

DIVISIONS OF THE CNS and their Functions

Improves Table 12.1

BRAINSTEM

MIDBRAIN

- mediates visual and auditory reflexes
- contains the substantia nigra involved in Parkinson's disease

PONS

- reflex control of respiratory depth. Controls whether you breathe shallow or deep.

MEDULLA OBLONGATA

- reflex control of Heart Rate, Respiratory Rate, and also Blood Pressure by adjusting the diameters of blood vessels
- also reflex control of swallowing, vomiting, sneezing, coughing
- motor fibers from each hemisphere of the cerebral cortex cross over to the opposite side of the spinal cord. This results in the right hemisphere controlling the left side of the body & vice-versa.

RETICULAR FORMATION (in particular a portion called the RETICULAR ACTIVATING SYSTEM)

- consists of neurons scattered throughout the brainstem. Visual, auditory, and somatic sensory impulses pass through here on their way to the cerebrum. See image p. 455
- acts like a 'filter' limiting the amount of information reaching the cerebrum thereby controlling our sleeping-waking cycles and determining our level of mental alertness.
- filters out repetitive stimuli (acts sort of like a "mute" button). Hallucinatory drugs such as LSD inhibits this and other filters (such as the thalamus) allowing the brain to be flooded with sensory input.

DIENCEPHALON

THALAMUS (a.k.a. the "gateway to the cortex")

- relays incoming impulses to the appropriate part of the cerebral cortex. Acts like a filter controlling the amount of information reaching the cerebral cortex.

HYPOTHALAMUS

- responsible for reflex control (not conscious control) of many homeostatic variables such as temperature, hunger, appetite, thirst, pain.
- also influences moods, emotions, and sex drive
- controls the pituitary gland by way of various 'releasing' hormones

CEREBRUM (consisting of the two CEREBRAL HEMISPHERES)

CEREBRAL CORTEX

- the outer layer of each hemisphere - consists mostly of unmyelinated cell bodies and dendrites
- responsible for conscious perception of sensory info.
- also conscious thought, reasoning, problem solving, etc.
- also conscious control of motor messages to skeletal muscles for body movement and speech.

BASAL NUCLEI (BASAL GANGLIA) (not visible on our models)

- areas deep within each hemisphere (see Fig 12.10)
- helps to control skeletal muscle activity by inhibiting (with IPSPs) unintentional movement

LIMBIC SYSTEM

- sometimes called the 'emotional brain' because it controls emotional responses to bad news, good news, pain, pleasure, etc.

CEREBELLUM

"Fine tunes," through inhibition (IPSPs), impulses from the motor cortex to skeletal muscles allowing us to produce smooth, coordinated, synchronized contractions.