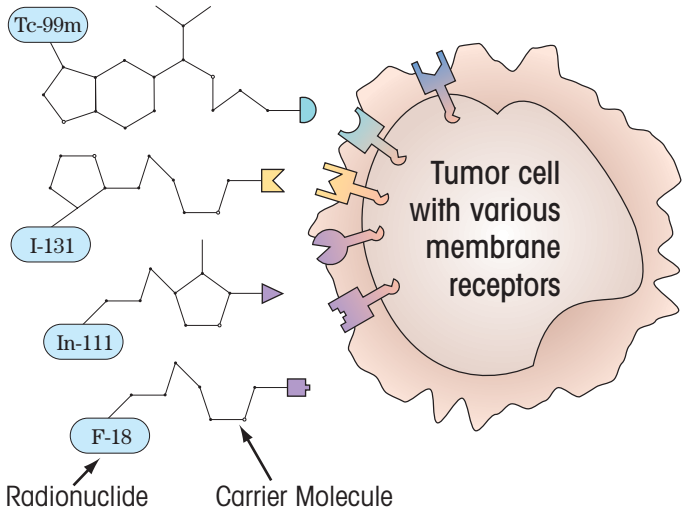
Targeting individual receptors with specific radiopharmaceuticals



Radiopharmaceuticals

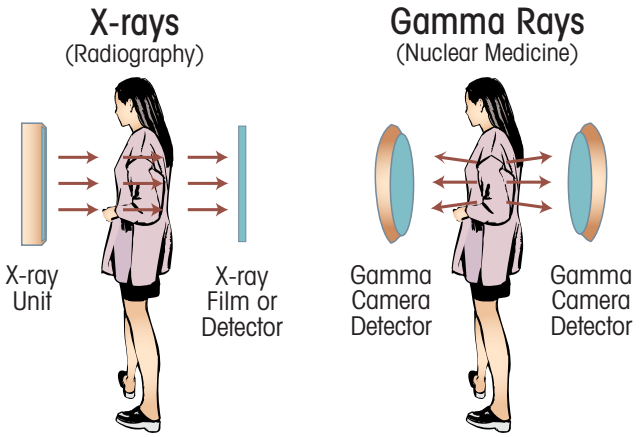
Equal Radionuclides Plus Carrier Molecules

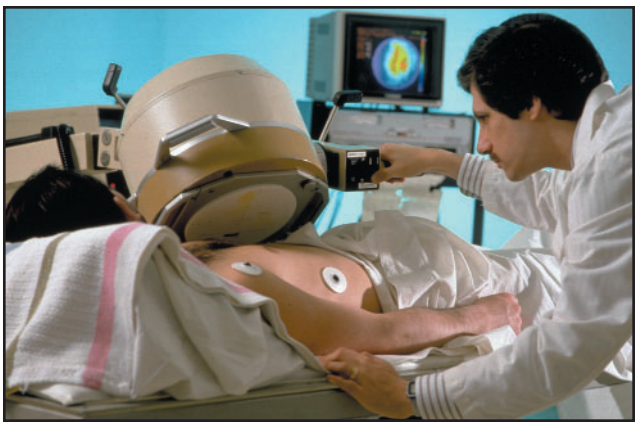
Most radiopharmaceuticals have two components: a radionuclide and a carrier molecule. The radionuclide is an "excited" atom that emits energy so that the atom can convert to a more stable form. Common radionuclides used in nuclear medicine include technetium-99m, thallium-201, fluorine-18, indium-111, gallium-67, iodine-123, iodine-131, and xenon-133. Once a radiopharmaceutical is injected into a patient, the carrier molecule travels through the body until it interacts with its target cell, tissue, or organ system. Almost all the radionuclides, and many of the carrier molecules, used in nuclear medicine today were discovered or developed by **BER** scientists over the past 50 years.

Energy Signals

From the Inside Out

Like an x-ray image, a nuclear medicine scan depends on energy passing through the body toward a detection device. In nuclear medicine, radiopharmaceuticals placed in the body emit radiation from the inside out. Diagnostic nuclear medicine scans expose patients to levels of radiation comparable to what patients receive in routine x-ray procedures.





Imaging Systems

Gamma Cameras Use Large Wafer-Like Detectors

Specialized imaging systems (e.g., gamma cameras or other scanners) stop gamma rays emitted from the patient. Fast, sophisticated computers map the energy signals into medically useful pictures that represent a biological process. The gamma camera was invented by a **BER** scientist in 1952.

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