

# Absorption

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Absorbance of radioactivity

## Alpha Particles

Alpha particles are a type of radiation that do not travel very far, do not pass through anything very thick, and can generally be absorbed or stopped by a few centimeters of air or a thin piece of tissue. Because they lose all of their energy in a small volume, alpha particles can be very damaging when inside the human body. Alpha particles have a short range because they use up their energy when they hit other atoms. Outside the body, alpha particles won't even go through the outer layer of skin. Inside the body, they can kill nearby cells. Examples of radioactive materials that give off alpha particles are polonium-210, radon-222, radium-226, and americium-241.

## Beta Particles

Beta particles are electrons emitted from the nucleus of an atom. In air, beta particles can travel a few hundred times farther than alpha particles—up to 2m or more for the beta particles with higher energies. For the common low-energy beta emitters used in laboratories, light clothing or a few centimeters of air can stop the beta radiation. For higher energy beta emitters, a centimeter or two of plastic will stop most of the particles. Beta particles are more like alpha particles when it comes to causing biological damage—more damaging if inside the body than if outside the body. Examples of radioactive materials that give off beta particles are hydrogen-3 (tritium), carbon-14, phosphorus-32, and sulfur-35.

## Gamma Rays and X Rays

Gamma and x rays are waves of energy that travel at the speed of light. These waves can have considerable range in air and have greater penetrating power (can travel farther) than either alpha or beta particles. X rays and gamma rays differ from one another because they come from different locations in an atom. Gamma rays come from the nucleus of an atom while x rays come from the electron shells. Even though x rays are emitted by some radioactive materials, they are more commonly generated by x-ray machines or linear accelerators in medicine. Gamma and x rays are both generally blocked by various thicknesses of lead or other heavy materials. Examples of common radionuclides that emit gamma rays are technetium-99m, the most commonly used radioactive material in nuclear medicine), iodine-125, iodine-131, cobalt-57, and cesium-137.

sources:<http://www.radiationanswers.org/radiation-introduction/types-of-radiation/types-of-emissions.html>