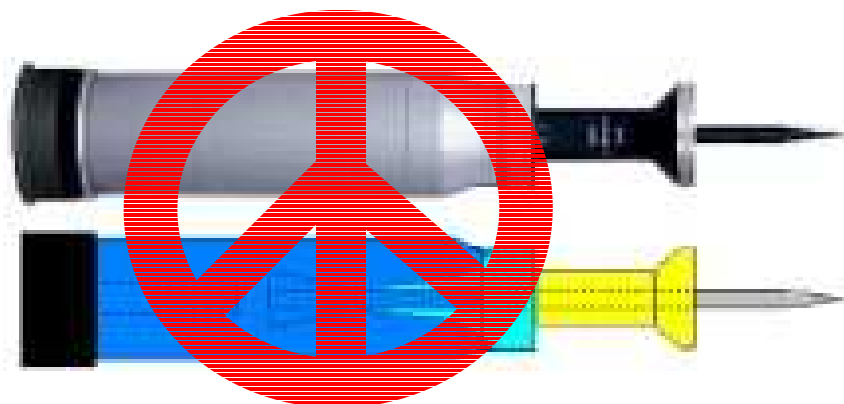


Health Effects of Uranium Weapons

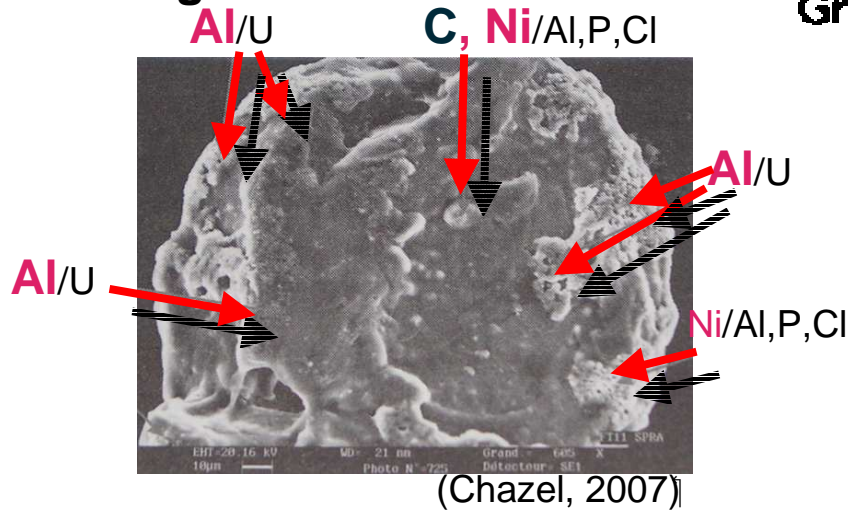


Katsumi Furitsu M.D.Ph.D
Board and Science Team member of
International Coalition to Ban Uranium Weapons(ICBUW)
Workshop: Towards a Uranium Weapons Treaty
in Geneva, April 2, 2008

