ORIGINAL ARTICLE

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Adenosine A_{2A} receptor imaging with [^{11}C]KF18446 PET in the rat brain after quinolinic acid lesion: Comparison with the dopamine receptor imaging

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We proposed [^{11}C]KF18446 as a selective radioligand for mapping the adenosine A_{2A} receptors being highly enriched in the striatum by positron emission tomography (PET). In the present study, we investigated whether [^{11}C]KF18446 PET can detect the change in the striatal adenosine A_{2A} receptors in the rat after unilateral injection of an excitotoxin quinolinic acid into the striatum, a Huntington's disease model, to demonstrate the usefulness of [^{11}C]KF18446. The extent of the striatal lesion was identified based on MRI, to which the PET was co-registered. The binding potential of [^{11}C]KF18446 significantly decreased in the quinolinic acid-lesioned striatum. The decrease was comparable to the decrease in the potential of [^{11}C]raclopride binding to dopamine D_2 receptors in the lesioned striatum, but seemed to be larger than the decrease in the potential of [^{11}C]SCH 23390 binding to dopamine D_1 receptors. *Ex vivo* and *in vitro* autoradiography validated the PET signals. We concluded that [^{11}C]KF18446 PET can detect change in the adenosine A_{2A} receptors in the rat model, and will provide a new diagnostic tool for characterizing post-synaptic striatopallidal neurons in the stratum.

Key words: [^{11}C]KF18446, adenosine A_{2A} receptor, dopamine receptor, positron emission tomography, autoradiography