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RADIOISOTOPES IN MEDICINE

Radioactive tracers had been used in the investigation of biochemical and physiological problems on a research basis long before the establishment of the field of Nuclear Medicine. More recently the marked advances in instrumentation technology combined with improved radionuclide production capabilities have resulted in rapid progress in the application of methods utilizing radioactive tracers to the solution of clinical problems. Nuclear Medicine has recently been established as a medical specialty with its own certifying examination, attesting to its importance in the everyday problems encountered in medical care.

This presentation is concerned with the diagnostic rather than the therapeutic utilization of radioactive isotopes. In diagnosis we use radioactively-labeled substances as indicators of pathways and distribution of non-labeled substances. It is assumed that in the process no perturbation of the natural handling of these materials by the body is caused by the introduction of them into the living organism. That this has not always been so, is apparent from some of the early work, when carrier-free radionuclides were not available. At the present time this can be a serious obstacle in the development of newer radiopharmaceuticals labeled with radioactive nuclides of very short half-life.

Objectives

Radioisotopes are used to obtain information concerning several types of processes. These are:

1. To study and quantify dynamic processes.
2. To measure the size of physiological compartments or pools.
3. To measure functional capacity of organs.
4. To delineate morphology.