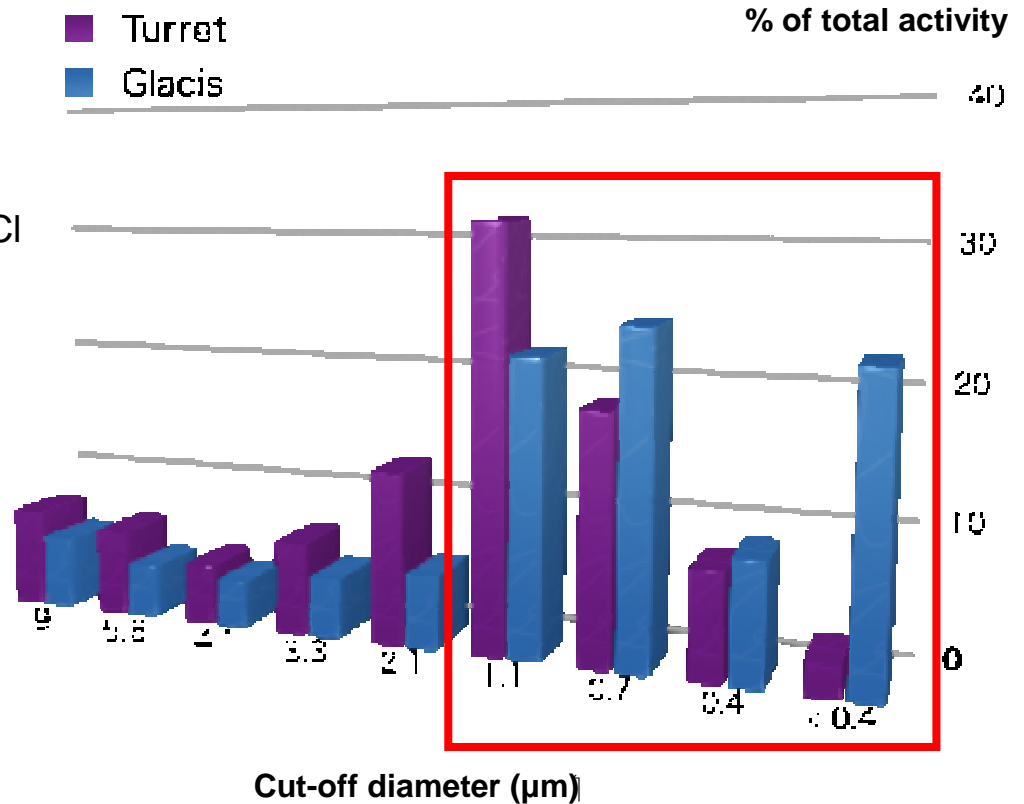


Unique fine particles created by DU weapons

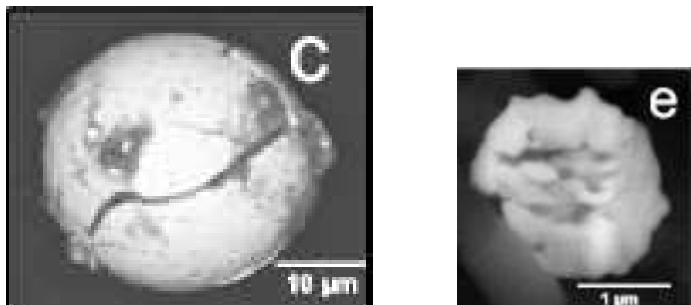
Firing the DU shells at a tank



Granulometric distribution of DU particles



Surrounding the DU weapon production factory



(Dr. Parrish, 2007)

