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Novel neuroimaging technique to study Parkinson's disease

Diagnosis of Parkinson's disease is mostly clinical. As a result, it is difficult to make an accurate diagnosis at an early stage. Because of the subjective nature of clinical diagnosis, many patients are misdiagnosed at an early stage. Because of this, treatment gets delayed and the disease progression cannot be slowed down. It is therefore important to have a diagnostic technique that helps us make an early diagnosis. A new imaging technique that we recently developed could be useful. The technique called single scan dynamic molecular imaging technique (SDMIT) uses positron emission tomography (PET) to detect, map and measure dopamine released acutely during a cognitive or behavioral processing. It exploits the competition between dopamine and its receptor ligand for occupancy of the same receptor site. In this technique after patients are positioned in the PET camera, a radio-labeled dopamine ligand is injected intravenously and the PET data acquisition started. These data are used by a receptor kinetic model to detect, map and measure dopamine released dynamically in different brain areas. The patients were asked to perform a behavioral or cognitive task while in the scanner and the amount of dopamine released in different brain areas measured. By comparing this data with data acquired previously in age-matched healthy volunteers during performance of a similar task, it is possible to determine whether dopamine neurotransmission is dysregulated in the patients and whether the dysregulation is responsible for clinical symptoms. Finding of a significant dysregulation in dopamine neurotransmission would confirm diagnosis of Parkinson's disease. Since this technique measures dopamine released under conditions of cognitive and behavioral stress, it can detect changes at a very early stage, when dysregulation of dopamine neurotransmission is not expressed at rest but manifests under conditions of cognitive/behavioral overload.

Biography

Rajendra D Badgaiyan, MD, is a psychiatrist and cognitive neuroscientist. He is Chairman of the Department of Psychiatry and Behavioral Sciences at Richmond University Medical Center, and Professor of Psychiatry at Icahn School of Medicine at Mount Sinai in New York. He received formal training in psychiatry, psychology, cognitive neuroscience, molecular imaging and neuroimaging. He was awarded the prestigious BK Anand National Research Prize in India and Solomon Award of Harvard Medical School. His research is focused on the study of neural and neurochemical mechanisms that control human brain functions. He developed the single scan dynamic molecular imaging technique (SDMIT) to detect, map, and measure neurotransmitters released acutely in the human brain during task performance. This technique is now used in laboratories all over the world. Using this technique, he studies dopaminergic control of human cognition and behavior. He is also interested in learning the nature of dysregulated dopamine neurotransmission in psychiatric and neuropsychiatric conditions. His research is funded by NIMH, NINDS, VA, and various foundations. Previously he served in the faculty of Harvard Medical School, SUNY Buffalo and University of Minnesota. He has published extensively in peer-reviewed journals.

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