

MRI

A magnetic resonance imaging (MRI) scan is an imaging test that uses powerful magnets and radio waves to create pictures of the body. It does not use radiation (x-rays).

Single MRI images are called slices. The images can be stored on a computer or printed on film. One exam produces dozens or sometimes hundreds of images.

For more information, see the specific MRI topics:

- [Abdominal MRI](#)
- [Cervical MRI](#)
- [Chest MRI](#)
- [Cranial MRI](#)
- [Heart MRI](#)
- [Lumbar MRI](#)
- [Pelvic MRI](#)

How the Test is Performed

You may be asked to wear a hospital gown or clothing without zippers or snaps (such as sweatpants and a t-shirt). Certain types of metal can cause blurry images.

You will lie on a narrow table, which slides into a large tunnel-shaped scanner.

Some exams require a special dye (contrast). Most of the time, the dye will be given through a vein (IV) in your hand or forearm before the test. The dye helps the radiologist see certain areas more clearly.

Small devices, called coils, may be placed around the head, arm, or leg, or around other areas to be studied. These help send and receive the radio waves, and improve the quality of the images.

During the MRI, the person who operates the machine will watch you from another room. The test lasts about 30 to 60 minutes, but may take longer.

How to Prepare for the Test

You may be asked not to eat or drink anything for 4 to 6 hours before the scan.

Tell your health care provider if you are afraid of close spaces (have claustrophobia). You may be given a medicine to help you feel sleepy and less anxious, or your doctor may suggest an open MRI, in which the machine is not as close to the body.

Before the test, tell your provider if you have:

- Artificial heart valves
- Brain aneurysm clips
- Heart defibrillator or pacemaker
- Inner ear (cochlear) implants
- Kidney disease or dialysis (you may not be able to receive contrast)
- Recently placed artificial joints
- Vascular [stents](#)
- Worked with sheet metal in the past (you may need tests to check for metal pieces in your eyes)

Because the MRI contains strong magnets, metal objects are not allowed into the room with the MRI scanner:

- Items such as jewelry, watches, credit cards, and hearing aids can be damaged.
- Pens, pocketknives, and eyeglasses may fly across the room.
- Pins, hairpins, metal zippers, and similar metallic items can distort the images.
- Removable dental work should be taken out just before the scan.

How the Test will Feel

An MRI exam causes no pain. If you have difficulty lying still or are very nervous, you may be given a medicine to relax you. Too much movement can blur MRI images and cause errors.

The table may be hard or cold, but you can request a blanket or pillow. The machine produces loud thumping and humming noises when turned on. You can wear ear plugs to help reduce the noise.

An intercom in the room allows you to speak to someone at any time. Some MRIs have televisions and special headphones that you can use to help the time pass.

There is no recovery time, unless you were given a medicine to relax. After an MRI scan, you can resume your normal diet, activity, and medications.

Why the Test is Performed

Having MRIs with other imaging methods can often help your doctor make a diagnosis.

MRI images taken after a special dye (contrast) is delivered into your body may provide extra information about the blood vessels.

A magnetic resonance angiogram (MRA), is a form of magnetic resonance imaging that creates 3-dimensional pictures of blood vessels. It is often used when traditional [angiography](#) cannot be done.

Normal Results

A normal result means the body area being studied looks normal.

What Abnormal Results Mean

Results depend on the part of the body being examined and the nature of the problem. Different types of tissues send back different MRI signals. For example, healthy tissue sends back a slightly different signal than cancerous tissue. Consult your health care provider with any questions and concerns.

Risks

MRI does not use ionizing radiation. No side effects from the magnetic fields and radio waves have been reported.

The most common type of contrast (dye) used is gadolinium. It is very safe. Allergic reactions rarely occur. However, gadolinium can be harmful to people with kidney problems who are on dialysis. Tell your provider before the test if you have kidney problems.

The strong magnetic fields created during an MRI can cause heart pacemakers and other implants not to work as well. The magnets can also cause a piece of metal inside your body to move or shift.

