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MEDICAL PHYSICS

1. A radioactive tracer is a chemical compound in which one or more atoms have been replaced by a radioisotope. Monitoring its radioactive decay, a radiotracer can be used to explore the mechanism of chemical reactions . They are also used for flow visualisation through different technologies, such as Single Photon Emission Computed Tomography (SPECT), Positon Emission Tomography (PET) and Computed Radioactive Particle Tracking (CARPT).

Radioactive tracers are made up of carrier molecules that are bonded tightly to a radioactive atom. These carrier molecules vary greatly depending on the purpose of the scan. Some tracers employ molecules that interact with a specific protein or sugar in the body and can even employ the patient’s own cells. Radioactive tracers can be administered intravenously,by inhalation, oral route or by injecting the organ directly.

1. PET Scans

Positron Emission Tomography produces three-dimensional images of organs and tissues through the use of radioactive isotopes. The isotopes, such as fluorine-18, give off gamma radiation -- a form of energy that passes through the body and into a detector. When combined with sugar and given to a patient, the fluorine migrates to those tissues that are actively metabolizing sugar, such as areas of the brain in a person working on math problems. PET scans show these body parts in clear detail. By observing the different levels of metabolism, a doctor can identify tell-tale signs of abnormalities such as tumors and dementia.