## T1-weighted

T1-weighted (T1W) MRI is a specific imaging sequence in magnetic resonance imaging (MRI) that produces images based on the longitudinal relaxation time (T1) of tissues. Here's a concise breakdown:

□ T1-Weighted MRI Overview □ Key Characteristics Anatomical detail: Excellent for structural anatomy.

Fat: Appears bright (hyperintense).

Water/CSF: Appears dark (hypointense).

Gray matter: Darker than white matter.

White matter: Appears relatively brighter.

Applications Detecting anatomical structures.

Post-contrast imaging (with gadolinium) — lesions or tumors often enhance.

Evaluating fat-containing lesions, hemorrhages (subacute), or melanin-rich tumors.

Clinical Uses Pre- and post-contrast assessment of tumors, infections, and inflammation.

Evaluating white matter diseases and cortical malformations.

 $\Box$  How It Works Tissues with short T1 relaxation times (like fat) return to equilibrium quickly  $\rightarrow$  appear bright.

Tissues with long T1 relaxation times (like water) return slowly  $\rightarrow$  appear dark.

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