

Inferior and Superior Colliculi

The midbrain or **mesencephalon** is the smallest region of the brainstem, and the functions of the midbrain are associated with vision, hearing, motor control, sleep/wake, arousal (alertness), and temperature regulation.

The mesencephalon contains the nuclei of three cranial nerves: III (oculomotor), IV (trochlear), and V (trigeminal).

The mesencephalon is made up of the tectum (also called the “corpora quadrigemina”), which consists of the inferior and superior colliculi; the tegmentum, which consists of ascending nerve tracts that carry sensory information from the spinal cord to the brain; the ventricular mesocoelia (the cerebral aqueduct); and the cerebellar peduncles, which consist of descending nerve tracts.

Web Media: Flickr: Jonathan Ehrich’s “Image of Sagittal Section of a Brain”

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Instructions: In this image of a sagittal section of a brain, the superior colliculi are labeled with #70, and the inferior colliculi are labeled with #42. Please carefully review this image.

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The tectum consists of the corpora quadrigemina (“four twins”), which are 4 nuclei that form mounds on the dorsal surface of the midbrain. The 4 nuclei are divided into a larger superior mound, called the superior colliculus, and a smaller inferior mound, called the inferior colliculus.

The superior colliculus is involved in visual reflexes, such as directing eye movements toward a visual, auditory, or tactile signal. The superior colliculus initiates these movements after a signal from the retina or cerebral cortex. Types of eye movements initiated by the superior colliculus consist of:

1. Saccadic movements (fast)
2. Smooth pursuit movements (tracking moving objects)
3. Fixation eye movements (fixing on a motionless object)
4. Vergence eye movements (both eyes move simultaneously in opposite directions.)

The superior colliculus is also involved in generating subtle movements, including spatially directed head turns, arm-reaching movements, and shifts in attention. One example of a reflex movement controlled by the superior colliculus is when someone



hears a sudden loud sound over his right shoulder. The person will turn his head and direct his eyes toward the sound.

The inferior colliculi are primarily auditory nuclei involved in integrating and routing sensory perceptions. The inferior colliculus is a synapsing point for sound information and receives input from the cochlear nuclei (which are the central nuclei receiving input from the ears). The inferior colliculus then sends information to nuclei in the thalamus. Collateral fibers from the inferior colliculi to the superior colliculi provide auditory input that stimulates visual reflexes—such as the sudden loud sound reflex described above.

