

MRI (Magnetic Resonance Imaging) works by using a strong magnetic field and radio waves to generate detailed images of the body's internal structures.

- o Technologists can adjust the contrast of images by modifying TR (repetition time) and TE (echo time) parameters.

Step 3: Radiofrequency (RF) Pulse Application

- o The MRI machine sends a radiofrequency pulse that disturbs the alignment of hydrogen protons.

Step 5: Data Processing (Fourier Transform)

- o The signals collected from the body are processed using Fourier Transform, which converts them into an image.

Step 2: Magnetic Field Alignment

- o The MRI machine contains a powerful magnet (usually 1.5T or 3T in strength) that creates a strong magnetic field.

Step 4: Relaxation and Signal Detection

- o Once the RF pulse is turned off, the hydrogen protons return to their original aligned state (a process called relaxation).
- o The time it takes for the protons to relax is measured using two parameters:
 - o T1 relaxation time – when protons realign with the main magnetic field.
 - o Different tissues return signals at different rates, allowing for the creation of contrast in the image.
 - o T2 relaxation time – when protons lose phase coherence with each other