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Medical Physics

1. Radioactive Tracers

Radioactive tracers are chemical compounds in which one or more atoms have been replaced by a radionuclide so by virtue of its radioactive decay it can be used to explore the mechanism of chemical reactions by tracing the path that the radioisotope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. Radiotracing is thus the radioactive form of isotopic labeling.

2. Application of radic tracers in medicine

Therapeutic applications of radioisotopes typically are intended to destroy the targeted cells. This approach forms the basis of radiotherapy, which is commonly used to treat cancer and other conditions involving abnormal tissue growth, such as hyperthyroidism. In radiation therapy for cancer, the patient’s tumor is bombarded with ionizing radiation, typically in the form of beams of subatomic particles, such as protons, neutrons, or alpha or beta particles, which directly disrupt the atomic or molecular structure of the targeted tissue. Ionizing radiation introduces breaks in the double-stranded DNA molecule, causing the cancer cells to die and thereby preventing their replication. While radiotherapy is associated with unpleasant side effects, it generally is effective in slowing cancer progression or, in some cases, even prompting the regression of malignant disease.