

## How to Prepare for Your Nuclear Medicine Exam

*This is a general description of how to prepare for most Nuclear Medicine exams. For information about a specific Nuclear Medicine exam, see the Nuclear Medicine – Tests and Treatments page (<https://www.radiologyinfo.org/en/nuclear-medicine>) .*

### How should I prepare for my nuclear medicine exam?

**Imaging:** You may wear a gown, or the technologist may allow you to wear your own clothing during the exam.

Women should always tell their doctor and technologist if they are pregnant or breastfeeding. *See the Radiation*

*Safety* (<https://www.radiologyinfo.org/en/info/safety-radiation#843487c12b3e453f9bf021f34e5a90b0>) *page for more information about pregnancy and breastfeeding related to nuclear medicine imaging.*

Tell the doctor and your exam technologist about any medications you are taking, including vitamins and herbal supplements. List any allergies, recent illnesses, and other medical conditions.

Leave jewelry and accessories at home or remove them prior to the exam. These objects may interfere with the procedure.

Your doctor will tell you how to prepare for your specific exam.

In some instances, certain medications or procedures may interfere with the examination ordered.

### What does nuclear medicine equipment look like?

Nuclear medicine has applications for medical imaging and for treatment (therapy).

**Imaging:** Your doctor will use one of these imaging devices for your nuclear medicine test.

**Gamma Camera:** The gamma camera detects the energy from the radiotracer in your body and converts it into an image. The gamma camera itself does not emit any radiation. It has radiation detectors called gamma camera heads. These are often shaped like a box and attached to a round, donut-shaped gantry. The patient lies on an exam table that slides in between two gamma camera heads that are above and below the patient. Sometimes, the doctor will place the gamma camera heads at a 90-degree angle over the patient's body.

**SPECT:** In SPECT, the gamma camera heads rotate around the patient's body to produce highly detailed, 3D images.

**PET:** A PET scanner is a large machine with a round, donut-shaped hole in the middle. It looks like a CT or MRI unit. Multiple rings inside the machine detect the energy from the radiotracer in your body. A computer converts that data into images.

**Hybrid Imaging:** Many imaging centers now use hybrid imaging systems that combine nuclear medicine studies with computed tomography (CT) (<http://www.radiologyinfo.org>) or magnetic resonance imaging (MRI) (<http://www.radiologyinfo.org>) to produce special views. . Hybrid imaging allows the doctor to see information combined from two different systems in one image.



This leads to more precise information and a more exact diagnosis. Single photon emission CT/CT (SPECT/CT) and positron emission tomography/CT (PET/CT) units can perform both CT imaging and nuclear medicine exams at the same time. PET/MRI may also be available and takes PET and MRI pictures at the same time.

Nuclear medicine has applications for medical imaging and for treatment (therapy).

## How does the procedure work?

**Imaging:** Nuclear medicine introduces a radiotracer into the body. Radiotracers accumulate in a specific organ or attach to certain cells in the body.

Your doctor typically injects the radiotracer into your bloodstream. You may also swallow or inhale it as a gas. The radiotracer accumulates in the area under examination, where it gives off energy. Imaging devices, such as a gamma camera (<http://www.radiologyinfo.org>), SPECT (<http://www.radiologyinfo.org>), and PET (<http://www.radiologyinfo.org>), detect this energy and, with the help of a computer, create pictures. These images show how your organs and tissues are functioning at a cellular level.

Nuclear medicine focuses on processes within the body, such as metabolism. Radiotracers concentrate in specific areas of the body called “hot spots.” Hot spots form where there is a lot of chemical or metabolic activity. “Cold spots” indicate a smaller concentration of radiotracer and less activity.

**Therapy:** A small amount of radioactive material is attached to a cell-targeting molecule. This compound is called a radiopharmaceutical. You will swallow or have an injection of the radiopharmaceutical. The radiopharmaceutical travels to the cells or area targeted for treatment. The targeted cells receive a high dose of radiation, which destroys them.

## How is the procedure performed?

**Imaging:** Nuclear medicine tests are done on an outpatient basis. You may also have a test while you are hospitalized.

You will lie on an exam table. A nurse or technologist will insert an intravenous (IV) (<http://www.radiologyinfo.org>) catheter into a vein in your hand or arm.

