## **Signal intensity**

The relative signal intensity (brightness) of tissues in an MRI image is determined by factors such as

The radiofrequency pulse and gradient waveforms used to obtain the image

Intrinsic T1 and T2 characteristics of different tissues

The proton density of different tissues

By controlling the radiofrequency pulse and gradient waveforms, computer programs produce specific pulse sequences that determine how an image is obtained (weighted) and how various tissues appear. Images can be

T1-weighted

T2-weighted

Proton density-weighted For example, fat appears bright (high signal intensity) on T1-weighted images and relatively dark (low signal intensity) on T2-weighted images; water and fluids appear relatively dark on T1-weighted images and bright on T2-weighted images. T1-weighted images optimally show normal soft-tissue anatomy and fat (eg, to confirm a fat-containing mass). T2-weighted images optimally show fluid and abnormalities (eg, tumors, inflammation, trauma). In practice, T1- and T2-weighted images provide complementary information, so both are important for characterizing abnormalities.

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