Midbrain reticular formation diagram

Reticular formation consists of a net-similar structure of different nuclei and neurons of the brain stem and covers a vast part of the brain stem, starting with mesencephaloene, expanding caudally through the oblong medulla, and projecting in the higher segments of the cervical spinal cord. Reticular formation does not have any different cytoarchitectual boundaries and dissipates throughout the brain stem as a network of interconnected neurons with many projections on subcortical and cortical structures of the brain, as well as caudarly to the spinal cord. Despite the presence of non-spilling boundaries, reticular formation contains more than 100 separate nuclei of the brain stem. In this vast array of neural connections there are connected but different nuclei of the brain stem, such as the red nucleus and the nucleus of reticularis tegmenti pontis, embedded in the reticular network. Due to its extensive network of tracts and interconnected structure, reticular education functions as an integration, relay and focal point for many vital vital functions and controls many protective reflexes. Despite the lack of clear boundaries of reticular education, many of its functions have been localized and correlated with common areas of the brain stem. By dividing reticular formation into different regions based on their orientation caudally, rostrally, medially or laterally, certain regions can correlate with neuron cell types and various functions opened through various experiments on animal models as well as human case studies. Many neurons in reticular formation are multimodal and respond to different stimuli methods, allowing them to integrate different types of feelings and transmit them to higher cortical areas. Interneyrons, which make up the vast majority of the neural population in reticular education, allow for this extensive connection. Each neuron in reticular formation makes synapses with many other secondary neurons, causing an exponential number of connections to form a network structure. Reticular education, through a wide range of projections and networks, functions to coordinate many reflexive and vital functions. The main functions that affect the formation of reticulars are arousal, consciousness, circadian rhythm, sleep and wake cycles, coordination of somatic movements of the motor, cardiovascular and respiratory control, pain modulation and addiction. Cardiovascular control, in particular, is modulated by the vasomotor center present in the oblongity of the medulla. The central areas that the studies have identified to play a role in vegetative breathing rhythms are located caudally in reticular formation near the compound of pons and medulla. These centers are also associated with the nuclei of the traumatic brain trigeminal, face, glossopharynges, vagus and hypogloss of nerves to coordinate the complex task of breathing. Division Formation in the middle and lateral orientation of the reticular formation is present in the pons and the medulla can be divided into lateral and medial tagmental fields, each of which is associated with different neuronal populations and functions. The lateral tagmental field of reticular formation contains mainly populations of interneurons, which is the main type of cells present throughout reticular formation. These interneurons in the lateral tagment field affect many of the nuclei of the cranial nerve (trigeminal, facial, vagal and hypoglossal), as well as form projections on different structures of the limbic system. In addition, in the lateral tagmental area, premotor neurons are present that project through long descending axons for the neurons of the spinal cord motor that are involved in many vegetative functions necessary for survival, such as breathing, abdominal pressure regulation and function, micturition, and regulation of blood pressure. In contrast, the medial tagmental field of reticular formation has the function of coordinating eye and head movements and integrating these movements with other somatosensory, vestibular and proprioceptive stimuli through the downward axonal tracts. Reticular formation can also be divided into three columns depending on their neural structure and function. These three columns from the medial to the lateral are the nucleuses of the raff, located in the middle line of the core of the reticular formation, the giant-cell reticular nuclei over lateral and particellular reticular nuclei, which make up the most lateral aspect of the column system. The rafting nuclei form the central ridge of reticular formation and play an important role in mood regulation and arousal through neurotransmission through serotonin and projections in limbic regions. The medial column of the giant cellal reticular nuclei consists of larger neurons and coordinates engine movements. The most lateral columns, which include parvocellular nuclei, contain smaller neurons and are known to regulate respiratory function, in particular exhalation. The lateral aspects of reticular formation are also close to different cranial nerves and work to modulate their motor function. Ascending and downward tracts of reticular formation Many projections arise from reticular formation and either rise into the subcortical and cortical regions of the brain, or descend to other areas of the brain and spinal cord, allowing reticular formation to play an important role as an integration and relay center. The main ascending pathway is known as the ascending reticular activation system and plays a role in establishing alertness, arousal, consciousness, sleep cycles and circadian rhythm. The ascending retecular active system has a neural population consisting mainly of dopaminergic, norradrenergic, serotonergic, histaminergic, cholinergic and glutamatergic nuclei, have projections on the thalamus and cortex of the brain, brain, prefrontal cortises. The main regulatory system of the ascending retecular activation system is the lateral hypothalamus. This area of the brain contains orexin neurons that are key neurons in coordinating alertness and sleep wakefulness cycles. Damage to this area of the brain stem leads to a decrease in the level of consciousness and progression to coma in many patients. If the lesions affect the ascending system of activation of reticulars bilaterally at the level of the middle brain, death can result. The rising reticular activation system is also responsible for the phenomenon of addiction. This process allows the brain to ignore stimuli that are repetitive and meaningless and divert attention to more important and changing