

HEALTH LINK**● Magnets in Medicine**

Think about what it would be like to peer inside the human body to locate a tumor, find tiny blockages in blood vessels, or even identify damage to the brain. Medical technology known as magnetic resonance imaging (MRI) gives doctors a quick and painless way to see and diagnose these problems and more.

Magnetic Images

Like X rays, MRI creates pictures of a person's internal organs and skeleton. But MRI produces clearer pictures than X rays do, and MRI does not expose the body to the potentially harmful radiation of X rays. Instead, MRI uses powerful electromagnets and radio waves to create images.

The patient is placed in a large machine. An electric current in the electromagnet creates a powerful magnetic field around the patient. Because the human body is composed mostly of fat and water, there are many hydrogen atoms in the body. The magnetic field causes the nuclei of the hydrogen atoms to align in the direction of the magnetic field. Then another, weaker magnetic signal is sent out to the cells. The energy in this signal causes some hydrogen nuclei to change their position. As the signal's energy is absorbed and then released by the hydrogen nuclei, the MRI machine collects the signals and its computer converts the information into an image.

A Diagnostic Device

MRI is particularly useful for locating small tumors, revealing subtle changes in the brain, pinpointing blockages in blood vessels, and showing damage to the spinal cord. This technology also allows doctors to observe the function of specific body parts, such as the ears, heart, muscles, tendons, and blood vessels.

Researchers are experimenting with more-powerful magnets that work on other types of atoms. This technology is known as magnetic resonance spectroscopy (MRS). One current use of MRS is to monitor the effectiveness of chemotherapy in cancer patients. Doctors analyze MRS images to find chemical changes that might indicate whether the therapy is successful.

Picture This

You may be familiar with X rays, but procedures like CAT or CT scans and MRI may be new to you. Research the different imaging tools—including X-ray tomography, CT or CAT scans, and MRI—that doctors can use to diagnose and treat injuries and disease. Select one of the imaging processes and make a model of how it works to demonstrate to the class. Be sure to include the procedure's advantages and disadvantages and the types of injuries or diseases for which it is used.