

Applications of SPECT imaging of dopaminergic neurotransmission in neuropsychiatric disorders

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Single photon emission computed tomography (SPECT) tracers selective for pre- and post-synaptic targets have allowed measurements of several aspects of dopaminergic (DA) neurotransmission. In this article, we will first review our DA transporter imaging in Parkinson's disease. We have developed the *in vivo* dopamine transporter (DAT) imaging with [^{123}I] β -CIT ((1*R*)-2 β -Carbomethoxy-3 β -(4-iodophenyl)tropane). This method showed that patients with Parkinson's disease have markedly reduced DAT levels in striatum, which correlated with disease severity and disease progression. Second, we applied DA imaging techniques in patients with schizophrenia. Using amphetamine as a releaser of DA, we observed the enhanced DA release, which was measured by imaging D2 receptors with [^{123}I]IBZM (iodobenzamide), in schizophrenics. Further we developed the measurement of basal synaptic DA levels by AMPT (alpha-methyl-paratyrosine)-induced unmasking of D2 receptors. Finally, we expanded our techniques to the measurement of extrastriatal DA receptors using [^{123}I]epidepride.

The findings suggest that SPECT is a useful technique to measure DA transmission in human brain and may further our understanding of the pathophysiology of neuropsychiatric disorders.

Key words: single photon emission computed tomography (SPECT), dopamine, Parkinson's disease, schizophrenia