Comparative Pharmacokinetics of Perfluorobutyrate in Rats, Mice, Monkeys, and Humans and Relevance to Human Exposure via Drinking Water

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Perfluorobutyrate (PFBA) has been detected in precipitation, surface waters, water treatment effluent, and in public and private wells in Minnesota at up to low *m*g/l concentrations. We evaluated the pharmacokinetics of PFBA in rats, mice, monkeys, and humans to provide a rational basis for dose selection in toxicological studies and to aid in human-health-risk assessment. Studies included (1) rats—iv and oral; (2) mice—oral; (3) monkeys—iv; and (4) humans—occupationally exposed volunteers. PFBA was determined in serum (all species), liver (rats and mice), urine (rats, mice, and monkeys), and feces (rats and mice). In addition, we characterized serum PFBA concentrations in 177 individuals with potential exposure to PFBA through drinking water. Mean terminal serum PFBA elimination half-lives for males (M) and females (F), respectively, in h were (1) for rats given 30 mg/kg, 9.22 and 1.76 (oral), and 6.38 and 1.03 (iv); (2) for mice given oral doses of 10, 30, or 100 mg/kg ammonium PFBA, 13.34 and 2.87 at 10 mg/kg, 16.25 and 3.08 at 30 mg/kg; and 5.22 and 2.79 at 100 mg/kg; (3) for monkeys given 10 mg/kg iv, 40.32 and 41.04; and (4) for humans, 72.16 and 87.00 (74.63 combined). Volume of distribution estimates indicated primarily extracellular distribution. Among individuals with plausible exposure via drinking water, 96% of serum PFBA concentrations were < 2 ng/ml (maximum 6 ng/ml). These findings demonstrate that PFBA is eliminated efficiently from serum with a low potential for accumulation from repeated exposure.