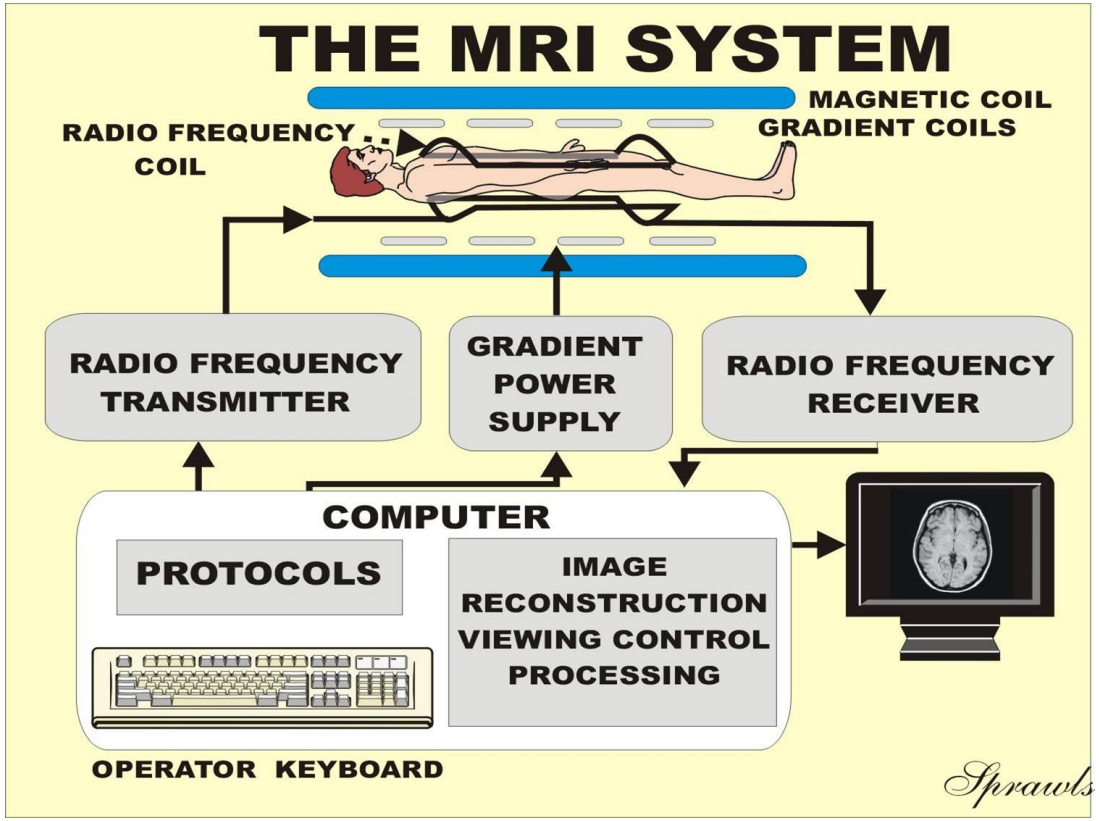
MRI Imaging

MRI Imaging System



MRI Imaging

A strong magnetic field first aligns the spins of each atom of the human body (hydrogen is used in clinical MRI) precessing in a center frequency that is dependent of the strength of the magnetic field. As the magnetic field is directed down the center of the MRI machine, the hydrogen protons align either towards the patient's head or feet, with approximately 50% going either way, effectively cancelling each other out. A very small number of protons are unmatched and aren't canceled out, about 1 to 2 in a million. Next, a radio frequency (RF) pulse (B1) which is specific to hydrogen, is applied by the MRI machine toward the part of the body being examined. This pulse causes the unmatched protons to spin in a different direction at a specific frequency. At the same time, a series of gradient magnets are cycled on and off, creating a field gradient, which changes the main magnetic field at a specific level, allowing cross-sectional images to be acquired. When the RF pulse ceases, the hydrogen ions return to their native state and release the energy absorbed from the pulses. This low energy is detected by the receiver coils in the MRI and sent to a computer, where a Fourier transformation converts the signal from the protons as mathematical data into a picture that can be interpreted by the clinician