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300level

MIs

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- What are Radioactive Tracers?

Radioactive tracer or radioactive label, is a chemical compound in which one or more atoms have been replaced by a radionuclide so by virtue of its radioactive decay, it can be used to explore the mechanism of chemical reactions by tracing the path that the radioisotope follows from reactants to products. Radiolabeling or radio tracing is thus the radioactive form of isotopic labeling.

A radioactive tracer can also be used to track the distribution of a substance within a natural system such as a cell or tissue or as a flow tracer to track fluid flow. Radioactive tracers are also used to determine the location of fractures created by hydraulic fracturing in natural gas production. Radioactive tracers form the basis of a variety of imaging systems, such as, PET scans, SPECT scans and technetium scans. Radiocarbon dating uses the naturally occurring carbon-14 isotope as an isotopic label.

- Discuss explicitly one application of radioactive tracers in medicine.

Diagnostic techniques in nuclear medicine use radioactive tracers which emit gamma rays from within the body. These tracers are generally short-lived isotopes linked to chemical compounds which permit specific physiological processes to be scrutinised. They can be given by injection, inhalation, or orally. Nuclear medicine uses radiation to provide diagnostic information about the functioning of a person's specific organs, or to treat them. Diagnostic procedures using radioisotopes are now routine.

Nuclear medicine uses radiation to provide information about the functioning of a person's specific organs, or to treat disease. In most cases, the information is used by physicians to make a quick diagnosis of the patient's illness. The thyroid, bones, heart, liver, and many other organs can be easily imaged, and disorders in their function revealed. In some cases radiation can be used to treat diseased organs, or tumours. Five Nobel Laureates have been closely involved with the use of radioactive tracers in medicine.