

## FACT SHEET: MAGNETIC RESONANCE IMAGING (MRI)

### **What is an MRI?**

MRI stands for Magnetic Resonance Imaging. It is an important tool used in many fields of medicine, and is capable of generating a detailed image of any part of the human body. As an analogy, think about a loaf of bread. You can't see inside the loaf, so how would you go about finding out what's in there? The simplest solution is to slice the bread and take a look; the thinner you slice the bread, the more of the bread you can see. And you can slice it many different ways; you can slice it the way you might to make a sandwich, or you can slice the entire top of the loaf off. Each of these slices gives you more information about what is inside the bread, and if you slice it enough times, you will know pretty much all there is to know about that loaf of bread. That's what an MRI does – it takes images of multiple slices and then can build an accurate 2-D or even 3-D image of the tissues in your body.

### **What is MRI used for?**

The MRI is often used for diagnosis or for monitoring disease. For example, if someone is having severe back pain, MRI can get a detailed look at the spine to see if there is a problem – a herniated disk or narrowing of the spinal canal are some of the causes of back pain that can be diagnosed by MRI. If someone has a bone or tissue injury, MRI can identify the injured tendons, ligaments, muscles, or bone. If a heart problem is suspected, MRI can be used to detect damage to the heart. MRI can even be used to detect or monitor the spread of many types of cancers. As you can see from even this limited list, it is an incredibly powerful and versatile tool used in medicine.

In the specific case of leukodystrophy diagnosis, the MRI can produce incredibly detailed pictures of the brain, and can identify many different types of abnor-

malities that can help in the diagnosis of the leukodystrophy.

### **How does an MRI work?**

As you can tell from the name, the most important component of the MRI is the magnet. It is a very strong magnet; much stronger than, for example, the magnet on your refrigerator. Therefore, you can imagine that having any metal objects in the room can be dangerous. If paperclips, pens, keys, scissors, or any other metal objects are present, they can be pulled rapidly to the magnet – even if they are in your pocket! In addition, any credit cards or anything else with magnetic coding that is near the magnet will be erased by most MRI systems.

MRI works by contrasting the differences present in the area being scanned. Different types of tissues respond in different ways to the magnetic field that is applied; it is these differences that allow us to distinguish many different types of tissue abnormalities and disease processes. Basically, the MRI produces an image that can be compared to an expected image; the differences that are seen can allow doctors to diagnose the problem.

### **What is it like to have an MRI?**

The MRI scan takes place inside of a long tube-like structure. If you are being scanned in an MRI, you will lie on a table which is then slid into the tube. How far into the tube you go depends on what part of your body is being scanned. If your head is being scanned, then your head will have to be positioned directly in the center of the tube.

You will need to remain very still while in the tube, since movement will interfere with the MRI reading;

any movement that takes place may result in parts of the scan needing to be repeated. A typical MRI takes 30-60 minutes, but they can sometimes take longer than 90 minutes. Remaining motionless under stressful conditions can be very difficult for some people, so if you are claustrophobic you may receive a sedative or even a general anaesthetic in order to ensure that you can remain still for the entire procedure. Infants and children generally require a general anaesthetic.

During the procedure, you will hear a fan and feel air moving. You may also hear tapping or snapping noises as the MRI scans are taken. You may be alone in the room where the scan is being taken; in this case, the MRI technologist will be watching you the whole time and you will be able to communicate through an intercom.

You will feel no discomfort from being in the MRI. Rarely, you may feel warmth in the area being examined by the MRI or a tingling in your mouth if you have metal dental fillings. However, this is considered normal and does not require treatment unless it becomes bothersome. Any particular uncomfotableness should be reported to the technologist handling the scan.

### **Is an MRI dangerous?**

MRI is a very safe procedure. There are no harmful effects resulting from an MRI. However, as we mentioned before, metal objects can be forcefully drawn to the magnet; if these metal objects are embedded in your body, they can be drawn to the magnet and cause damage. Certain types of metal are acceptable; for example, if you have a hip or a knee replacement, you may be able to have an MRI within 6 weeks after surgery, because enough healing has taken place to firmly hold the metal in place. Regardless, any possible metal that could be present in your body should be reported to your physician and the MRI technologist prior to the scan.

### **Can anyone have an MRI?**

There are certain people who should not have an MRI. The presence of metal embedded in the body can be dangerous during an MRI, and as such should be evaluated by your physician and the MRI technologist. If you have had any sort of surgery, the doc-

tors and technologists performing the scan should be informed, because of the possibility the metal is present that the patient does not know about.

In addition, a strong magnetic field can damage electrical systems; therefore, if you have certain devices implanted such as heart pacemakers, certain types of implanted pumps, or nerve stimulators, cannot have an MRI since it can damage the system.