

PET evaluation of the relationship between D₂ receptor binding and glucose metabolism in patients with parkinsonism

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Objective: To clarify the relationship between D₂ receptor binding and the cerebral metabolic rate for glucose (CMRGlucose) in patients with parkinsonism, we simultaneously measured both of these factors, and then compared the results. **Methods:** The subjects consisted of 24 patients: 9 with Parkinson's disease (PD), 3 with Juvenile Parkinson's disease (JPD), 9 with multiple system atrophy (MSA), and 3 with progressive supranuclear palsy (PSP). The striatal D₂ receptor binding was measured by the C-11 raclopride transient equilibrium method. CMRGlucose was investigated by the F-18 fluorodeoxyglucose autoradiographic method. **Results:** The D₂ receptor binding in both the caudate nucleus and putamen showed a positive correlation with the CMRGlucose in the PD-JPD group, but the two parameters demonstrated no correlation in the MSA-PSP group. The left/right (L/R) ratio of D₂ receptor binding in the putamen showed a positive correlation with that of CMRGlucose in the MSA-PSP group, while the two demonstrated no correlation in the PD-JPD group. **Conclusion:** Our PET study showed striatal D₂ receptor binding and the CMRGlucose to be closely related in patients with parkinsonism, even though the results obtained using the L/R ratios tended to differ substantially from those obtained using absolute values. The reason for this difference is not clear, but this finding may reflect the pathophysiology of these disease entities.

Key words: D₂ receptor binding, CMRGlucose, ¹¹C-raclopride, ¹⁸F-FDG, Parkinson's disease