

Safety Corner

What is radiation poisoning and what is neutron poisoning?

There are two types of radiation: ionizing and non-ionizing. Exposure to non-ionizing radiation, such as sun light, can cause different levels of burn damage to tissue depending on the intensity and duration of exposure. Ionizing radiation, such as X-rays, CT Scan, or Gamma rays, produces immediate chemical effects on human tissues and can cause great damage to internal organ and even DNA at cellular level.

Radiation poisoning, also known as radiation sickness, refers to damage to body caused by a large dose of ionising radiation, often received over a short period of time. The degree of radiation poisoning will depend on the amount of time the person was exposed, the body part that was exposed, the genetic composition and the distance between the person and the source of exposure.

Measures to prevent radiation poisoning includes:

- Distance – increasing distance from the radiation source
- Time – minimizing exposure time
- Shielding – placing matter between the source and body
- Reduction of incorporation into the human body – taking Potassium iodide tablets to protect thyroid gland or other means to reduce organ intake
- Fractionation of dose – breaking down an intentional dose into a number of smaller doses, with time allowed for recovery between irradiations. This technique is routinely used in radiotherapy.

Neutron poisoning has nothing to do with poisoning; it is a process where a neutron-absorbing material, known as neutron poison, absorbs neutrons inside a nuclear reactor. Neutron poisoning is normally an undesirable effect; however, neutron poisons are sometimes intentionally inserted into nuclear reactors in order to lower the high reactivity of the initial fresh fuel load. Some of these poisons deplete as they absorb neutrons during reactor operation, while others remain relatively constant. The nuclear fission process in a reactor also generates neutron poisons such as xenon-135. The poisoning of a reactor core by these fission products may become so serious that the chain reaction comes to a standstill.

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