CT scan

A computed tomography (CT) scan is an imaging method that uses x-rays to create pictures of cross-sections of the body.

Related tests include:

- [Abdominal and pelvis CT scan](#)
- [Cranial or head CT scan](#)
- Cervical, thoracic, and [lumbosacral spine CT scan](#)
- [Orbit CT scan](#)
- [Chest CT scan](#)

How the Test is Performed

You will be asked to lie on a narrow table that slides into the center of the CT scanner.

Once you are inside the scanner, the machine's x-ray beam rotates around you. Modern spiral scanners can perform the exam without stopping.

A computer creates separate images of the body area, called slices. These images can be stored, viewed on a monitor, or printed on film. Three-dimensional models of the body area can be created by stacking the slices together.

You must stay still during the exam, because movement causes blurred images. You may be told to hold your breath for short periods of time.

Complete scans most often take only a few minutes. The newest scanners can image your entire body in less than 30 seconds.

How to Prepare for the Test

Certain exams require a special dye, called contrast, to be delivered into your body before the test starts. Contrast helps certain areas show up better on the x-rays.

Let your doctor know if you have ever had a reaction to contrast. You may need to take medicines before the test in order to avoid another reaction.

Contrast can be given several ways, depending on the type of CT being performed.

- It may be delivered through a vein (IV) in your hand or forearm.
- It may be given into your rectum using an enema.
- You might drink the contrast before your scan. When you drink the contrast depends on the type of exam being done. The contrast liquid may taste chalky, although some are flavored. The contrast passes out of your body through your stools.

If contrast is used, you may also be asked not to eat or drink anything for 4 to 6 hours before the test.

Before receiving the contrast, tell your health care provider if you take the diabetes medication metformin (Glucophage). People taking this medicine may need to stop temporarily. Also let your provider know if you have any problems with your kidneys. The IV contrast can worsen kidney function.

Find out if the CT machine has a weight limit if you weigh more than 300 pounds. Too much weight can damage the scanner.

You will need to remove jewelry and wear a hospital gown during the study.

How the Test Will Feel

Some people may have discomfort from lying on the hard table.

Contrast given through an IV may cause a slight burning feeling, a metallic taste in the mouth, and a warm flushing of the body. These sensations are normal and usually go away within a few seconds.

Why the Test is Performed

A CT scan creates detailed pictures of the body, including the brain, chest, spine, and abdomen. The test may be used to:

- Diagnose an infection
- Guide a surgeon to the right area during a biopsy
- Identify masses and tumors, including cancer
- Study blood vessels

Normal Results

Results are considered normal if the organs and structures being examined are normal in appearance.

What Abnormal Results Mean

Abnormal results depend on the part of the body being studied. Talk to your provider about questions and concerns.

Risks

Risks of CT scans include:

- Allergic reaction to the contrast dye
- Damage to kidney function from the contrast dye
- Exposure to radiation

CT scans expose you to more radiation than regular x-rays. Having many x-rays or CT scans over time may increase your risk for cancer. However, the risk from any one scan is small. You and your doctor should weigh this risk against the value of the information that will come from a CT scan.

Some people have allergies to contrast dye. Let your doctor know if you have ever had an allergic reaction to injected contrast dye.

- The most common type of contrast given into a vein contains iodine. If you have an iodine allergy, a type of contrast may cause [nausea or vomiting](#), [sneezing](#), [itching](#), or [hives](#).

- If you absolutely must be given such contrast, your doctor may give you antihistamines (such as Benadryl) or steroids before the test.
- Your kidneys help remove iodine from the body. You may need to receive extra fluids after the test to help flush iodine out of your body if you have diabetes or kidney disease.

Rarely, the dye may cause a life-threatening allergic response called [anaphylaxis](#). If you have any trouble breathing during the test, tell the scanner operator immediately. Scanners come with an intercom and speakers, so the operator can hear you at all times.

Alternative Names

CAT scan; Computed axial tomography scan; Computed tomography scan