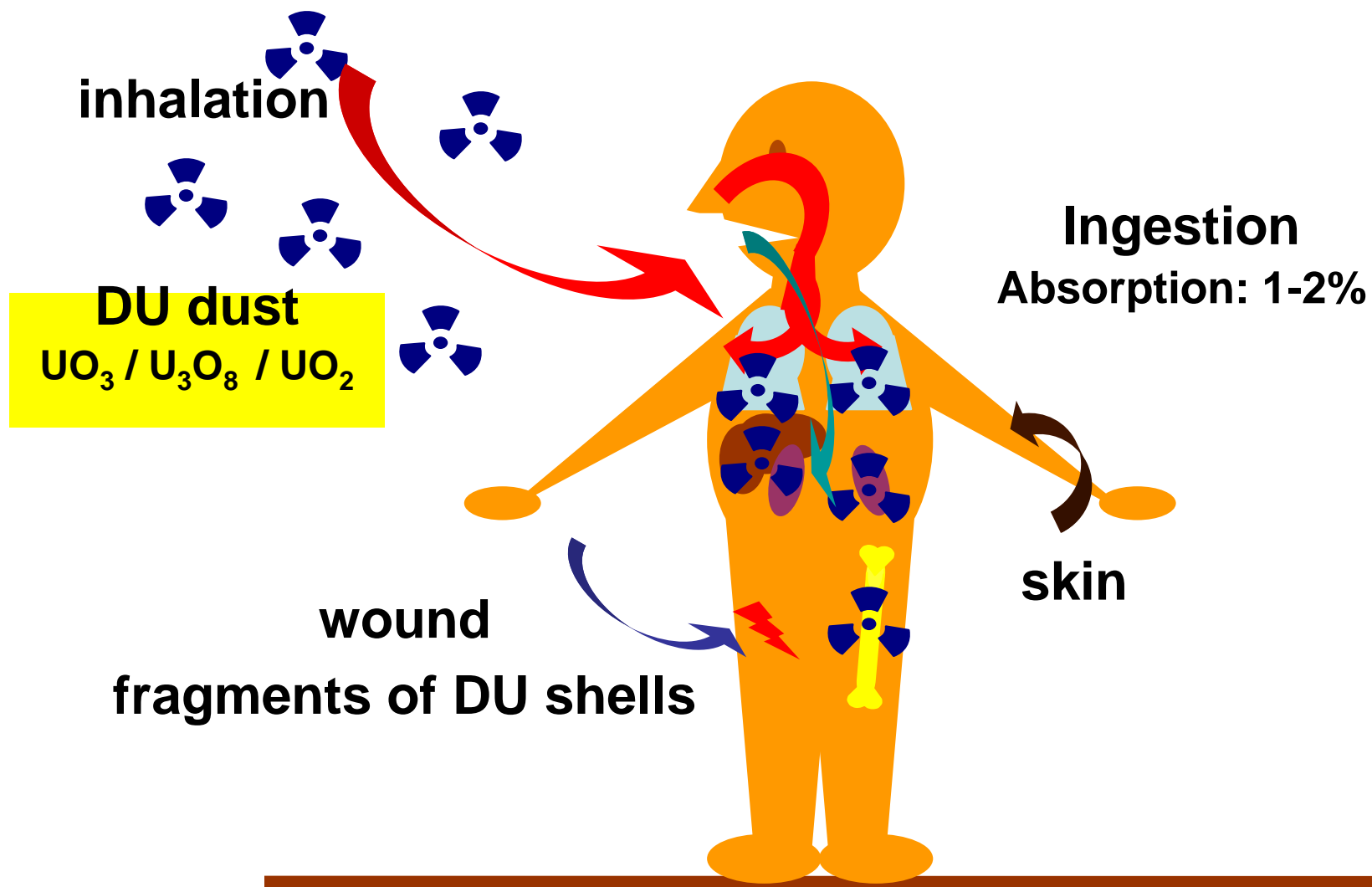
(Chazel, 2007)



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Internalization of DU fine particles

