

Bone Surface Concentrations and Dose Rate 11 Years After Massive Accidental Exposure to ^{241}Am

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Alpha-particle spectrograms of bone samples from USTUR Case 246 were analyzed to determine the depth in tissue from which the ^{241}Am alpha particles were emitted. In four samples of bone, the lack of energy straggling in the alpha spectra indicated that essentially all the ^{241}Am was deposited directly on the exposed bone surface, and none had been translocated to within bone volume. These findings agree well with the results of autoradiographic examination of bone samples from the same case, but are in marked contrast to findings on another case (USTUR Case 102) who had been exposed to a much smaller amount of ^{241}Am at a younger age and survived approximately twice as long after the exposure. It is problematical whether the lack of ^{241}Am redistribution, and therefore the implied absence of bone remodeling, in Case 246 was due to his advanced age at exposure or to a deterministic effect of alpha-irradiation on bone metabolism, but the observation of radiation effects on bone metabolism in former radium workers supports the latter.

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