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**Do dopamine transporters predict the risk of cognitive impairment in patient with opioid use disorder?**San-Yuan Huang<sup>1</sup> and Chih-Sung Liang<sup>1,2</sup><sup>1</sup>National Defense Medical Center, Taiwan<sup>2</sup>Tri-Service General Hospital, Taiwan

**Background:** Dopamine plays an important role in reward system of opioid use disorder (OUD). Novelty seeking (NS) is a core personality trait that primes the susceptibility to drug addiction. Striatal dopamine activity contributes to cognitive flexibility, an important cognitive strategy to inhibit impulsivity and compulsive drug-seeking behavior. Evidence supports the association between dopamine and NS. However, in OUD patients, the link between NS, striatal dopamine activity, and cognitive flexibility is still unclear.

**Methods:** We recruited 22 opioid-dependent individuals and 30 age and sex-matched healthy controls. Single-photon emission computed tomography with [99mTc] TRODAT-1 as a ligand was used to measure the striatal dopamine transporter (DAT) availability. The Trail Making Test (TMT) was performed to assess cognitive flexibility. Cloninger's Tridimensional Personality Questionnaire (TPQ) was used to measure NS.

**Results:** We found that in opioid-dependent patients, the striatal DAT availability was lower and negatively associated with TMT Part B÷Part A. Moreover, an inverted-U shape significantly matched the scores of NS as a function of the striatal DAT availability, with maximum NS potential in the midrange of the DAT availability. An extra sum-of-squares F test was conducted, indicating that a quadratic model fitted the association between the DAT and NS better than a linear model did.

**Conclusion:** Repeated opioid exposure reduces striatal dopamine transporter density, and the striatal DAT availability is nonlinearly linked to NS and linearly linked to cognitive flexibility. The role of the striatal DAT in the transition from controlled to compulsive opioid use warrants further research.

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