

Supplementary Table S1 Framework to understand the cognition and behavior using different study methods from gray matter to white matter

Cognition	Functional network	Cortical regions	Lesional studies and Clinical findings	Anatomical tract	DTI based Tract on CC	Structure of CC	lobar anatomy	Histology labelling
Action-inhibition, emotion, and perception-somesthesis-pain Anti-task network	Medial frontal (Executive) Network DMN Salient network	Vm PFC	Frontal disconnection syndrome Behavioural and cognitive changes	Genu	OF and AF	Rostrum	Prefrontal - orbitofrontal, anterior frontal, medial frontal lobes.	Prefrontal area 9
Action-inhibition, emotion, and perception-somesthesis-pain	Medial frontal (Executive) Network DMN Salient network	OMPFC	Frontal disconnection syndrome	Genu	OF and AF	Rostrum	Prefrontal - orbitofrontal, anterior frontal, medial frontal lobes	Prefrontal area 9
Action-inhibition, emotion, and perception-somesthesis-pain	Medial frontal (Executive) Network Salient network	Medial PFC	Language disorders, limbic system dysfunction, dysfunction of spatial awareness	Genu	AF	Genu	lateral frontal and medial (superior) frontal lobes	Prefrontal area 9
Action-inhibition, emotion, and perception-somesthesis-pain	Medial frontal (Executive) Network Salient network	VL PFC	Frontal disconnection syndrome (deficits of visual & verbal memory, dysexecutive cognitive & behavioral syndrome, & disturbances in interhemispheric transfer of motor learning)	Genu	AF, SF	Genu and rostrum	Prefrontal (orbitofrontal, anterior frontal, small portion of lateral frontal and medial (superior) frontal lobes	Prefrontal area 9
Cognition/language paradigms perception-somesthesis-pain	Frontoparietal Network right and left *bilateral representation known esp pain	DL PFC	Frontal disconnection syndrome	Superior parietal fasciculus and CC	SF	Anterior third of body	Premotor (medial frontal lobes with small portion of lateral frontal lobe)	Dorsal premotor anteriorly And Ventral premotor posteriorly on CC
Bimanual motor tasks action-execution and perception-somesthesis	Sensorimotor	-	Motor deficits	Body of CC	SP	Mid third of body CC	Primary motor	M1
Bimanual motor tasks action-execution and perception-somesthesis	Sensorimotor	-	Sensorimotor deficits	Body of CC	SP	Posterior third of body CC	Primary somato sensory	S1 area 2

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Cognition	Functional network	Cortical regions	Lesional studies and Clinical findings	Anatomical tract	DTI based Tract on CC	Structure of CC	lobar anatomy	Histology labelling
Anti-task network	DMN	-	Anomia, phonemic &/or semantic paraphasia, Apraxia, acalculia, Gerstmann syndrome, Visual hallucinations memory deficits	Body of CC	PP	Splenium anterior third	Posterior parietal	PPC area 5
Action-execution-speech, cognition-language-speech, and perception-	Auditory	-	Visual deficits, dysnomia or even aphasia, memory deficits Auditory disconnection syndromes social cognition Language disorders	Body of CC	Temporal	Splenium mid third	Temporal	Temporal PaAC Tpt
Cognition-language-orthography and cognition-space	Visual	-	visual disconnection syndromes	Splenium of CC	Occipital	Splenium posterior third	Occipital	Prestriate V4 anteriorly and Striate V1V2 posteriorly on CC

Abbreviations: AF, anterior frontal fibres; CC, corpus callosum; OF, orbitofrontal fibres; PP, posterior parietal fibres; SF, Superior frontal fibres; SP, superior parietal fibres.