

The claustrum and its projection system in the human brain: a tractographic anatomical study

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The claustrum is a thin, irregular, sheet-like neuronal structure allocated between internal capsule and external capsule included between the deep face of insula and the lenticular nucleus of striatus. Anatomically we classify claustrum in basal ganglia also if differs from them for its relationship with neocortex in absence of thalamic connections. Claustrum in animal functionally is a polisensorial integration system and has demonstrated several potential sources of somatosensory and visual inputs to auditory and motor cortex. Claustrum is considered like a possible connection among such systems and working memory process. The existence of cross-modal associations indicates a single target persecuted by functionally different cerebral areas. The entire study was performed using a 3T Achieva Philips scanner; a SENSE 8 channels head coil, acquiring T1 weighted 3D TFE, DTI sequence and finally fMRI sequences on five healthy subjects. Using DTI technique in this study we examined the claustrum and its projection to neocortex and with a fMRI task based on “filtered answer” we analyzed activation of claustrum and cerebral cortex.

From results, aside animal cases already studied in present literature, we put in evidence not only a “claustrum-cortex” connection but also a “claustrum-claustrum-ipsilateral cortex” one. Such result looks like related to the performed “filtered answer” motor task.

Keywords: Claustrum, DTI, fMRI, working memory.