



## Nuclear Medicine

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### About Nuclear Medicine

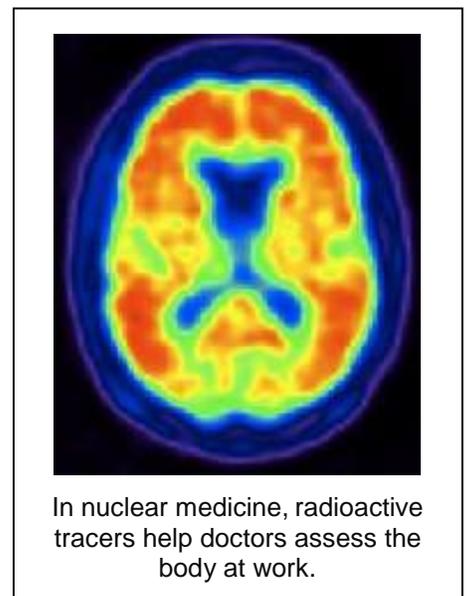
Nuclear medicine procedures can help detect and treat disease by using a small amount of radioactive material, called a radiopharmaceutical. Some radiopharmaceuticals are used with imaging equipment to detect diseases. Others are placed in or near a cancerous tumor to shrink or kill it.

A positron emission tomography (PET) scan is an example of diagnostic nuclear medicine. A PET scan uses a radioactive substance as a tracer that is injected into the blood stream. Blood carries the tracer to a specific organ in the body. Doctors use a special camera to watch how the tracer moves. The camera sends information to a computer, which takes pictures as the tracer moves through the organ. Doctors use the images to detect problems with the organ or identify how the organ is working.

Radiopharmaceuticals are also used to treat disease by shrinking tumors and killing cancerous cells. For example, during a brachytherapy procedure, doctors surgically place small radioactive "seeds" near or inside a cancerous tumor. The radiation from the seeds helps destroy the nearby cancer cells.

Different radioactive elements are absorbed differently by different organs. For example, iodine-131 is used to diagnose and treat thyroid cancer. The doctors choose the best radiopharmaceutical for the part of the body they need to diagnose or treat.

Most nuclear medicine procedures involve small amounts of radioactive materials. As a result, patients usually receive only small doses of radiation. However, some tests, such as heart scans, result in much higher doses. Properly used, the benefits of diagnostic nuclear medicine outweigh the risks.



In nuclear medicine, radioactive tracers help doctors assess the body at work.

## Rules and Guidance

### U.S. NUCLEAR REGULATORY COMMISSION (NRC)

Under the Atomic Energy Act, NRC regulates the use of radioactive material, including radiopharmaceuticals. NRC requires all nuclear medicine facilities to be licensed. To get the license, facilities must prove they have a radiation safety program to protect both the patients and the staff. In addition, the staff must meet certain standards of training and experience before they are allowed to treat patients with radioactive material.

### THE STATES

Each state has one or more radiation program to ensure safe use of radioactive materials. NRC has agreements with more than half the states (Agreement States) that give them the authority to regulate the use of radiopharmaceuticals. Agreement states inspect facilities to make sure the staff is trained properly. They also make sure equipment is operating safely.

### U.S. HEALTH AND HUMAN SERVICES (HHS), U.S. FOOD AND DRUG ADMINISTRATION (FDA)

FDA's Center for Drug Evaluation and Research (CDER) regulates the production of prescription drugs, including radiopharmaceuticals. FDA does not regulate how the radiopharmaceuticals are used in medical facilities.

## What you can do

When undergoing a nuclear medicine procedure, there are a few things that patients can do to protect themselves:

- Let the doctor about other nuclear medicine tests or treatments.
- Let the doctor know if the patient is pregnant or breastfeeding.
- Discuss the risks associated with using nuclear medicine with the doctor or the technician before the procedure.
- Follow all instructions given by the doctor or the radiation safety officer at the facility.

After certain procedures, patients may need to take extra precautions for a few days as the radiopharmaceutical passes through their bodies. Be sure to talk with the doctor about post-treatment guidelines.

## Where to learn more

You can learn more about nuclear medicine by visiting the resources available on the following webpage: <http://www3.epa.gov/radtown/nuclear-medicine.html#learn-more>.