by DAT plays no or a limited role in the pathophysiology of overweight and obesity.

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Introduction

Overweight and obesity are an increasing health problem worldwide and are defined as a body mass index (BMI) of 25–30 and > 30 kg/m², respectively. Overeating of highly palatable and caloric foods is thought to play a major role in the overweight and obesity epidemic (Davis et al., 2004). There is a large body of evidence that suggests that dopamine is one of the neurotransmitters that is involved in the regulation of food intake and overeating (Ravussin and Bogardus, 2000). Food is able to induce a dopamine release in the nucleus accumbens in animals (Bassareo and Di Chiara, 1999) and in the striatum in humans (Small et al., 2003). The ability of