

Distributions of Actinide Tissue Concentrations and Dose Rates in USTUR Donors

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The objective of this study is to evaluate the frequency distributions of actinide concentrations and internal dose rates measured in the tissues of the U.S. Transuranium & Uranium Registries' (USTUR) deceased volunteer donors, for comparison with the generally much higher concentrations measured in the Russian MAYAK study cohort. These donors were radiation workers of the United States Department of Energy (DOE) facilities and were mainly exposed to actinide elements during their careers as a result of accidents. Frequency distributions of the wet concentrations of plutonium (²³⁹Pu) and americium (²⁴¹Am) in the lungs, liver and skeleton of 285 voluntary tissue donors have been analyzed and their log-Gaussian statistical characteristics evaluated. Corresponding estimates of the log-normal frequency distributions of lung, liver and bone surface dose rates at the time of death have also been derived for this volunteer population. Their application to group individual donors into 'high' and 'low' categories of cumulative weighted external dose equivalent for the purpose of statistical analysis of proportionate cancer mortality in this population is discussed.

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