stimuli in the environment. Reticulospinal tracts are the main downward pathways from the formation of reticulars and act at many levels of the spinal cord to coordinate movements and vegetative functions. The styculospinal tracts project the spinal cord motor neurons and help modulate tone, balance, posture, and coordination of body movements through other sensory stimuli such as visual, auditory, vestibular, and proprioceptive information. In the lateral system of the downward ethycolospinal tract there are corticospinal and rurospinal tracts that modulate subtle control of movement. The medial system of descending ethycolospinal pathways consists of the ethyulospinal pathway and the vestibulospinal pathway, the main players in the coordination of posture. This sticulospinal pathway is further divided into medial Pontian and lateral medullary sticulospinal tracts, each of which has a unique function. The medial Pontian reticulospinal tract controls the musculature. The lateral medullary reticulospinal tract functions to inhibit the excitatory axial stretched muscle, as well as control the vegetative functions of breathing. These downward pathways of reticular education play an important role in maintaining the appropriate posture. If the styrospinal tract is damaged in the ponies or medull or vestibules, patients may experience postural instability and ataxia. Damage, which disrupts the normal signaling of vestibular nuclei in ponies from the red nucleus located in the middle of the brain, can lead to decerebrat posturing, causing the arms and legs to expand and spin internally in response to painful stimuli, hyperreflexes and hypertensive muscles. Damage to the brain stem above the red core can lead to decent posturing, in which the arms remain bent to the core of the body, and the legs lengthen in response to painful stimuli. Damage below the vestibular nuclei in the medulla can lead to hypotension, hyporeflexion, sluggish paralysis of the limbs and body, quadriplegia and loss of respiratory drive. This phenomenon is called cerebrosal shock, and patients experience these symptoms due to loss of tonic activity from both lateral and reticulospinal reticulospinal which usually affect peripheral motor neurons. There are also some areas of reticular education, axons of which bifurkat and send signals in both ascending and descending tracts. These areas are usually located in the growth part of the middle brain and send prognosis to the hypothalamus, basal ganglia, and septum areas. The division of the reticular formation in Rostral into caudal orientation Another way of dividing reticular formation into vague functional areas is in the growth to caudal orientation. The functions of reticular education, which are more modular in nature, are usually controlled by the growth sections, while the tail sections control the functions of the premotor. The rostral and caudal orientation of reticular formation also determines the relative contribution of medial and lateral columns. As one examines the reticular formation columns moving from the rostral section more caudally, the medial reticular formation column will be less prominent, and the side column will be prominent. Studies on animals that have studied the effects of lesions on various areas of reticular formation have shown that rostral lesions are produced by hypersomnia and causal lesions produced by insomnia in cat patterns. Many studies like these have shown contradictory behaviors in various regulatory functions of reticular education based on the location of lesions, demonstrating their prominent role in modulating, integrating and coordinating different systems throughout the body. Pain modulation Is another important function of reticular formation in modulating pain stimuli. For pain from the periphery to reach the cerebral cortex to be brought to conscious attention, pain signals travel through the reticular activation system through the ascending tract. The reticular active system also projectes downward pathways that play a role in the pain pain relief pathway, modulating the sensation of pain on the periphery and blocking transmission from the spinal cord to the cortex. The pain pain relief works through the gate control mechanism present in the spinal cord, in which presynaptic pain stimulation inhibition occurs in the zone II of the spinal cord gelatinose, before it can be transmitted to the secondary neuron and rise to the cerebral cortex through the spinothalamine tract. The idea is that nociceptive stimuli that reach reticular formation are responsible for numerous behavioral and protective responses to pain. Evidence also suggests that these ascendant pain signals, reaching reticular formation in the medulla, also play a modulate role in vegetative function with a greater impact on cardiovascular control, as well as motor control within flight or combating sympathetic reactions. Understanding pain and pain pathways modulated by different areas of the cortex brain, brain stem and spinal cord, can give give neuropathic pain. The idea is that since reticular formation and other pain modulation regions of the brain have extensive links with limbic and memory centers, chronic central pain can persist despite the cessation of harmful peripheral stimuli. Another important phenomenon is associated with the contribution of reticular formations to pain after spinal cord injuries. Due to the diffuse location and multi-synaptic network of reticular formation, it rarely completely collapses after spinal cord injury, allowing pain pathways to the cerebral cortex to persist and contributes to substantial pain and discomfort. This condition can also lead to a misinterpretation of non-painful sensations below the level of spinal cord injury to travel through the pain of carrying up the ascending pathways of reticular formation, causing the phenomenon of alesion. Eye responses reticular formation also plays a vital role in eye view, eye saccation coordination and head movements. Different parts of reticular education are responsible for different eye functions. Mesencephalic reticular formation coordinates the vertical view, the paramedian Pontian reticular formation coordinates the horizontal view, and the medullary pontic reticular formation coordinates the movements of the head and the holding gaze. These regions are directly projected onto the motor's extraoglaze cores and are essential for saccastic eye movements. These centers also have connections through descending ethycal neurons to coordinate posture and neck movements with eye movements. The movement. [3] [7]