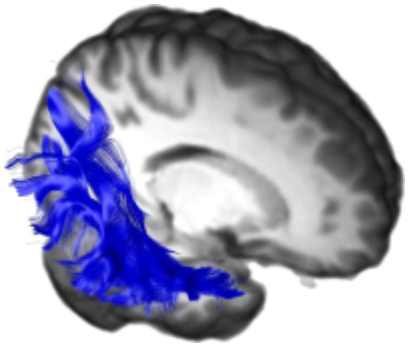
Sagittal stratum



Sagittal Stratum (SS) contains the inferior frontooccipital fascicle, the inferior longitudinal fasciculus, and posterior thalamic radiation.

The Sagittal Stratum is a major corticosubcortical white matter bundle that conveys fibers from the parietal, occipital, cingulate, and temporal regions to subcortical destinations in the thalamus, pontine nuclei, and other brainstem structures. It also conveys afferents principally from the thalamus to the cortex. It may, therefore, be viewed as equivalent to the internal capsule in that it is a major subcortical fiber system and not exclusively a fiber tract linking the lateral geniculate nucleus with the calcarine cortex.

The sagittal stratum (SS) is a critical neural crossroad traversed by several white matter tracts that connect multiple areas of the ipsilateral hemisphere. Scant information about the anatomical organization of this structure is available in the literature. The goal of a study of Di Carlo et al. was to provide a detailed anatomical description of the SS and to discuss the functional implications of the findings when a surgical approach through this structure is planned.

Five formalin-fixed human brains were dissected under the operating microscope by using the fiber dissection technique originally described by Josef Klingler.

The SS is a polygonal crossroad of associational fibers situated deep on the lateral surface of the hemisphere, medial to the arcuate fasciculus/superior longitudinal fasciculus complex, and laterally to the tapetal fibers of the atrium (tapetum). It is organized in three layers: a superficial layer formed by the middle and inferior longitudinal fasciculus, a middle layer corresponding to the inferior frontooccipital fascicle, and a deep layer formed by the optic radiation, intermingled with fibers of the anterior commissure. It originates posteroinferiorly to the inferior limiting sulcus of the insula, contiguous with the fibers of the temporal stem, and ends into the posterior temporo-occipito-parietal cortex.

The white matter fiber dissection reveals the tridimensional architecture of the SS and the relationship between its fibers. A detailed understanding of the anatomy of the SS is essential to decrease the operative risks when a surgical approach within this area is undertaken [1].

1)
Di Carlo DT, Benedetto N, Duffau H, Cagnazzo F, Weiss A, Castagna M, Cosottini M, Perrini P. Microsurgical anatomy of the sagittal stratum. Acta Neurochir (Wien). 2019 Jul 30. doi: 10.1007/s00701-019-04019-8. [Epub ahead of print] PubMed PMID: 31363919.