

The Quantitative Analysis of Depleted Uranium Isotopes in British, Canadian, and U.S. Gulf War Veterans*

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The purpose of this work was to determine the concentration and ratio of uranium isotopes in allied forces Gulf War veterans. The 27 patients had their 24-hour urine samples analyzed for ^{234}U , ^{235}U , ^{236}U and ^{238}U by mass spectrometry. The urine samples were evaporated and separated into isotopic dilution and concentration fraction by the chromatographic technique. The isotopic composition was measured by a thermal ionization mass spectrometer using secondary multiplier (SEM) detector and ion counting system. The uranium blank control and SRM960 U isotopic standard were analyzed by the same procedure. Statistical analysis was done by unpaired t-test. The results confirm the presence of depleted uranium (DU) in 14 of 27 samples, with the $^{238}\text{U}:^{235}\text{U}$ ratio > 207.15 . This is significantly different from natural uranium ($p < 0.008$) as well as from the DU shrapnel analysis, with 22.22% average value of DU fraction, and warrants further investigation.

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