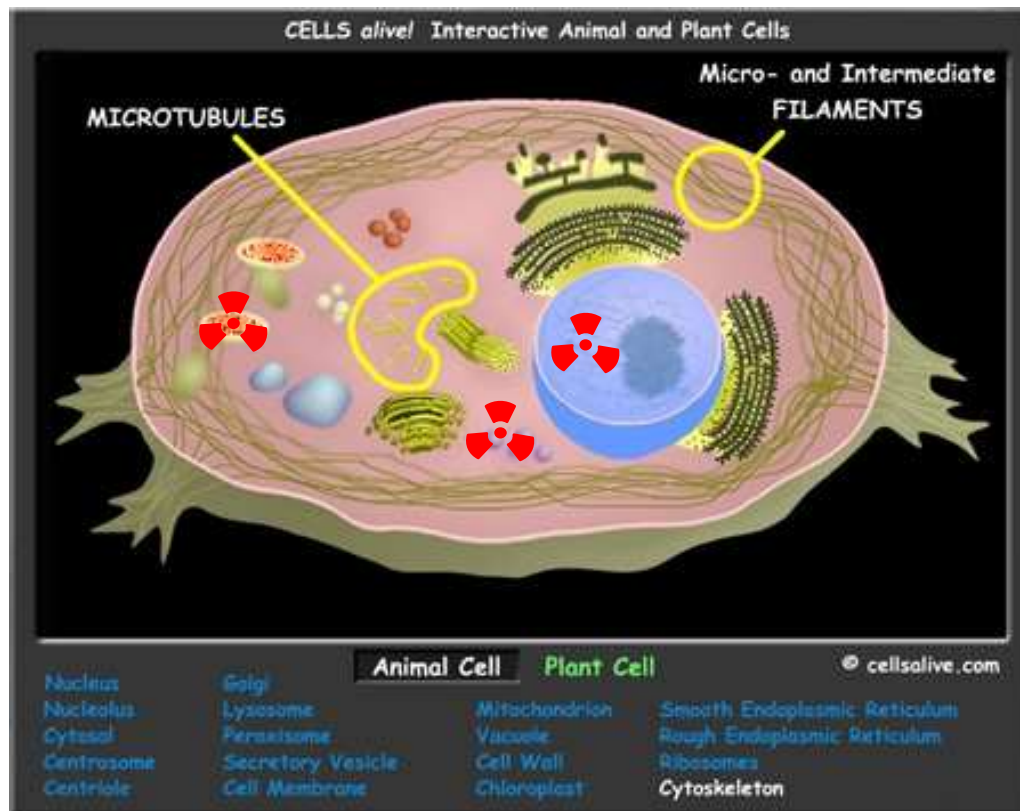




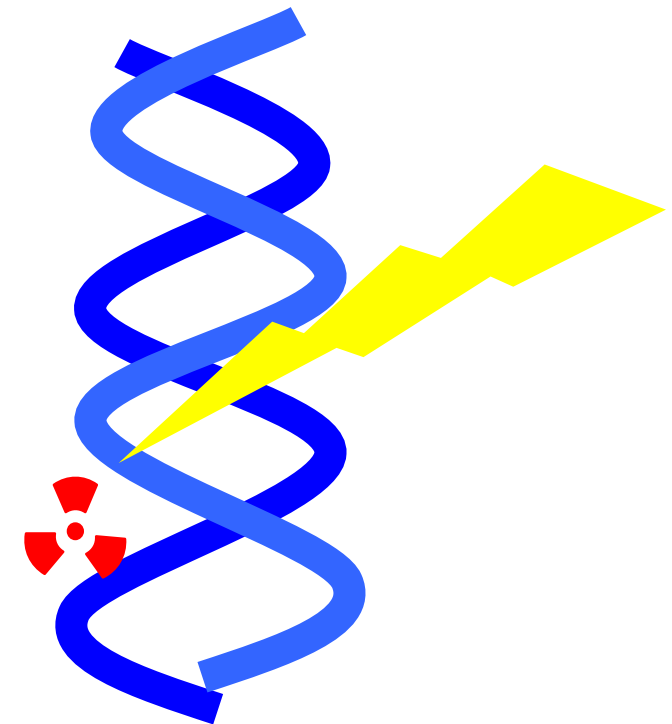
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Damage to intra-cellular system and DNA



Intra-Cellular System



DNA



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Generation of DU oxide dust

Physical nature
of
Uranium

- High density
- Pyrophoric



High temperature
>3000°C



A-10 and attacked tank



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Uranium Oxide Particles from the use of DU weapons

New type of contamination to humans and the environment

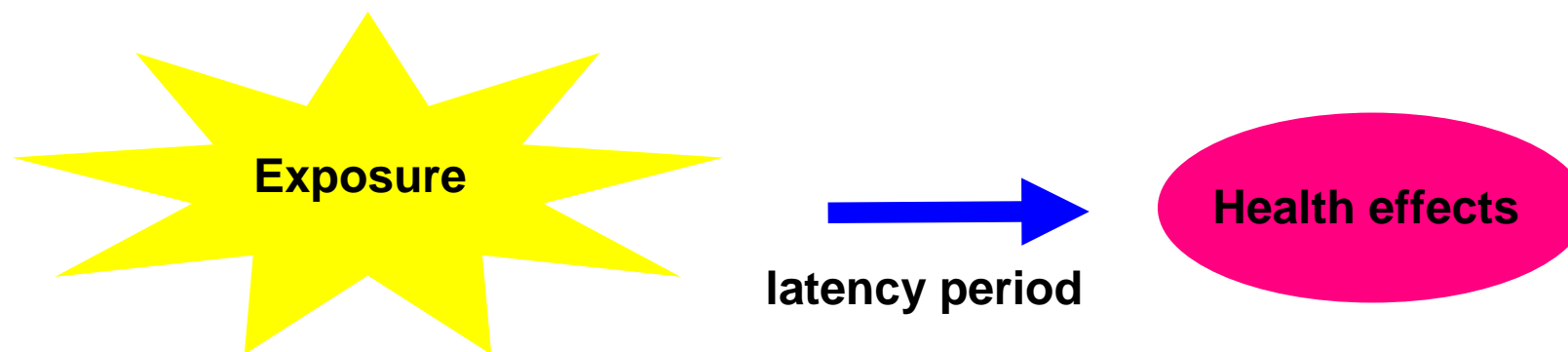
Fine particles of DU created at extremely high temperatures while shells are penetrating are:

micron- and nano-sized: aerosolized

- easily spread and re-suspend in the environment**
- more toxic and more rapidly absorbed from the lungs than larger particles**
- mixture of other toxic metals and their oxide of the targeted tanks**

They are not an analogue to naturally existing uranium.

