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Comparison of the elimination between perfluorinated fatty acids with different carbon chain length in rats

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Elimination in urine and feces was compared between four perfluorinated fatty acids (PFCAs) with different carbon chain length. In male rats, perfluoroheptanoic acid (PFHA) was rapidly eliminated in urine with the proportion of 92 % of the dose being eliminated within 120 h after an intraperitoneal injection. Perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA) and perfluorodecanoic acid (PFDA) was eliminated in urine with the proportions of 55 %, 2.0 % and 0.2 % of the dose, respectively. In female rats, the proportions of PFOA and PFNA eliminated in urine within 120 h were 80 % and 51 % of the dose, respectively, which were significantly higher compared with those in male rats. There was the tendency that PFCA with longer carbon chain length is less eliminated in urine in both male and female rats. Less than 5% of dosed PFCAs was eliminated in feces. No sex-related difference was observed in the fecal elimination of PFCAs. The rates of biliary excretion of PFCAs in male rats were slower than those in female rats. Sex-related difference in urinary elimination of PFOA was abolished when male rats had been castrated. On the contrary, treatment with testosterone suppressed the elimination of PFOA in urine in both castrated male rats and female rats. The effect of testosterone was in a time- and dose-dependent manner. These results suggest that PFCAs are distinguished by their carbon chain length by a renal excretion system, which is regulated by testosterone.