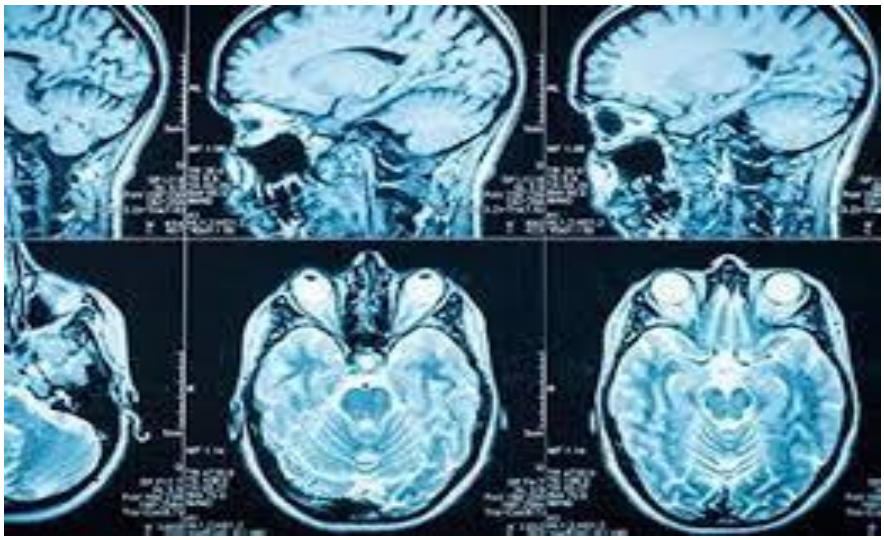
Head MRI

What is a head MRI?

Magnetic resonance imaging (MRI) of the head is a painless, noninvasive test that produces detailed images of your brain and brain stem. An MRI machine creates the images using a magnetic field and radio waves. This test is also known as a brain MRI or a cranial MRI. You will go to a hospital or radiology center to take a head MRI.

An MRI scan is different from a CT scan or an X-ray in that it doesn't use radiation to produce images. An MRI scan combines images to create a 3-D picture of your internal structures, so it's more effective than other scans at detecting abnormalities in small structures of the brain such as the pituitary gland and brain stem. Sometimes a contrast agent, or dye, can be given through an intravenous (IV) line to better visualize certain structures or abnormalities.



Why do I need a head MRI?

A head MRI is a useful tool for detecting a number of brain conditions, including:

- aneurysms, or bulging in the blood vessels of the brain
- multiple sclerosis
- spinal cord injuries
- hydrocephalus, a buildup of spinal fluid in the brain cavities
- stroke
- infections
- tumors

- cysts
- swelling
- hormonal disorders, such as acromegaly and Cushing's syndrome
- hemorrhage, or bleeding
- inflammation
- problems with development or structure (such as a Chiari malformation)
- blood vessel issues
- an issue due to a previous head injury

A head MRI can help determine whether you sustained any damage from a stroke or head injury. Your doctor may also order a head MRI to investigate symptoms such as:

- dizziness
- weakness
- seizures
- changes in thinking or behavior
- blurry vision
- chronic headaches

These symptoms may be due to a brain issue, which an MRI scan can help detect.

A functional MRI (fMRI) of the brain is useful for people who might have to undergo brain surgery. An fMRI can pinpoint areas of the brain responsible for speech and language, and body movement. It does this by measuring metabolic changes that take place in your brain when you perform certain tasks. During this test, you may need to carry out small tasks, such as answering basic questions or tapping your thumb with your fingertips.

Additionally, there is a type of MRI called magnetic resonance angiography (MRA), which better examines the blood vessels in the brain.

How do I prepare for an MRI?

EAT/DRINK: You may eat, drink and take medications as usual for most MRI exams. There are some specialty MRI exams that require certain restrictions. You will be provided detailed preparations instructions by Johns Hopkins Medical Imaging when you schedule your exam.

CLOTHING: You must completely change into a patient gown and lock up all personal belongings. A locker will be provided for you to use. Please remove all piercings and leave all jewelry and valuables at home.

