

Radiation Effects

Radiation sickness, harmful effect produced on body tissues by exposure to radioactive substances. The biological action of radiation is not fully understood, but it is believed that a disturbance in cellular activity results from the chemical changes caused by ionization. Some body tissues are more sensitive to radiation than others and are more easily affected; the cells in the blood-forming tissues (**bone marrow, spleen, and lymph nodes**) are extremely sensitive. Radiation sickness may occur from exposure to a single massive emanation such as a nuclear explosion (such as Hiroshima and Nagasaki), or it may occur after repeated large exposure or to even very small doses in a plant or laboratory, since radiation effects are cumulative. Moreover, exposure to the ultraviolet radiation of the sun can cause tissue destruction and trigger mutations that can lead to skin cancer. **Radiation sickness may be fairly mild and transitory, consisting of weakness, loss of appetite, vomiting, and diarrhea.** Since even in a mild dose of radiation the blood-forming tissue is destroyed to some extent, there is a **reduction in the supply of blood cells and platelets.** This increases the tendency to bleed and reduces the body's defense against **infection.** After a massive dose of radiation the reaction may be so severe that death quickly ensues. This is usually due to **severe anemia or hemorrhage, to infection, or to dehydration.** Extremely high doses damage the tissues of the brain, and death usually follows within 48 hours as was demonstrated at Chernobyl. There is no treatment for radiation sickness, although it is sometimes possible for persons to survive otherwise lethal doses of radiation if bone marrow transplants are performed. Potassium iodide is to protect against thyroid cancer from radiation exposure, but the drug should ideally be taken four hours prior to the exposure. Exposure to radiation can cause genetic mutation; the progeny of those subjected to excessive radiation tend to show deleterious genetic changes. The genetic damage from the atomic bombs dropped on Japan is still evident and such damage will continue to surface in people directly affected by the nuclear disaster at Chernobyl. Persons working with radioactive materials or X rays protect themselves from excessive exposure to radiation by shields and special clothing usually containing lead. Processes involving radioactive substances are observed through thick plates of specially prepared glass that exclude the harmful rays. A dosimeter, a device measuring the amount of radiation to which an individual has been exposed, is always worn by persons working in radioactive areas.

The two main types of radiation are penetrating (ionizing) and non-penetrating (non-ionizing). Penetrating radiation affects you by entering your body and depositing radioactive energy into your tissues, which then can cause cell damage or cell death. Non-penetrating radiation doesn't pass through your skin. A large dose of penetrating radiation may kill bone marrow cells, while a large dose of non-penetrating radiation may burn your skin similar to a severe sunburn.

Symptoms:

Nausea and vomiting	Shedding or sloughing-off of the outer layer of skin (Desquamation)
Diarrhea	Changes in taste
Skin burns (redness, blistering)	Ulceration of the oral mucosa
Weakness, fatigue, exhaustion, fainting, malaise	Ulceration of the esophagus, stomach or intestines
Dehydration	Vomiting blood
Inflammation of exposed areas, Erythema, Edema (redness, tenderness, swelling, bleeding)	Bloody stool
Increased skin pigment (hyper-pigmentation)	Bleeding from the nose, mouth, gums, and rectum
Skin itching and pain (Pruritus)	Bruising
Hair loss	Sloughing of skin
Difficulty or pain swallowing	Open sores on the skin
Atrophy	Anorexia
Increased susceptibility to infection	Fetal damage (in pregnant women)

First Aid

Only provide medical care if you have appropriate protective gear to prevent possible contamination:

- Check for adequate breathing and circulation.
 - Start CPR if necessary.
 - Remove clothing.
 - Vigorously wash body with soap and water.
 - Dry body and wrap with soft, clean blanket.
 - Call for emergency medical assistance or transport to nearest emergency medical facility (if available).
 - If medical assistance is unavailable remove patient to an area where patient can rest and drink lots of fluids.
- If symptoms occur during or after medical radiation treatments or a nuclear incident:
- Handle affected areas gently.
 - Treat symptoms or illnesses.

DO NOT remain in area where exposure occurred.
DO NOT apply ointments to burned areas.
DO NOT remain in contaminated clothing.
DO NOT minimize the potential danger -- radiation exposure is dangerous!

Prevention

Avoid unnecessary exposure to radiation sources and areas.
Always use "shields" over parts of the body not being treated when available.