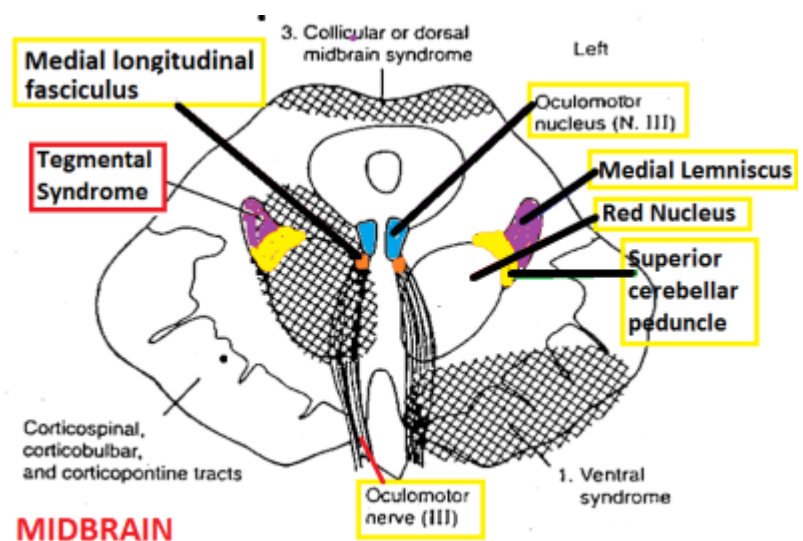


Medial longitudinal fasciculus (MLF)



The medial longitudinal fasciculus (MLF) is one of a pair of crossed fiber tracts (group of axons), on each side of the brainstem. These bundles of axons are situated near the midline of the brainstem and are composed of both ascending and descending fibers that arise from a number of sources and terminate in different areas. MLF is the main central connection for the [oculomotor nerve](#), [trochlear nerve](#), and [abducens nerve](#). The vertical gaze center is at the rostral interstitial nucleus (riMLF).

The MLF ascends to the [interstitial nucleus of Cajal](#), which lies in the lateral wall of the third ventricle, just above the cerebral aqueduct.

The medial longitudinal fasciculus carries information about the direction that the eyes should move.

It connects the cranial nerve nuclei III (Oculomotor nerve), IV (Trochlear nerve) and VI (Abducens nerve) together, and integrates movements directed by the gaze centers (frontal eye field) and information about head movement (from cranial nerve VIII, Vestibulocochlear nerve). It is an integral component of [saccadic eye movements](#) as well as vestibulo-ocular and optokinetic reflexes.

It also carries the descending tectospinal tract and medial vestibulospinal tracts into the cervical spinal cord, and innervates some muscles of the neck and upper limbs. Clinical significance

A lesion of the MLF produces slowed or absent adduction of the ipsilateral eye, usually associated with involuntary jerky eye movements (nystagmus) of the abducting eye, a syndrome called internuclear ophthalmoplegia. Because multiple sclerosis causes de-myelination of the axons of CNS, it can cause internuclear ophthalmoplegia when MLF axons get de-myelinated, where it presents as nystagmus and diplopia.

The descending MLF mainly arises from the Superior-medial Vestibular nucleus (VN) and is thought to be involved in the maintenance of gaze reflex (stimulated by input from Semicircular canal). This is achieved by inputs to the VN from:

the Vestibulocochlear (8th cranial) nerve about head movements, gait adjustments from the flocculus of the cerebellum, head and neck proprioceptors and foot and ankle muscle spindle, via the fastigial nucleus.

Descending fibers can also arise from the superior colliculus in the rostral midbrain for visual reflexes, the accessory oculomotor nuclei in the rostral midbrain for visual tracking, and the pontine reticular formation, which facilitates extensor muscle tone. Ascending tracts arise from the Vestibular nucleus (VN) and terminate in the III, IV and VI nuclei, which are important for visual tracking. History

In 1846 neurologist Benedict Stilling first referred to what is now known as the MLF as the acusticus, followed by Theodor Meynert in 1872 calling it posterior. But in 1891, Heinrich Schutz chose the name dorsal to describe the longitudinal bundle, "for brevity's sake". This name stuck despite other authors attempting further renaming (Ramon y Cajal's periependymal in 1904, Theodor Ziehen's nubecula dorsalis in 1913). But finally, it was Wilhelm His, Sr. who changed the name to medial for the sake of the Basle nomenclature to end the confusion.

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