

# Radiation Effects on Humans

Certain body parts are specifically affected by exposure to different types of radiation sources. Several factors are involved in determining the potential health effects of exposure to radiation. These include:

- The size of the dose (amount of energy deposited in the body)
- The ability of the radiation to harm human tissue
- Which organs are affected

The most important factor is the amount of the dose - the amount of energy actually deposited in your body. The more energy absorbed by cells, the greater the biological damage. Health physicists refer to the amount of energy absorbed by the body as the radiation dose. The absorbed dose, the amount of energy absorbed per gram of body tissue, is usually measured in units called rads. Another unit of radiation is the rem, or roentgen equivalent in man. To convert rads to rems, the number of rads is multiplied by a number that reflects the potential for damage caused by a type of radiation. For beta, gamma and X-ray radiation, this number is generally one. For some neutrons, protons, or alpha particles, the number is twenty.

<b>Dose (rem)</b>	<b>Effects</b>
5-20	Possible late effects; possible chromosomal damage.
20-100	Temporary reduction in white blood cells.
100-200	Mild radiation sickness within a few hours: vomiting, diarrhea, fatigue; reduction in resistance to infection.
200-300	Serious radiation sickness effects as in 100-200 rem and hemorrhage; exposure is a Lethal Dose to 10-35% of the population after 30 days (LD 10-35/30).
300-400	Serious radiation sickness; also marrow and intestine destruction; LD 50-70/30.
400-1000	Acute illness, early death; LD 60-95/30.
1000-5000	Acute illness, early death in days; LD 100/10.

## Hair

The losing of hair quickly and in clumps occurs with radiation exposure at 200 rems or higher.

## Brain

Since brain cells do not reproduce, they won't be damaged directly unless the exposure is 5,000 rems or greater. Like the heart, radiation kills nerve cells and small blood vessels, and can cause seizures and immediate death.

## Thyroid

Certain body parts are more affected by exposure to different types of radiation sources than others. The thyroid gland is susceptible to radioactive iodine. In sufficient amounts, radioactive iodine can destroy all or part of the thyroid. Taking potassium iodide can reduce the effects of exposure.

## **Blood System**

When a person is exposed to around 100 rems, the blood's lymphocyte cell count will be reduced, leaving the victim more susceptible to infection. This is often referred to as mild radiation sickness. Early symptoms of radiation sickness mimic those of flu and may go unnoticed unless a blood count is done. According to data from Hiroshima and Nagasaki, symptoms may persist for up to 10 years and may also have an increased long-term risk for leukemia and lymphoma. For more information, visit [Radiation Effects Research Foundation](http://www.atomicarchive.com/Effects/radeffects.shtml).

## **Heart**

Intense exposure to radioactive material at 1,000 to 5,000 rems would do immediate damage to small blood vessels and probably cause heart failure and death directly.

## **Gastrointestinal Tract**

Radiation damage to the intestinal tract lining will cause nausea, bloody vomiting and diarrhea. This occurs when the victim's exposure is 200 rems or more. The radiation will begin to destroy the cells in the body that divide rapidly. These including blood, GI tract, reproductive and hair cells, and ultimately harms their DNA and RNA of surviving cells.

## **Reproductive Tract**

Because reproductive tract cells divide rapidly, these areas of the body can be damaged at rem levels as low as 200. Long-term, some radiation sickness victims will become sterile.

<http://www.atomicarchive.com/Effects/radeffects.shtml>