

Uptake of radioactive octanoate in astrocytoma cells: Basic studies for application of [^{11}C]octanoate as a PET tracer

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Fatty acids are taken up and metabolized in the brain. *In vitro* uptake experiments on astrocytoma cells were carried out to assess the potential use of [^{11}C]octanoate as a positron emission tomography (PET) tracer for astroglial functions. Uptake of [^{14}C]octanoate increased in a time-dependent fashion until 60 min after application. The uptake of [^{11}C]octanoate showed similar results to that of [^{14}C]octanoate until 10 min. As for medium pH, [^{14}C]octanoate uptake increased gradually with the decrease in pH. We also examined the effects of glutamate, glucose deprivation and hypoxia on the uptake of octanoate and found that these conditions did not bring about any change in the extent of [^{14}C]octanoate uptake. These results show that the octanoate uptake was not influenced by any of several pathological conditions. When the number of astrocytes increases in the area of hypoglycemia or hypoxia near a brain lesion, the amount of octanoate uptake also increases, so this indicates the possibility that ^{11}C -octanoate will detect a brain lesion.

Key words: astrocytoma cell culture, ^{11}C -octanoate, ^{14}C -octanoate, pathological conditions