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Brain tumor accumulation and plasma pharmacokinetic parameters of 2′-deoxy-5-^{18}F-fluorouridine

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Using positron emission tomography and radio-high performance liquid chromatography, the accumulation of 2′-deoxy-5-^{18}F-fluorouridine in the brain tumors and plasma pharmacokinetic parameters were investigated in 20 patients. High accumulation of the tracer in high grade gliomas and meningiomas and very rapid degradation of the tracer in the plasma were found. Very large variations were observed in both tumor accumulation and pharmacokinetic data. The tumor accumulation, however, did not correlate with any of the plasma pharmacokinetic parameters: area under the plasma concentration-time curve, mean residence time, total body clearance and steady-state volume of distribution. The results suggest that the accumulation of the tracer reflects the metabolic activity of the brain tumor tissues and that the effect of the rapid metabolic change in the tracer in the plasma on the tumor accumulation may be minor.

Key words: brain tumor, 2′-deoxy-5-^{18}F-fluorouridine, positron emission tomography, nucleic acid metabolism, pharmacokinetics