You will receive an injection of the radiotracer. Or you may swallow it or inhale it as a gas.

The radiotracer will travel through your body and build up in the area of your body being studied. This may take anywhere from several seconds to several days. Your doctor will tell you when imaging will begin and how long the procedure will last.

When imaging begins, the camera or scanner will take a series of images. The camera may rotate around you or stay in one position. You may need to change positions during the test. You will need to remain still for brief periods. In some cases, the camera may move very close to your body. This is necessary to get the best quality images. Tell the technologist if you have a fear of closed spaces.

You may have tests to measure radioactivity levels in your blood, urine, or breath. A technologist may pass a small hand-held probe over the body.

The length of time for nuclear medicine test varies. The actual imaging time ranges from 20 minutes to several hours. Your test may be done over a period of several days.

Young children may require gentle wrapping or sedation to help them hold still. If the exam uses sedation, you will be told if you can feed your child on the day of the exam. A doctor or nurse who specializes in pediatric anesthesia will ensure your child's safety while under sedation. When scheduling the exam for a young child, ask if a child life specialist is available. A child life specialist is trained to make your child comfortable and less anxious without sedation. This specialist will also help your child to remain still

during the examination.

After the exam, you may need to wait to make sure no more images are needed.

If you have an intravenous (IV) line for the procedure, your technologist will remove it. If you have another procedure scheduled for the same day, your IV will be left in place.

**Therapy:** Radioactive iodine (I-131) therapy for hypothyroidism (<https://www.radiologyinfo.org/en/info/radioiodine>) : The radioiodine I-131 is swallowed in a single capsule or liquid dose and is quickly absorbed into the bloodstream in the gastrointestinal (GI) tract. It concentrates in the thyroid gland, where it begins destroying the gland's cells. Radioactivity in the thyroid will gradually diminish over the next few days. You will get the maximum benefit from this treatment three to six months after treatment. Usually, a single dose is successful in treating hyperthyroidism. A second and third treatment may be needed but this is rare.

Radioactive iodine (I-131) therapy for thyroid cancer (<https://www.radiologyinfo.org/en/info/thyroid-cancer-treatment>) : Most thyroid cancers are treated by surgically removing the thyroid gland. Radioactive iodine therapy is often used after surgery to destroy any remaining thyroid, including healthy tissue and cancer cells. You will swallow a capsule or pill that contains radioactive iodine (I-131). Both healthy and cancerous thyroid cells absorb the I-131, which destroys them. This treatment usually takes place in a hospital. You may stay overnight. During the treatment and for a short period afterward, you will give off radiation. Your doctor will tell you how to protect your family, friends, and pets at home.

Radioimmunotherapy (RIT) (<https://www.radiologyinfo.org/en/info/radio-immuno>) /**Yttrium-90 Tiuxetan (Zevalin®)** (<https://www.radiologyinfo.org/en/info/gennuclear>) ): RIT is usually performed on an outpatient basis. It involves several trips to the treatment facility. On the first visit, you will receive a dose of the monoclonal antibody (without radioactive material) through an intravenous (IV) injection. The monoclonal antibody will attach to non-cancerous B cells (<http://www.radiologyinfo.org>) in your body to protect them from radiation. This IV infusion may take up to five hours.

You will return to the hospital during the following week to have another IV injection of non-radioactive monoclonal antibody. When that is complete, you will have the radioactive monoclonal antibody injected. This injection will take an hour.

**I-131 MIBG Therapy:** You will receive I-131 MIBG therapy through a small tube (cannula) inserted into a blood vessel on the back of your hand. The therapy involves an IV infusion, which may last between 90 minutes and four hours. You will stay in the hospital five to seven days while the radiation leaves your body, mostly through urine. Special arrangements are made for parents of young patients to allow them to help the care for their child while undergoing this therapy.

**Lu-177 dotatate Therapy (Lutathera®):** A peptide that binds to the surface of GET-NETs is combined or “radiolabeled” with the radionuclide Lu-177. You will receive this radiopharmaceutical as an intravenous (IV) infusion. You will most likely have four treatments scheduled 8 weeks apart. Treatment sessions last most of the day. During treatment, you will have a nuclear medicine scan to check the location of the Lu-177 in your body.

