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Brain Dopamine Receptor Density Correlates with Social Status

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People have typically viewed the benefits that accrue with social status primarily from the perspective of external rewards. A new paper in the February 1st issue of *Biological Psychiatry* suggests that there are internal rewards as well.

Dr. Martinez and colleagues found that increased social status and increased social support correlated with the density of dopamine D2/D3 receptors in the striatum, a region of the brain that plays a central role in reward and motivation, where dopamine plays a critical role in both of these behavioral processes.

The researchers looked at social status and social support in normal healthy volunteers who were scanned using positron emission tomography (PET), a technology that allowed them to image dopamine type 2 receptors in the brain.

This data suggests that people who achieve greater social status are more likely to be able to experience life as rewarding and stimulating because they have more targets for dopamine to act upon within the striatum.

Dr. Martinez explains their findings: "We showed that low levels of dopamine receptors were associated with low social status and that high levels of dopamine receptors were associated with higher social status. The same type of association was seen with the volunteer's reports of social support they experience from their friends, family, or significant other."

Dr. John Krystal, Editor of Biological Psychiatry commented, "These data shed interesting light into the drive to achieve social status, a basic social process. It would make sense that people who had higher levels of D2 receptors, i.e., were more highly motivated and engaged by social situations, would be high achievers and would have higher levels of social support."

These data also may have implications for understanding the vulnerability to alcohol and substance abuse, as the work of Dr. Nora Volkow, the Director of the National Institute on Drug Abuse, and colleagues suggests that low levels of D2/D3 receptors may contribute to the risk for alcoholism among individuals who have family members who abuse alcohol. The current data suggest that vulnerable individuals with low D2/D3 receptors may be vulnerable to lower social status and social supports, and these social factors have previously been suggested as contributors to the risk for alcohol and substance use.

These findings are particularly exciting because they put human neurobiology into a social context, and we humans are fundamentally social creatures. It is in these social contexts that the biological effects on behavior obtain their real meaning.

More information: The article is “Dopamine Type 2/3 Receptor Availability in the Striatum and Social Status in Human Volunteers” by Diana Martinez, Daria Orlowska, Rajesh Narendran, Mark Slifstein, Fei Liu, Dileep Kumar, Allegra Broft, Ronald Van Heertum, and Herbert D. Kleber. Martinez, Orlowska, Slifstein, Liu, Kumar, Broft, and Kleber are affiliated with the Department of Psychiatry, while Van Heertum is with the Department of Radiology, all at Columbia University, College of Physicians and Surgeons, New York, New York. Narendran is from the Department of Radiology, University of Pittsburgh, Pittsburgh, Pennsylvania. The article appears in *Biological Psychiatry*, Volume 67, Issue 3 (February 1, 2010).

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