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Novel use of stem cell technique to study pathophysiology of psychiatric conditions

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Our knowledge of the pathophysiology of psychiatric and neuropsychiatric conditions is limited primarily because of inadequate understanding of the nature of dysregulated neuronal functions. This limitation is due to lack of a reliable technique to study cellular functions in the live human brain. To resolve this limitation we exploited recent advances in stem cell research and developed a novel approach to study cellular functions in these conditions. The approach involves development of induced pluripotent stem cell (IPSC) from skin fibroblasts of patients using lentiviral transfection of pluripotent genes. The IPSC is then cultured in feeder-free conditions and differentiated to different neuronal lineages using dibutyryl cAMP, BDNF and GDNF. Assuming that these cells carry properties of the cells in diseased brain, neural lineages are studied *in vitro* to understand elctrophysiological, neurochemical and structural properties. This approach provides a novel method to study nature of dysfunctional brain cells in psychiatric and neuropsychiatric conditions. The technique also allows us to examine validity of hypotheses concerning structural and functional alterations in neurons under these conditions.

Biography

Rajendra D. Badgaiyan is the Director of Neuroimaging and Molecular Imaging at SUNY, Buffalo, NY. He received MBBS and M.D. degrees from Gandhi Medical College, Bhopal in India and completed residency training in Psychiatry at Harvard Medical School. He also obtained Master of Medical Sciences degree from Harvard University and a Master's degree in Psychology. He is trained in cognitive neuroscience, neuroimaging and molecular imaging. He is a member of the faculty at Harvard University and SUNY Buffalo. He is the principal investigator of a number of NIH, VA and Foundation grants and has published several high impact papers. He has conducted pioneering research in neuroimaging and developed the single scan dynamic molecular imaging technique, which allows detection of dopamine release in live human brain during performance of a cognitive and behavioral task.

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