



## There is No Safe Dose of Ionizing Radiation

There are many reputable scientists who believe, based on their research, that there is no threshold for radiation damage to humans- no dose which is harmless. These are just a few of their words:

“There is no safe level of exposure and there is no dose of radiation so low that the risk of a malignancy is zero”--Dr. Karl Z. Morgan, dubbed the father of Health Physics.<sup>1</sup>

“...there is no safe level of exposure to ionising radiation, and the search for quantifying such a safe level is in vain.”—Rosalie Bertell, PhD.<sup>2</sup>

In 1940, several members of the US Committee on X-Ray and Radium Protection “proposed that the [radiation exposure] standard be lowered by a factor of five in response to the accumulating evidence that ANY amount of radiation, no matter how small, can cause genetic damage, injuring future generations.” Gioacchino Failla argued against the lowering of the standards saying that “if genetic damage were to be a consideration for standard-setters, then logically no radiation exposure should be allowed.”<sup>3</sup>

“...the human epidemiological evidence establishes—by any reasonable standard of proof—that there is no safe dose or dose-rate...the safe-dose hypothesis is not merely implausible—it is disproven.” Dr. J.W. Gofman<sup>4</sup>

“One thing we should take from this (1991 study of Oak Ridge weapons workers by Steve Wing, et al.) is that there isn’t any safe level of radiation exposure...” Dr. Carl Shy<sup>5</sup>.

“The reanalysis (of Hanford worker data) provides no support for the idea that...there is reduced cancer effectiveness of radiation at low dose levels...” Drs. G.W. Kneale and A. Stewart<sup>6</sup>.

“There is evidence that single tracks of all types of ionizing radiation can induce a variety of damage including DNA double-strand breaks which are believed to be critical lesions in radiation exposure. There is also a body of experimental evidence that argues against an error-free DNA repair system operating at low doses of ionizing radiation that might result in a dose threshold for the induction of gene and chromosomal mutations.” MP Little and CR Muirhead.<sup>7</sup>

“An important feature of alpha irradiation is that, no matter how low the total dose to the whole body, a substantial dose of radiation (approx. .5 Gy) is delivered to an individual cell if it is traversed by a single alpha particle.” E Wright<sup>8</sup>.

The U.S. Committee on the Biological Effects of Ionizing Radiations concludes that, despite some evidence of a partial repair mechanism, recent low-dose radiation data "do not contradict the hypothesis, at least with respect to cancer induction and hereditary genetic effects, that the frequency of such effects increases with low-level radiation as a linear, non-threshold function of the dose." (National Research Council BEIR V 1990)

A panel from the U.S. National Academy of Sciences (NAS) charged to investigate the dangers of low-energy, low-dose ionizing radiation has concluded, “that it is unlikely that a threshold exists for the induction of cancers... (BIER VII, 2005)

#### Works Cited:

- 1... "Cancer and low level ionizing radiation" *The Bulletin of the Atomic Scientists*. September 1978.
- 2.... *No Immediate Danger? Prognosis for a Radioactive Earth*. Women's Educational Press, Toronto, Ontario. 1985: 45. isbn 0-88961-092-4
- 3 Caufield, Catherine. *Multiple Exposures: Chronicles of the Radiation Age*. Harper and Row, New York. 1989: 48. isbn 0-06-015900-6.
- 4... *Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis*. Committee for Nuclear Responsibility, Inc. 1990:18-16, 18-18. Isbn 0-932682-89-8.
- 5 Garloch, Karen. "Repeated low radiation doses hike leukemia risk, UNC study finds." *The Charlotte Observer*. Wednesday, March 20, 1991.
- 6 ... "Reanalysis of Hanford Data: 1944-1986 Deaths." *American Journal of Industrial Medicine*. 23:371-389 (1993).
- 7... "Curvilinearity in the Dose-Response Curve for Cancer in Japanese Atomic Bomb Survivors." *Environmental Health Perspectives*. 105 (6): 1505. (1997)
- 8... "Chromosomal instability in the descendants of unirradiated surviving cells after alpha particle irradiation." *Proc. Natl. Acad. Sci. USA*. 95: 5730 (1998).

The following are additional studies are not quoted above:

#### **Epidemiology:**

Stewart, A.M., et al. "Radiation Exposures of Hanford Workers Dying from Cancer and Other Causes." *Health Physics*. Nov (1977).

Stewart, A.M, et al. "Delayed Effects of A-bomb radiation: a review of recent mortality rates and risk estimates for five-year survivors." *Journal Epidemiology and Community Health*. 36(2):80-6 (1982).

Morgenstern, H., et al. "Epidemiologic Study to Determine Possible Adverse Effects to Rocketdyne/Atomic International Workers from Exposure to Ionizing Radiation" Report by the UCLA School of Public Health. September, 1997.

Wing S., et al. "Mortality Among Workers at Oak Ridge National Laboratory." *JAMA*, 26 (11):1397 (1991)

#### **Cell studies:**

Lorimore S. A., et. al. "Chromosomal Instability in the descendants of unirradiated surviving cells after alpha particle irradiation." *Proc. Natl. Acad. Sci. USA*. 95: 5730-5733 (1998). (Eric Wright is co-author)

Kadhim M. A., et al. "Transmission of chromosomal instability after plutonium alpha particle irradiation." *Nature*. 355:738 (1992). (Eric Wright is co-author)

**Beyond Nuclear, 6930 Carroll Avenue Suite 400, Takoma Park, MD 20912; [www.beyondnuclear.org](http://www.beyondnuclear.org); 301-270-2209 phone; [info@beyondnuclear.org](mailto:info@beyondnuclear.org)**