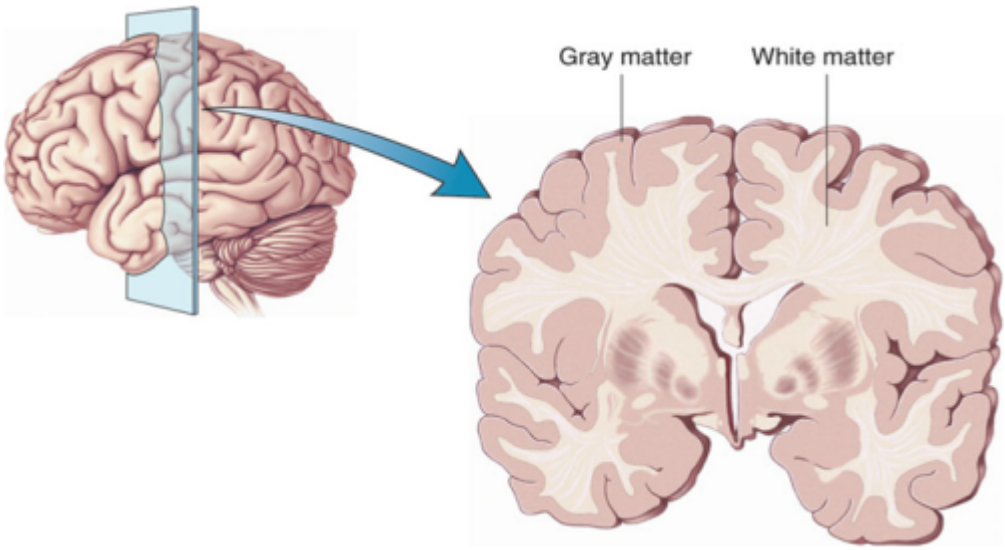
White matter

The commissural fibers or transverse fibers are coherent white matter structures that connect the two hemispheres of the brain.



see White matter changes.

see White matter hyperintensity.

see White matter dissection.

see White matter infarct.

see White matter lesion.

see White matter tract.

Is a component of the central nervous system, in the brain and superficial spinal cord, and consists mostly of glial cells and myelinated axons that transmit signals from one region of the cerebrum to another and between the cerebrum and lower brain centers.

White matter tissue of the freshly cut brain appears pinkish white to the naked eye because myelin is composed largely of lipid tissue veined with capillaries. Its white color in prepared specimens is due to its usual preservation in formaldehyde.

White matter, long thought to be passive tissue, actively affects how the brain learns and functions. While grey matter is primarily associated with processing and cognition, white matter modulates the distribution of action potentials, acting as a relay and coordinating communication between different brain regions.

The white matter, located in each hemisphere between the cerebral cortex and nuclei, as a whole has a semioval shape. It consists of cortical projection fibers, association fibers and cortical fibers. It continues ventrally as the corona radiata.

Conventional white matter (WM) imaging approaches, such as diffusion tensor imaging (DTI), have been used to preoperatively identify the location of affected WM tracts in patients with intracranial

tumors in order to maximize the extent of resection and potentially reduce postoperative morbidity.

A better comprehension of the superficial white matter organization is important in order to minimize potential and avoidable damage to long or intermediate association fibre bundles during every step of a surgical approach.

Atlas

Two- and three-dimensional (3D) white matter atlases were created based on high-spatial-resolution diffusion tensor magnetic resonance (MR) imaging and 3D tract reconstruction. The 3D trajectories of 17 prominent white matter tracts could be reconstructed and depicted. Tracts were superimposed on coregistered anatomic MR images to parcel the white matter. These parcellation maps were then compared with coregistered diffusion tensor imaging color maps to assign visible structures. The results showed (a). which anatomic structures can be identified on diffusion tensor images and (b). where these anatomic units are located at each section level and orientation. The atlas may prove useful for educational and clinical purposes [1)].

White Matter Disconnection

White Matter Disconnection

1)

Wakana S, Jiang H, Nagae-Poetscher LM, van Zijl PC, Mori S. Fiber tract-based atlas of human white matter anatomy. Radiology. 2004 Jan;230(1):77-87. Epub 2003 Nov 26. PubMed PMID: 14645885.

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