

Establishment of a Repository Containing Tissues of Organs of Deceased Workers of Mayak Industrial Association Exposed to Actinide Elements

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The purpose of this US-Russian collaborative research project is to establish a Russian Human Radiobiology Tissue Repository (RHRTR) at the First Institute of Biophysics study organ and tissue samples from deceased MAYAK facility workers with known occupational radiation exposures. The repository is patterned after and complements the successful National Human Radiobiology Tissue Repository operated in the US by the United States Transuranium and Uranium Registries.

Initial activities accomplished during the first two Milestone quarterly report periods, include a comprehensive inventory and characterization of tissue materials from the initial 100 registrants of the newly formed RHRTR. This includes analysis and documentation of medical records, history of diseases, autopsy protocols, route of actinide intake, accumulated external γ -exposure dose, Pu body burden and estimated content in the major organs of deposition.

The inventory of the tissue materials of 100 registrants stored in RHRTR includes formalin-fixed tissue samples of all internal organs including brain. In addition, there are primary tumors and / or metastases, several types of decalcified bone samples fixed in 70% alcohol, paraffin blocks of bone and soft tissue as well as histological slides of soft tissue sections.

Radiochemical determination of Pu body burden and Pu content in the major organs of deposition was performed for 82 registrants. In 53 cases, the Pu body burden exceeded 1.5 kBq (40 nCi), including 9 cases in which the Pu body burden was greater than 37 kBq (1000 nCi). In 29 registrants, the Pu lung burden exceeded 300 Bq (8 nCi), including 6 cases with greater than 3000 Bq (80 nCi). Skeletal content of Pu exceeded 730 Bq (20 nCi) in 53 registrants, including 17 cases greater than 7.3 kBq (200 nCi). External gamma doses accumulated over an employment period of 4-30 y exceeded 1 Gy in 85 registrants, including 12 cases where the doses exceeded 4 Gy.

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Extension of the inventory and characterization of RHRTR tissue materials to 500 cases autopsied between 1970-92, and related studies proposed in the next Phase II year will be discussed.