Time latency between exposure and effects



Acute health effect: within a few months

Late health effect: several years ~ decades

cancer, chronic disease



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Question to us:

Is it right

***to continue to produce and use
DU weapons, until we detect
statistically significant data
among the exposed populations?***



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“Possible” Health effects

result from exposure to DU particles

- Mainly from the data of cellular and animal experiments -

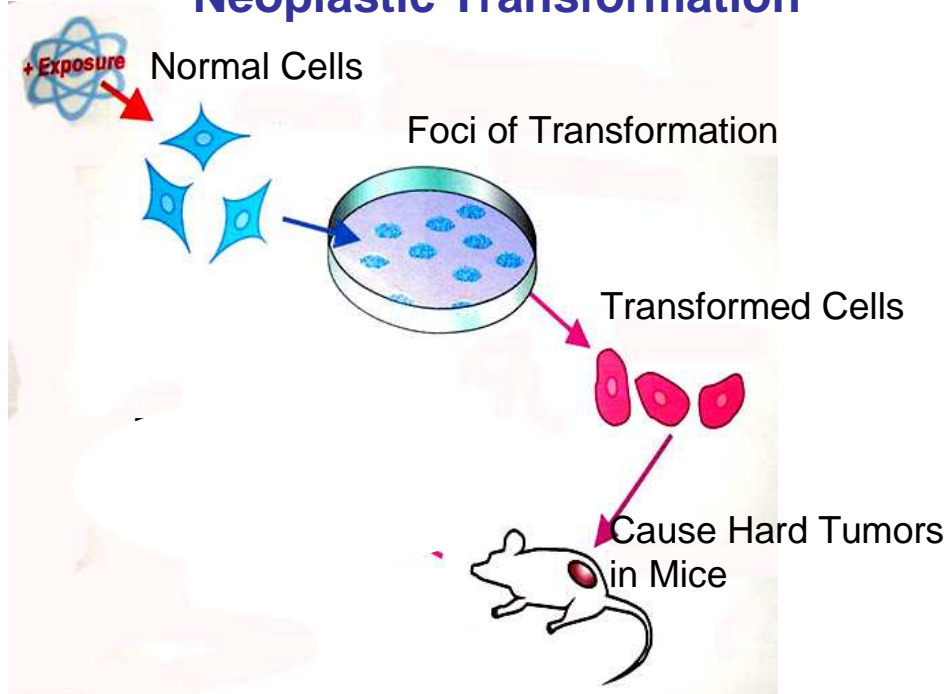
- ♥ **Chronic respiratory disorders**
 - ♥ **Neurological disorders**
 - ♥ **Immunological disorders**
 - ♥ **DNA damage / chromosomal aberration**
 - ♥ **cancer**
 - ♥ **effect to gestation process and fetuses**
- etc.**



