17 - 3. White matter pathways

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© SPMM Course 3. White matter pathways There are 3 major types of white matter pathways. Projection fibers run vertically connecting higher and lower centres of the brain. Association fibers interconnect different regions within the same hemisphere of the brain. Commissural fibers interconnect similar regions in the opposite hemisphere. Corpus callosum is the largest bundle of fibres that connect the two cerebral hemispheres; the other such bundles are anterior commissure (interconnects olfactory bulbs), posterior commissure (interconnects midbrain pretectal nuclei), hippocampal commissure and habenular commissure (interconnects posterior dorsal thalamic nuclei). The pericallosal artery derived from the anterior cerebral artery provides blood supply to the anterior aspect and most of the body of the corpus callosum. Left sided apraxia and agnosia may be seen in cases of vascular disruption. Posterior cerebral artery territory supplies splenium (posterior aspect of the corpus callosum) and disrupted supply here prevents right visual cortex accessing the dominant hemispheric processes such as language resulting in alexia and color anomia but with preserved ability to copy words as motor information is relayed via anterior corpus callosum Fornix is an important white mater tract that connects hippocampus to the hypothalamus via mammillary bodies. Thus, it relays cortical input to regulate neuroendocrine and autonomic systems. Arcuate fasciculus connects Broca’s and Wernicke’s areas. Damage results in conduction aphasia. Uncinate fasciculus is a major frontotemporal tract that connects orbitofrontal cortex to the anterior temporal lobes. It plays an important role in social cognition and language.

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