

## Ionic interaction of [ $^{11}\text{C}$ ]- $N,\alpha$ -dimethylbenzylamine (DMBA) in rodent brain

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The [S] enantiomer of [ $^{11}\text{C}$ ]- $N,\alpha$ -dimethylbenzylamine (DMBA) was synthesized by N-methylation of [S]- $\alpha$ -methylbenzylamine, and its biodistribution in mice was measured. [ $^{11}\text{C}$ ]-[S]-DMBA was rapidly distributed into the brain, heart and lungs, and considerable long-term retention in the brain was observed. The radioactive metabolites in the plasma were analyzed by liquid chromatography. Kinetic analysis using unmetabolized [ $^{11}\text{C}$ ]DMBA in the plasma as the input function was performed employing a simplified two-compartment model. The estimated distribution volumes (DV) of [ $^{11}\text{C}$ ]DMBA in the brain and heart were 6.05 and 3.95, respectively. The right striatum of the rat brain was lesioned with ibotenic acid 2 weeks before the tracer experiment. Both *in vitro* and *in vivo* autoradiographic studies were performed, and revealed significant reduction of the radioactivity levels in the lesioned striatum. On the other hand, the regional cerebral blood flow, as measured by [ $^{14}\text{C}$ ]iodoantipyrine, was not significantly altered in the lesioned striatum. These results indicate that the ionic binding component for DMBA exists mainly in neural cells rather than in glial cells. [ $^{11}\text{C}$ ]DMBA might be a useful radiotracer for detection of neural cell loss in the brain.

**Key words:** dimethylbenzylamine (DMBA), brain, neuron, ibotenic acid