Diurnal Urinary Volume and Uranium Output in Uranium Workers and Unexposed Controls

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Volume and uranium content were determined in individual urine voids over a 76-h (3.25-d) period from six unexposed normal male subjects and three male uranium workers. Uranium analyses were accomplished by a newly developed high-precision kinetic phosphorescence analysis technique with a lower level of detection of 0.007 ng mL^{-1}. Urinary uranium concentrations in individual voids varied by a factor of 2 or less for any one unexposed subject, although there was an order of magnitude variation among the group of unexposed men. The fractional urinary volume excreted in the "standard" so-called simulated 24-h samples was 0.43 ± 0.15 in the unexposed group but only 0.31 ± 0.13 in the uranium worker group, suggesting that the use of the simulated 24-h urine sample would underestimate the total daily urinary uranium output by approximately a factor of 2 in the uranium workers. Daily urinary excretion relative to intake from drinking water (essentially equal to the gastrointestinal uptake fraction) among the unexposed group ranged from 0.002-0.028, averaging 0.011 ± 0.008, with an indication that the gastrointestinal uptake factor was inversely proportional to total intake via drinking water.

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