

Radioactive Tracers for Internal Imaging: Summary Sheet

Radioactive tracers contain radioactive isotopes which help to detect any internal abnormalities or diseases. This is done by either injecting, inhaling or taking the radioactive substance orally. Once inside the system the nucleus of the radioactive isotope decays and emits alpha particles (referred to as a helium nucleus due to its similarity containing 2 protons and 2 neutrons), beta particles (electrons that originate within a nucleus of a radioactive atom) and gamma particles (also known as gamma rays which are emitted from the nucleus of unstable radioactive atoms) throughout a certain area of target within the body. Using scientific medical tools such as a gamma camera or P.E.T. scanner, the gamma rays can be detected. This is what allows doctors to observe how the body tissue reacts to these chemicals in real life. The most common medicine used as tracers in P.E.T. scans specifically for oncology (the study and treatments of tumors) is Carbon-11, Nitrogen-13, Oxygen-15 and Fluorine-18. The positron that is emitted from Fluorine-18 travels in the body and meets an electron producing 2 gamma ray photons which can be detected by the P.E.T scanner. Another common radioactive tracer is iodine-131 which is injected to observe the thyroid gland. To detect the problem doctors will look to see if iodine is gathered in the thyroid and if it's not properly gathered, then the thyroid is not healthy.

There are no particular serious side effects due to the injection of radioactive tracers because of their half life which eventually leaves your system and how the tracers are radioactive glucose (sugar) but the injection is equivalent to 2 chest x-rays. The advantages of radioactive tracers is it helps to locate malignant tumors, it helps to diagnose neurological diseases and other diseases. The disadvantages is that you can't be exposed with radioactive isotopes constantly, pregnant women can't be injected with these tracers and the making of radioisotopes used in tracers, requires an expensive machine which not all hospitals can afford.

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