Results of animal/cell experiments

Carcinogenicity of Uranium

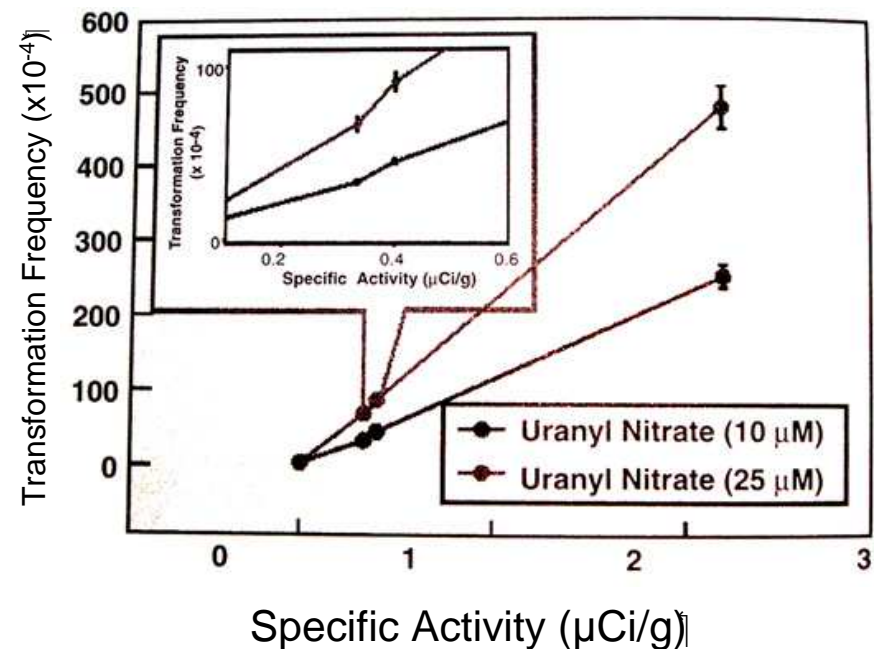
Neoplastic Transformation



D.E. McClain, A.C. Miller

Armed Forces Radiobiology Research Institute

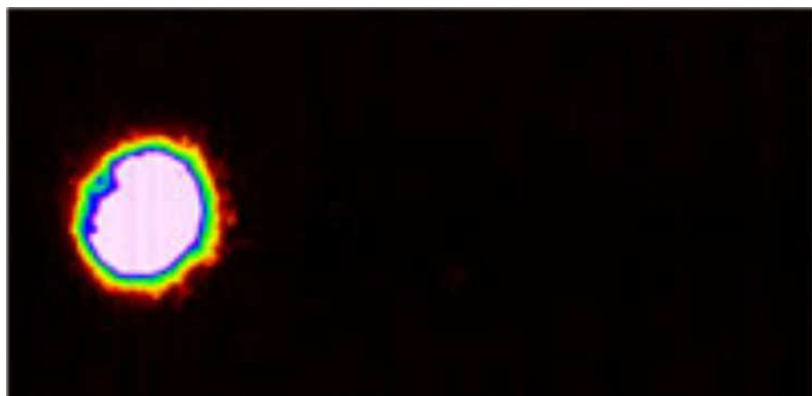
Neoplastic Transformation Assay Specific Activity Dose-Response of Uranyl Nitrate Compounds



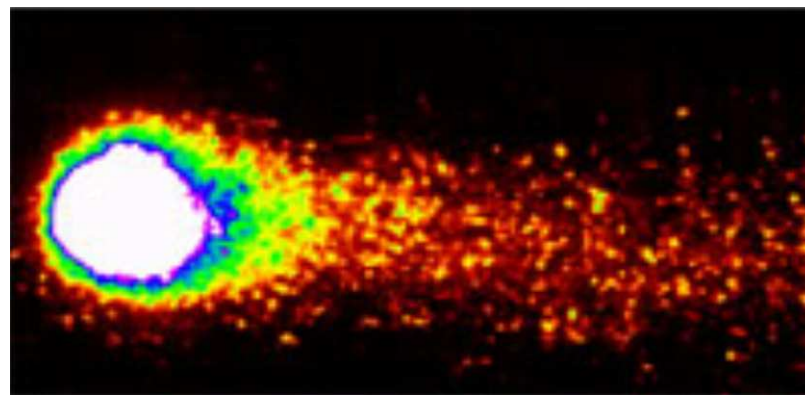
These figures were quoted from the book;
DEPLETED URANIUM, Properties, Uses, and Health Consequences, Edited by A.C. Miller,
CRC Press, 2007

Results of animal/cell experiments

DNA damage by Uranium's chemical toxicity



untreated



treated with U

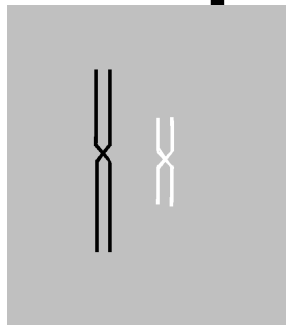
“Comet assay” of CHO cells:
appearance with a “tail” of fragmented DNA
(Dr. Diane Stearns, North Arizona University, 2006)

These picture were quoted from the site of
Native American Cancer Research Partnership
<http://nacrp.web.arizona.edu/index.htm>

