

## MRI: MAGNETIC RESONANCE IMAGING

The MRI is the best thing yet in imaging. Instead of x-rays like a radiograph or sound waves used in ultrasound scans, the MRI uses magnetic fields and radiowaves. When the body is placed within a strong magnetic field, some of the protons in the body will absorb and emit radiowave energy. Different tissues absorb and release radiowave energy at different rates. The differences between different tissues are detectable. Radio frequency signals produced by the body under the magnet are collected and analyzed by a computer, which reconstructs them as images instead of sounds.

Water is the main source of the higher magnetic resonance signals. Bone and collagen are low in water content and thus produce a low frequency signal. Fat also resonates differently from water and bone. Unlike an x-ray image, on which fluid and tissue look the same, on the MRI each type of tissue is different as to fat and water content and will be clearly differentiated by the computer. Each tissue type appears as a different color on the image. All the internal organs and even the different types of brain tissue, white and gray matter, can be clearly seen.

There is no risk of ionizing radiation with an MRI scan, but there are safety considerations for patients who have metallic implants or foreign bodies. Pacemakers, bone pins or plates, shrapnel such as bullet fragments or bee bees, vascular clips or staples (commonly used to clamp off blood vessels during routine abdominal surgery), or an object such as a swallowed coin may be pulled by the huge magnet, causing them to move and possibly cause further injury. Any metal object, even a quite large one such as a worker's toolbox, becomes a projectile when the powerful magnet is turned on, sucking the object onto the magnet.

The greatest disadvantage of the MRI is not a safety issue, it's cost. The machines are huge, expensive and require special shielded buildings so as not to interfere with every computer or electronic device within hundreds of yards. Because few veterinary institutions can afford the equipment, most MRIs for pets are done through special arrangements at human hospitals, often in the middle of the night when the hospital doesn't need them. Someday, however, they will be much more widely available and will greatly aid veterinarians with the diagnosis of animal diseases.