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Comparison of three PET dopamine D_2-like receptor ligands, [^{11}C]raclopride, [^{11}C]nemonapride and [^{11}C]*N*-methylspiperone, in rats

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We studied the tracer kinetics of three dopamine D_2-like receptor ligands, [^{11}C]raclopride ([^{11}C]RAC), [^{11}C]nemonapride ([^{11}C]NEM) and [^{11}C]*N*-methylspiperone ([^{11}C]MSP), in anesthetized rats by tissue dissection, *ex vivo* ARG and PET in order to clarify their characteristics for PET imaging. The *in vivo* affinity of the three ligands for the striatum ([^{11}C]MSP > [^{11}C]NEM > [^{11}C]RAC) obeyed the *in vitro* affinity for dopamine D_2 receptors. The affinity of [^{11}C]RAC and [^{11}C]MSP for the cerebellum was very low, but the affinity of [^{11}C]NEM for the cerebellum was compatible to that for the cortex and was not to be ignored. Also the affinity of [^{11}C]MSP for the cortex was relatively high. [^{11}C]RAC showed the highest selectivity. The striatal PET image with [^{11}C]RAC was clearer than that with [^{11}C]NEM or [^{11}C]MSP, but the activity decreased much faster than that measured by tissue dissection because of the partial volume effect. The striatal activity with [^{11}C]NEM remained high and that with [^{11}C]MSP gradually increased. [^{11}C]RAC and [^{11}C]MSP, but not [^{11}C]NEM, showed a high accumulation in the periorbital region.

Key words: raclopride, nemonapride, *N*-methylspiperone, dopamine D_2-like receptor, rat, PET