

Changes in Soft Tissue Concentrations of Plutonium and Americium with Time After Human Occupational Exposure

Ronald E. Filipy and Ronald L. Kathren**

** U.S. Transuranium and Uranium Registries, Washington State University, Tri-Cities, 100 Sprout Rd., Richland, WA 99352*

Concentrations of $^{239+240}\text{Pu}$ and ^{241}Am in human tissues (testes, thyroid gland, kidneys, spleen, heart, skeletal muscle, brain, and pancreas) were compared to those in livers of the same subjects. The subjects were volunteer donors with occupational exposure to plutonium and americium autopsied as part of the United States Transuranium and Uranium Registries program. The temporal distributions of tissue-to-liver ratios were compared to liver uptake fractions assumed on the basis of current models to estimate the initial uptake fractions for each tissue studied. Regressions of the ratios were used to compare tissue retention half-times to those of the liver. Effective half-times for plutonium and americium in the tissues studied were similar to those for the liver with three exceptions: (1) the clearance half-time for plutonium in kidneys is shorter than that of liver; (2) the retention half-time for plutonium in testes is longer than that of liver; (3) the retention half-time for americium in skeletal muscle was longer than in the liver. Next to liver, the greatest initial uptake of systemic actinides was in skeletal muscle and the greatest initial concentrations were in the spleen. The uptake fraction of plutonium in the testes proposed by the ICRP was verified.

Published in HPJ. Vol 70 (2): 153-159; (1996)

USTUR-0016-94