

Uranium Deposition and Retention in a USTUR Whole Body Case

J.J. Russell and R.L. Kathren‡*

** U.S. Transuranium and Uranium Registries, Washington State University Tri-Cities, 2710 University Drive, Richland, Washington 99352; ‡College of Pharmacy, Washington State University, 2710 University Drive, Richland, WA 99352*

This report describes a whole body donation from a person with a documented occupational intake of uranium. USTUR Case 1002 was an adult male who died from an acute cerebellar infarct at the age of 83. He worked as a power operator, utility operator, and metal operator for 28 years in a facility that processed and handled radioactive material. Although he suffered a number of burns from hot metal and acids, cuts, abrasions, and puncture wounds during his many years of work, there were no corresponding health physics or medical records to indicate that these occurrences needed or required excision or decontamination due to the suspicion of the deposition of radioactive material. Over the course of his employment, USTUR Case 1002 submitted numerous urine samples for U, Pu and fission product analysis. The highest single U value measured during this time period was $\sim 30 \mu\text{g L}^{-1}$ recorded in during the second year of his employment. A urinary bioassay sample taken before termination of employment measure $4.3 \mu\text{g/L}$. The mean urinary U concentration per liter per year calculated from the employee's bioassay records covering the first eleven years of monitoring average less than $3 \mu\text{g/L}$. The ratio of $^{234}/^{238}\text{U}$ activity in the lung tissue was about 1, same as that found in natural uranium. The highest concentration of U was found in a tracheobronchial lymph node. Because this was a highly insoluble uranium material, the U content in the various tissues of the body followed a rank in order lung>skeleton>liver>kidney. The concentration of U in the kidney tissue was $\sim 1.98 \text{ ng/g}$ which is about 3 orders of magnitude less than the generally accepted threshold level for permanent kidney damage of $3 \mu\text{g U/g}$ and roughly equal to the $\frac{1}{4} \text{ ng/g}$ reported for Reference Man. The results of the autopsy disclosed findings not uncommon in the aged: severe atherosclerosis, areas of sclerotic kidney glomeruli, with stromal fibrous scarring and moderate to severe arterionephrosclerosis. Lung sections contained parenchymal areas of acute vascular congestion and a mild degree of anthracosis.

USTUR-0150-00