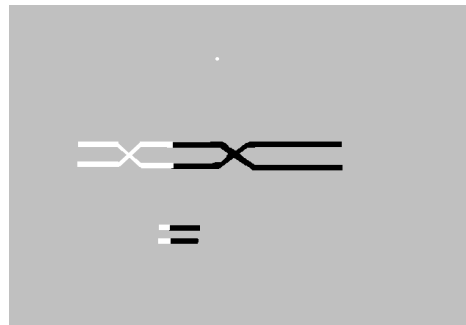


Chromosome aberrations

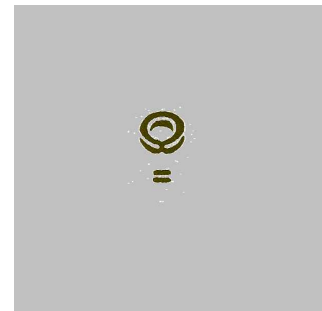
specific to the radiation exposure



normal
Chromosomes



dicentric chromosome, dic
and acentric fragment, ace



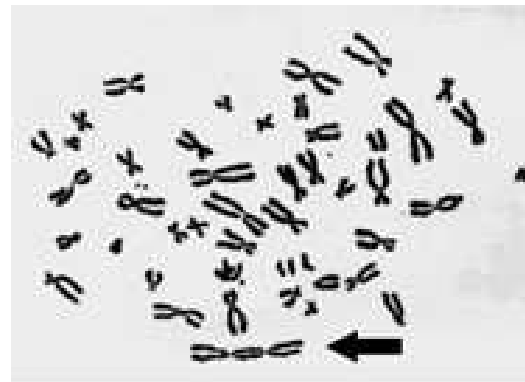
centric ring, cR
and ace

16 UK veterans

GW (1991)

Balkans (1991-99)

5.2 times increased
dic+cR incidence
compared to control



Pilot study by Heike Schröder, 2006



Precautionary principle

‘Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation’

(Rio Declaration on Environment and Development, 1992)

The burden of proof

should be placed on the users, the military and governments, to prove that “DU is safe.”



Problems of WHO monograph on DU -1

- They did not consider the unique aspects of DU nano-particles or the mixture of several other toxic metals, which are created by DU weapons.**
- They mainly focused on the radiological toxicity to the lung and the chemical toxicity to the kidneys, which comes from the study of uranium miners and nuclear industry workers.**
- They did not fully reference the most up-to-date peer-reviewed papers since 2001.**



Problems of WHO monograph on DU -2

-They have not yet fully assessed the risk to children or pregnant women, who may be more sensitive to DU contamination, although they have recognised that there may be a difference in sensitivity.

-They have estimated radiation doses using the model of the ICRP and have accepted the risks based on the International Basic Safety Standards (BSS).

“Cost-benefit” cannot apply to the risk assessment of health effects by DU weapons

-They recognized that uncertainties in the assessment of the health effect of DU exist. However, they did not make any recommendations based on the “precautionary principle”.

For the Reports to the UN Secretary General

- Referring to the results of basic scientific research on the effects of DU; *genotoxic (carcinogenic and mutagenic) effects, immunological and neurological disorders, effects to gestation process and fetuses, etc.*
- Epidemiological data; some suggestive reports about affected populations.
- Concrete recommendations based on the *“precautionary principle”*
immediate clearance of contaminated remnants
monitoring of the environment and the health of people
proposal to refrain from further use of these weapons

Reports from the doctors in the affected areas

Great concerns about the increase of cancer and leukemia.
Medical support is also one of our urgent priorities!



Dr. Al-Ali and one of his patients of acute lymphocytic leukemia (ALL)
in Basra, in the southern Iraq

For the Reports to the UN Secretary General

- Referring to the results of basic scientific research on the effects of DU;
- Epidemiological data; some suggestive reports about affected populations.
Local doctors can sometimes be the first witnesses of health problems in their patients.
- Concrete recommendations based on the *“precautionary principle”*
immediate clearance of contaminated remnants
monitoring of the environment and the health of people
proposal to refrain from further use of these weapons



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Depending on our work!

**For the prevention of
further contamination and
the protection of people's health**



Thank you !