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MLS314

MED LAB

QUESTIONS:

1. What are radioactive tracers?
2. Discuss explicitly one application of tracer in medicine.

ANSWERS:

1. RADIOACTIVE TRACERS:

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. For example; in cases where doctors need to know the exact source of intestinal bleeding, they may radiolabel (add radioactive atoms) to a sample of red blood cells taken from the patient. They then reinject the blood and use a SPECT scan to follow the path of the blood in the patient. Any accumulation of radioactivity in the intestines informs doctors of where the problem lies.

For most diagnostic studies in nuclear medicine, the radioactive tracer is administered to a patient by intravenous injection. However, a radioactive tracer may also be administered by inhalation. By oral ingestion, or by direct injection into an organ. The mode of tracer administration will depend on the disease process that is to be studied.

Approved tracers are called: RADIOPHARMACEUTICALS since they must meet FDA's exacting standards for safety and appropriate performance for the approved clinical use. The nuclear medicine physician will select the tracer that will provide the most specific and reliable information for a patient's particular problem. The tracer that is used determines whether the patient receives a SPECT OR PET SCAN.

2. ONE APPLICATION OF TRACERS IN MEDICINE:

One application of tracer in medicine includes;

• SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY(SPECT):

SPECT imaging instruments provide three-dimensional (tomographic) images of the distribution of radioactive tracer molecules that have been introduced into the patient's body. The 3D images are computer generated from a large number of projection images of the body recorded at different angles. SPECT imagers have gamma ray emissions from the tracers that have been injected into the patient.

Gamma rays are a form of light that moves at a different wavelength than visible light. The cameras are mounted on a rotating gantry that allows the detectors to be moved in a tight circle around a patient who is lying motionless on a pallet.