**Radionuclide Therapies for Bone:** You will receive the following therapies as an intravenous (IV) infusion:

- Radium-223 dichloride (Xofigo®)
- Strontium-89 chloride (Metastron®)
- Samarium-153 (Quadramet®)

A typical course of therapy includes several treatment sessions separated by a period of weeks.

## What will I experience during and after the procedure?

**Imaging:** Except for intravenous injections, most nuclear medicine procedures are painless. Significant discomfort and side effects

are rare.

You will feel a slight pin prick when the nurse or radiologic technologist inserts the needle into your vein for the intravenous line. You may feel a cold sensation moving up your arm during the radiotracer injection. Generally, there are no other side effects.

Radiotracers have little or no taste. Inhaling a radiotracer feels no different than breathing the air around you.

With some procedures, the technologist may place a catheter (<http://www.radiologyinfo.org>) into your bladder. This may cause temporary discomfort.

It is important to remain still during the exam. Nuclear imaging causes no pain. However, having to remain still or in one position for long periods may cause discomfort.

Unless your doctor tells you otherwise, you may resume your normal activities after your exam.

A technologist, nurse, or doctor will provide you with any necessary special instructions before you leave.

The small amount of radiotracer in your body will lose its radioactivity over time through the natural process of radioactive decay. Much of it will pass out of your body through your urine or stool the first few hours and days after your test. Drink plenty of water to help flush the radiotracer out of your body. You will need to follow safety precautions to keep from exposing other people to radiation. *See the Radiation Safety* (<https://www.radiologyinfo.org/en/info/safety-radiation#843487c12b3e453f9bf021f34e5a90b0>) *page for more information.*

Your doctor will tell you how often and when you will need to return for further procedures.

**Therapy:** Except for intravenous injections, most nuclear medicine procedures are painless. Significant discomfort and side effects are rare.

You will feel a slight pin prick when the nurse or technologist inserts the needle into your vein for the intravenous line.

Following radionuclide therapies and I-131 radioiodine treatment, the technologist or nurse will give you special safety precautions to follow once you return home.

Radionuclide therapies may cause side effects including:

- Lu-177: vomiting, nausea, decreased blood cell counts, increased liver enzymes, decreased blood potassium levels and increased glucose in the bloodstream
- MIBG: high blood pressure, feeling sick, and a drop in the level of platelets in your body
- Yttrium-90: nausea, stomach pain, diarrhea, fever, cough, stuffy nose, sore throat, sinus pain, weakness, tiredness
- Radium 223: diarrhea and sickness, low levels of blood cells
- Strontium-89: black, tarry stools, blood in urine or stools, cough or hoarseness, fever or chills, lower back or side pain, painful or difficult urination, pinpoint red spots on skin, unusual bleeding, or bruising.
- Samarium-153: decreased function of bone marrow, decreased blood platelets, low levels of white blood cells, nausea, and vomiting.

## Disclaimer

This information is copied from the RadiologyInfo Web site (<http://www.radiologyinfo.org>) which is dedicated to providing the highest quality information. To ensure that, each section is reviewed by a physician with expertise in the area presented. All information contained in the Web site is further reviewed by an ACR (American College of Radiology) - RSNA (Radiological Society of North America) committee, comprising physicians with expertise in several radiologic areas.

However, it is not possible to assure that this Web site contains complete, up-to-date information on any particular subject. Therefore, ACR

and RSNA make no representations or warranties about the suitability of this information for use for any particular purpose. All information is provided "as is" without express or implied warranty.

Please visit the RadiologyInfo Web site at <http://www.radiologyinfo.org> to view or download the latest information.

**Note:** Images may be shown for illustrative purposes. Do not attempt to draw conclusions or make diagnoses by comparing these images to other medical images, particularly your own. Only qualified physicians should interpret images; the radiologist is the physician expert trained in medical imaging.

## Copyright

This material is copyrighted by either the Radiological Society of North America (RSNA), 820 Jorie Boulevard, Oak Brook, IL 60523-2251 or the American College of Radiology (ACR), 1891 Preston White Drive, Reston, VA 20191-4397. Commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is prohibited.

Copyright © 2026 Radiological Society of North America, Inc.