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## Use of Depleted Uranium Is a Form of Radiologic Warfare

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A relatively new weapon has entered the armory of the US arsenal. Anti-tank shells made of 10 pounds of solid uranium-238 -- commonly called depleted uranium (DU) are very effective weapons to use against tank armaments because they slice through the steel armor like a hot knife through butter. Despite the apparent effectiveness of DU, there are grave dangers.

Uranium-238 is pyrophoric, bursting into flame on impact, and when it burns 70% of the shell aerosolizes into particles less than 5 microns in diameter, which are respirable in size. Uranium-238 is an alpha radioactive emitter which is both chemically toxic and mutagenic.

Basically, there are 5 mechanisms by which uranium can induce mutations and cell damage:

1. Direct damage to DNA molecules from alpha radiation hits<sup>[1]</sup>
2. Genomic instability as genetic and chromosomal damage are passed through succeeding generations of damaged cells<sup>[2]</sup>
3. Bystander effect where adjacent cells that are not directly hit by alpha radiation incur DNA genetic damage<sup>[3,4]</sup>
4. Chemical toxicity from uranyl ions that bind avidly to DNA-clumped chromatin -- hence their mutagenic capability; uranyl acetate stains are used extensively in electron microscopy<sup>[5]</sup>

#### 5. Excretion of uranium through the kidney in high doses causing acute nephritis

Uranium induces lung, bone, and hematological cancers and it infiltrates the CNS.<sup>[6]</sup> It is excreted in the urine and semen, and uranyl ions infiltrate the testes, ovaries, placenta, embryo, and fetus.<sup>[5]</sup>

This is a radiological and dangerous element which can cause generations of damage to human beings. Yet hundreds of tons of uranium-238 munitions were used in Kuwait, Saudi Arabia, and Iraq in 1991, in Bosnia and Kosovo during the 1990s, and in the current Iraq war.<sup>[7]</sup>

Children, of course, are more susceptible to radiation-induced cancer than adults. Pediatricians report a marked increase in childhood cancer and severe congenital anomalies in Basra, which was polluted in 1991 with hundreds of tons of aerosolized uranium-238.<sup>[5]</sup>

Uranium-238, with a half-life of 4.5 billion years, will contaminate water, food chains, and the ambient air in these countries forever. The use of radiological weapons, including depleted uranium, should be banned by international treaties, and all countries should refrain from using them for the health and safety of all.

That's my opinion. I'm Dr. Helen Caldicott, MD, pediatrician and President of the Nuclear Policy Research Institute.

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Readers are encouraged to respond to the author at [caldicott@nuclearpolicy.org](mailto:caldicott@nuclearpolicy.org) or to Paul Blumenthal, MD, Deputy Editor of *MedGenMed*, for the editor's eyes only or for possible publication via email: [pblumen@stanford.edu](mailto:pblumen@stanford.edu)

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