

## DOPAMINE D2/3 RECEPTOR AVAILABILITY AND HUMAN COGNITIVE IMPULSIVITY: A HIGH-RESOLUTION PET IMAGING STUDY WITH [<sup>11</sup>C]RACLOPRIDE

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**Introduction and objectives:** Human impulsivity is a complex multidimensional construct encompassing cognitive, emotional, and behavioral aspects. Previous animal studies have suggested that striatal dopamine receptors play a critical role in impulsivity. In this study, we investigated the relationship between self-reported cognitive impulsiveness and dopamine D2/3 receptor availability in striatal subdivisions in healthy subjects using high-resolution positron emission tomography (PET) with [<sup>11</sup>C]raclopride.

**Methods:** Twenty-one participants completed 3-Tesla magnetic resonance imaging and high-resolution PET scans with [<sup>11</sup>C]raclopride. The trait of impulsiveness was measured using the Barratt Impulsiveness Scale (BIS-11). Partial correlation analysis was performed between BIS-11 scores and D2/3 receptor availability in striatal subregions, controlling for the confounding effects of temperament characteristics that are conceptually or empirically related to dopamine, which were measured by the Temperament and Character Inventory.

**Results:** The analysis revealed that the non-planning ( $p = 0.004$ ) and attentional ( $p = 0.007$ ) impulsiveness subscale scores on the BIS-11 had significant positive correlations with D2/3 receptor availability in the pre-commissural dorsal caudate. There was a tendency toward positive correlation between non-planning impulsiveness score and D2/3 receptor availability in the post-commissural caudate.

**Conclusions:** These results suggest that cognitive subtrait of impulsivity is associated with D2/3 receptor availability in the associative striatum that plays a critical role in cognitive processes involving attention to detail, judgment of alternative outcomes, and inhibitory control.