17/MHS06/067

MEDICAL PHYSICS

MLS 314

ASSIGNMENT ANSWERS:

1.RADIOACTIVE TRACERS: Radiotracer or radioactive label, is a chemical compound in which one or more atoms have been replaced by a radionuclide so by virtue of its radioactive decay .Radioactive tracers are synthetic chemical compounds consisting of an endogenous or exogenous carrier molecule that partakes in human metabolism and in which one or more atoms have been replaced by a radioisotope through its natural decay allows for imaging of the compound .They can be given by injection, inhalation or orally. They emit a signal , usually gamma rays, that can be identified. The tracer provides valuable information that assists in making diagnosis. Examples include tritium, carbon -11, carbon -14, oxygen -15, fluorine-18, phosphorus -32, sulfur -35, technetium-99, iodine-123, &gallium-67. The tracer traces the paths of various biochemical molecules in our bodies. 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 .it is also used to determine the location of fractures created by hydraulic fracturing in natural gas production.

2. APPLICATION OF TRACER IN MEDICINE:Tracer are used in nuclear medicine . Nuclear medicine make use of radioactive tracers to assess bodily functions and to diagnose and treat disease . specially designed cameras allows doctors to track the path of these radioactive tracers. Single proton emission computed tomography or SPECT and positron emission tomography or PET scans are the two most common imaging modalities in nuclear medicine. For example , in cases where doctors need to know the exact source of intestinal bleeding , they may be radiolabel [add radioactive atoms] to asample of red blood cells taken from the patient . Thet then reinject the blood and use a SPECT scan to follow the path of the blood in the patient. Any acculumations of radioactivity in the intestines informs doctors of where the problems lies.

For most diagnostic studies in nuclear medicine , the radioactive tracer is administered to apatient 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. The nuclear medicine physican 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 .