



General Information about Magnetic Resonance Imaging

What is magnetic resonance imaging (MRI)?

MRI, or magnetic resonance imaging, is a means of “seeing” inside of the body in order for doctors to find certain diseases or abnormal conditions. MRI does not rely on the type of radiation (i.e. ionizing radiation) used for an x-ray or computed tomography (CT). The MRI examination requires specialized equipment that uses a very powerful, constant magnetic field, rapidly changing local magnetic fields, radiofrequency energy, and dedicated equipment including a powerful computer to create very clear pictures of internal body structures.

During the MRI examination, the patient is placed within the MR system or “scanner”. The powerful, constant magnetic field aligns a tiny fraction of subatomic particles called protons that are present in most of the body’s tissues. Radiofrequency energy is applied to cause these protons to produce signals that are picked up by a receiver within the scanner. The signals are specially characterized using the rapidly changing, local magnetic field and computer-processed to produce images of the body part of interest.

What is MRI used for?

MRI has become the preferred procedure for diagnosing a large number of potential problems in many different parts of the body. In general, MRI creates pictures that can show differences between healthy and unhealthy tissue. Doctors use MRI to examine the brain, spine, joints (e.g., knee, shoulder), abdomen, pelvic region, and other body parts.

Is MRI safe?

MRI has been shown to be extremely safe as long as proper safety precautions are taken. In general, the MRI procedure produces no pain and causes no known short-term or long-term tissue damage of any kind.

The powerful magnetic field of the scanner can attract certain metallic objects that are “ferromagnetic”, causing them to move suddenly and with great force towards the center of the MR system. This may pose a risk to the patient or anyone in the path of the object. Therefore, great care is taken to prevent ferromagnetic objects from entering the MR system room. It is vital that you remove metallic objects in advance of an MRI examination, including watches, jewelry, and items of clothing that have metallic threads or fasteners.

LACGH-MRI has a screening procedure that, when carefully followed, will ensure that the MRI technologist and Radiologist knows about the presence of metallic implants and materials so that special precautions can be taken. In some ~~unusual~~ cases, the examination may be cancelled because of concern related to a particular implant or device. For example, if an MRI is ordered, it



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may be cancelled if the patient has a ferromagnetic aneurysm clip because of the risk of dislodging the clip from the blood vessel. Also, the magnetic field of the scanner can damage an external hearing aid or cause a heart pacemaker to malfunction. If you have a bullet, shrapnel, or similar metallic fragment in your body there is a potential risk that it could change position, possibly causing injury.

How to prepare for the MRI examination.

Unless specifically requested that you not eat or drink anything before the exam, there's no special preparation necessary for the MRI examination. Continue to take any medication prescribed by your Doctor unless otherwise directed. If you are claustrophobic and require sedation, your primary care physician will need to give you a prescription. This medication should be brought with you to your MRI appointment and it is NOT to be taken until you have talked to the MRI technologist.

You won't be allowed to wear anything metallic during the MRI examination, so it would be best to leave watches, jewelry, piercings or anything made from metal at home. Even some cosmetics contain small amounts of metals, so it is best to not wear make-up.

In order to prevent metallic objects from being attracted by the powerful magnet, all personal items will need to be removed and stored in a locker provided before entering the MR system room:

- Purse, wallet, money clip, credit cards, other cards with magnetic strips
- Electronic devices such as beepers or cellular phones
- Hearing aids
- All jewelry, watches, all piercings
- Hair barrettes, hairpins

Before the MRI procedure, you will also undergo an interview by the MRI technologist or a member of the MRI facility using the safety MRI screening form ([link](#)). This form is used to review all past surgeries/operations in order to safely proceed with your MRI scan. Even if you have undergone an MRI procedure before at LACGH or another facility, you will still be asked to complete an MRI screening form each time you have a MRI exam.



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Examples of items or things (but not limited to) that may create a health hazard or other problem during an MRI exam include:

- Pacemaker/leads
- Implantable cardioverter defibrillator (ICD)
- Neurostimulation system
- Aneurysm clip/coils
- Metallic implants
- Implanted drug infusion device
- Foreign metal objects, especially if in or near the eye
- Shrapnel or bullet
- Permanent cosmetics or tattoos
- Dentures/teeth with metal or magnetic keepers
- Other implants that involve magnets
- Medication patch (i.e. transdermal patch) that contains metallic foil/contents

Check with the MRI technologist or at the MRI facility if you have questions or concerns about any implanted object or health condition that could impact the MRI procedure. This is particularly important if you have undergone surgery involving the brain, ear, eye, heart, or blood vessels.

Important Note: If you are pregnant or think that you could be pregnant, you must notify your physician, the MRI facility or the MRI technologist at the MRI facility prior to the MRI procedure.

*Before entering the MR system room, any friend or relative that might be allowed to accompany you will be asked the same safety questions to ensure that he or she may safely enter the room and will likewise be instructed to remove all metallic objects.

What is the MRI examination like?

The MRI examination is performed in a special room that houses the MR system or “scanner”. You will be escorted into the room by a MRI technologist and asked to lie down on a comfortably padded table that gently glides you into the scanner.

In order to prepare for the MRI examination, you will be given earplugs and headphones to protect your hearing because, when certain scanners operate, they may produce loud banging noises. These loud noises are normal and should not worry you.

For some MRI studies, a contrast agent called “gadolinium” may be injected to help obtain a clearer picture of the body part that is undergoing examination. At some point during the procedure, a MRI technologist will inject the contrast agent which is typically done through a small needle connected to an intravenous line that is placed in an arm or hand vein. Unlike contrast



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agents used in x-ray studies, MRI contrast agents **do not contain iodine** and, therefore, rarely cause allergic reactions or other problems.

The most important thing to do is remain still while the imaging takes place. Most MRI exams take between 15 to 45 minutes to complete depending on the body part imaged and how many images are needed, although some may take 60 minutes ~~or longer~~. You'll be told ahead of time how long your scan is expected to take.

When the MRI scan begins, you may breathe normally, however, for certain examinations it may be necessary for you to hold your breath for a short period of time.

During your MRI examination, the MRI technologist who is operating the MR scanner will be able to speak to you, hear you, and observe you at all times. Consult the MRI technologist by squeezing the alarm/emergency ball that will be given to you, if you have any question or feel anything unusual. When the MRI scan is over, you may be asked to wait until the images are examined to determine if more images are needed. After the scan, you have no restrictions and can go about your normal activities.

Once the entire MRI examination is completed, the images will be reviewed by a Radiologist, a specially-trained physician, who is able to interpret the images for your Doctor. The Radiologist will send your Doctor a report. You should contact your Doctor to go over your results and discuss your next step.