A coil consists of one or more loops of conductive wire, looped around the core of the coil. Coils are part of the hardware of MRI machines and are used to create a magnetic field or to detect a changing magnetic field by voltage induced in the wire. A coil is usually a physically small antenna. The perfect coil produces a uniform magnetic field without significant radiation. Different types of MRI coils are used in MR systems: Gradient coils are used to produce controlled variations in the main magnetic field (B0) to provide spatial localization of the signals and to apply reversal pulses in some imaging techniques. MR imaging radio frequency coils to receive and/or transmit the RF signal. Shim coils provide auxiliary magnetic fields in order to compensate for inhomogeneities in the main magnetic field of the MRI machine.

Common MRI coils used in clinical routine include:

MRI head coils / MRI brain coils are typically birdcage coils. Multi channel coils allow to speed up the scan time with parallel imaging particularly at 3T (coils with 8 to 16 channel / elements are common). Transmit receive coils with their low image noise are particularly useful for spectroscopic imaging techniques. Multi channel neuro coils enable to combine cervical spine MRI, brain MRI, and neurovascular MRI, etc.