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Radiochemical genotoxicity risk and absorbed dose

The biological consequences of exposures to internal radionuclides are currently modeled by estimating the integrated absorbed dose to organs in the body from specified intakes. Biological damage and health risk is then predicted from epidemiological studies of externally irradiated populations where absorbed dose is known or has been calculated. However, the approach does not distinguish between individually specific properties of radionuclides based upon their biochemical identities. This approach is equivalent to employing dose as mass (in grams) as a predictor of chemical toxicity irrespective of the pharmacological agent. The issue and its consequence is discussed in terms of theoretical, empirical and epidemiological indicators of the effects of internal exposures to anthropogenic radionuclide mixtures and a generalized risk coefficient for low level mixed Uranium fission-product exposures is deduced from genetic and heritable effects reported in Chernobyl contaminated territories. Application of this coefficient to global nuclear test fallout in the 1960s predicts effects on infant mortality and downstream health consequences in the fallout cohort which are currently emerging. The legal and philosophical implications will be briefly discussed.

Biography

Christopher Busby is a Researcher in the health effects of ionizing radiation. He qualified in Chemical Physics at the Universities of London and Kent, and worked on the molecular physical chemistry of living cells for the Wellcome Foundation. He is the Scientific Secretary of the European Committee on Radiation Risk (ECRR) based in Brussels. He has held a number of honorary university positions, including Visiting Professor at the Faculty of Health, University of Ulster.

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