1. **What are Radioactive Tracers?**

Radioactive tracers are synthetic chemical compounds consisting of an endogenous or exogenous carrier molecule that partakes in human metabolism and in which one or more atoms have been replaced by a radioisotope through which its natural decay allows for imaging of the compound.The use of a radioactive tracer is called radiolabeling, which is one form of isotopic labeling.

Emitters of beta radiation or gamma radiation are used because these types of radiation readily pass out of the body, and they are less likely to be absorbed by cells than alpha radiation.

A radioactive tracer is used to detect and image tissues, not affect them with radiation, so it uses only small amounts of radioactive material.

2. **Application of tracer in medicine**

Radioactive tracers 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.

In Medicine, they have many uses, such as imaging, being used as tracers to identify abnormal bodily processes, testing of new drugs and conducting research into cures for disease.

**Medical tracers**

Radioactive isotopes and radioactively labelled molecules are used as tracers to identify abnormal bodily processes. This is possible because some elements tend to concentrate (in compound form) in certain parts of the body – iodine in the thyroid, phosphorus in the bones and potassium in the muscles. When a patient is injected with a compound doped with a radioactive element, a special camera can take pictures of the internal workings of the organ. Analysis of these pictures by a specialist doctor allows a diagnosis to be made.

The thyroid gland, situated in the neck, produces a hormone called thyroxine, which regulates the rate of oxygen use by cells and the generation of body heat. Within each molecule of thyroxine, there are 4 iodine atoms. If a patient is made to drink a solution of sodium iodide that has been doped with radioactive iodine-131, most of it will end up in the thyroid gland. A special camera can capture the radiation emitted by the iodine-131, and an image of the gland can be constructed. An assessment can then be made about the shape, size and functioning of the gland.