

Biological Effects of Exposure to a Single Dose of Ionizing Radiation¹

Dose (rems) ²	Probable Acute (Immediate) Effect	Probable Delayed Effect
0-25	Little or no detectable effect	Possible premature aging, small possibility of mild mutation in offspring, small risk of future tumors.
25-50	Small decrease in blood lymphocytes (white blood cells)	Possible premature aging, possibility of mild mutation in offspring, small risk of future tumors. Slight increase in susceptibility infections.
50-100	Lesions, slow or non-healing. Decrease in blood lymphocytes. Radiation sickness.	Individual susceptible to infection. Genetic damage. Probable damage to offspring, benign or malignant tumors, premature aging, and probable shortened lifespan.
100-200	Nausea, vomiting, diarrhea, lesions, loss of hair – with probable recovery in approximately 6 months. Premature aging – graying hair, skin pigmentation, flabby muscles, “tired blood”, and lowered disease resistance.	High probability of cancer (leukemia) or benign tumors within 10 years. Shortened lifespan. Genetic effects.
200-500	Nausea, vomiting, diarrhea, lesions, loss of hair, hemorrhaging (vomiting of blood, bloody discharge from bowels or kidneys, nose bleeding, etc.), non-healing ulcers, destruction of bone marrow, lymph nodes and spleen with decrease in blood cells. Probable death to 50% of population affected	Person may be ill for several days, then, feel normal for a few weeks as the body deteriorates until infection, anemia, or hemorrhaging results in death. Survivors may experience keloids (scarred skin), ophthalmological disorders, blood dyscrasis, malignant tumors, and psychoneurological disturbances.
500+	Fatal – immediate or within a few days Note: cells irradiated with 500-50,000 rads may survive but lose ability to reproduce and can grow to 1 mm in diameter before dying.	
10,000 intense burst	Penetrating radiation: nervous system breakdown, person may be confused and clumsy, then, lapse into coma. Death within a few days. Non-penetrating radiation (from fallout): may not be as severe. Mostly skin reaction, burning, itching, dark patches, raised areas, and loss of hair.	
100,000 Intense burst	Penetrating radiation: extensive ionization of nerve cell cytoplasm causing central nervous system breakdown. Animal dies in convulsions. Non-penetrating radiation: absorbed in first few mm of tissue. Produces rapid reddening of skin (erythema), death resulting from toxic effects of the burn. (Animal may live long enough to blister.)	

Notes:

1. Effects, as listed, will vary slightly depending on the source of information.
2. For this table, 1 rad of absorbed radiation is approximately equivalent to 1 rem