WHAT TO EXPECT: Imaging takes place inside of a large tube-like structure, open on both ends. You must lie perfectly still for quality images. Due to the loud noise of the MRI machine, earplugs are required and will be provided.

ALLERGY: If you have had an allergic reaction to contrast that required medical treatment, contact your ordering physician to obtain the recommended prescription. You will likely take this by mouth 24, 12 and two hours prior to examination.

ANTI-ANXIETY MEDICATION: If you require anti-anxiety medication due to claustrophobia, contact your ordering physician for a prescription. Please note that you will need some else to drive you home.

STRONG MAGNETIC ENVIRONMENT: If you have metal within your body that was not disclosed prior to your appointment, your study may be delayed, rescheduled or cancelled upon your arrival until further information can be obtained.

Based on your medical condition, your health care provider may require other specific preparation.

When you call to make an appointment, it is extremely important that you inform if any of the following apply to you:

- You have a pacemaker or have had heart valves replaced
- You have any type of implantable pump, such as an insulin pump
- You have vessel coils, filters, stents, or clips
- You are pregnant or think you might be pregnant
- You have any body piercing
- You are wearing a medication patch
- You have permanent eye liner or tattoos
- You have ever had a bullet wound
- You have ever worked with metal (for example, a metal grinder or welder)
- You have metallic fragments anywhere in the body
- You are not able to lie down for 30 to 60 minutes.

What is the procedure for a head MRI?

During the exam, it's important to stay still to obtain the clearest images. Children who have difficulty staying still may need sedation, administered either orally or through an IV line. Sedation can also be helpful for adults who are claustrophobic.

You will lie down on a table that slides into the MRI machine. The table slides through a large magnet shaped like a tube. You may have a plastic coil placed around your head. After the table slides into the machine, a technician will take several pictures of your brain, each of which will take a few minutes. There will be a microphone in the machine that allows you to communicate with staff.

The test normally takes 30 to 60 minutes. You may receive a contrast solution, usually gadolinium, through an IV to allow the MRI machine to see certain parts of your brain more easily, particularly your blood vessels. The MRI scanner will make loud banging noises during the procedure. You may be offered earplugs to block the MRI machine's noises, or you may listen to music during the test.

There are no risks associated with an MRI itself. There is a very slight chance that you will have an allergic reaction to a contrast solution. Tell the medical staff if you have decreased kidney function. It may not be safe to use contrast solution if this is the case.

What happens after a head MRI?

After the test, you can get dressed and leave the testing facility. If you were sedated for the exam, staff may move you to a recovery area until you wake up — usually one to two hours after you received the sedative.

A radiologist will analyze your MRI images and provide your doctor with the results. Your results will be available quickly if your head MRI was an emergency procedure.

Next steps will depend on whether the results revealed anything unusual or discovered the cause of any abnormalities.

What are the risks of an MRI?

Because radiation is not used, there is no risk of exposure to ionizing radiation during an MRI exam.

Due to the use of the strong magnet, special precautions must be taken to perform an MRI on patients with certain implanted devices such as pacemakers or cochlear implants. The MRI technologist will need some information from you regarding the implanted device, such as the make and model number, to determine if it is safe for you to have an MRI. Patients who have internal metal objects, such as surgical clips, plates, screws or wire mesh, might not be eligible for an MRI.

If there is a possibility that you are claustrophobic, then you can ask your physician to provide you with anti-anxiety medication to take prior to your MRI examination. You should plan to have someone drive you home after the MRI.

If you are pregnant or suspect that you may be pregnant, you should notify your health care provider. To date there is no information indicating that MRI is harmful to an unborn child, however MRI testing during the first trimester is discouraged.

A doctor may order a contrast dye to be used during some MRI exams in order for the radiologist to better view internal tissues and blood vessels on the completed images. If contrast is used, there is a risk for allergic reaction. Patients who are allergic or sensitive to contrast dye or iodine should notify the radiologist or technologist.

There may be other risks depending on your specific medical condition. Be sure to discuss any concerns with your doctor prior to the procedure.