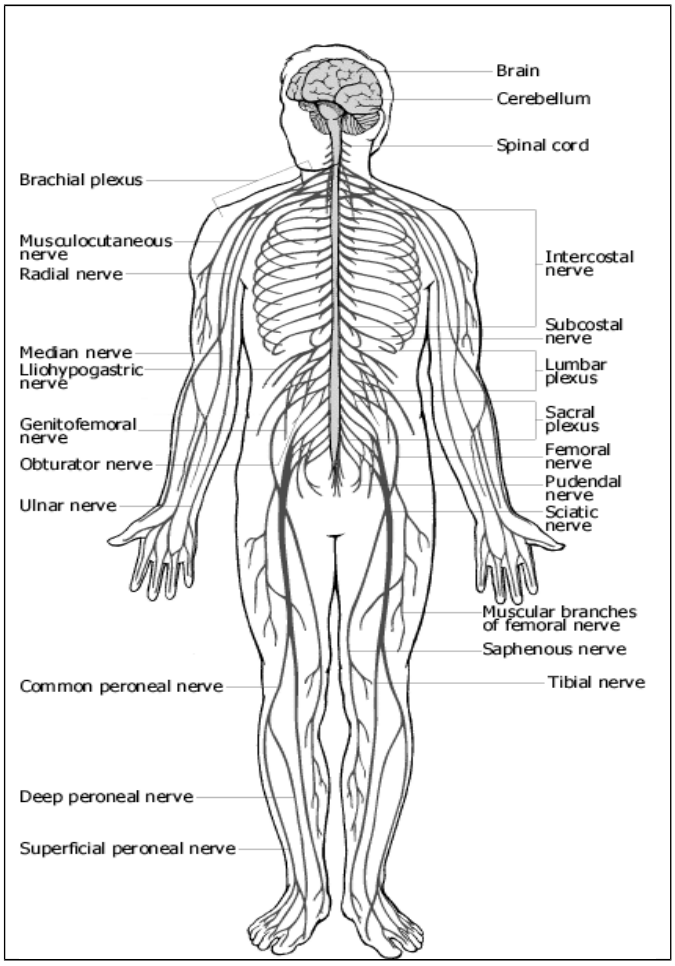
~Chapter 3 The Nervous System and the Brain~



The Human Nervous System consists of the Central Nervous System, which relates to the Brain and the Spinal Cord, and the Peripheral Nervous System, which relates to the functions of the body and how the body responds and acts to these functions.

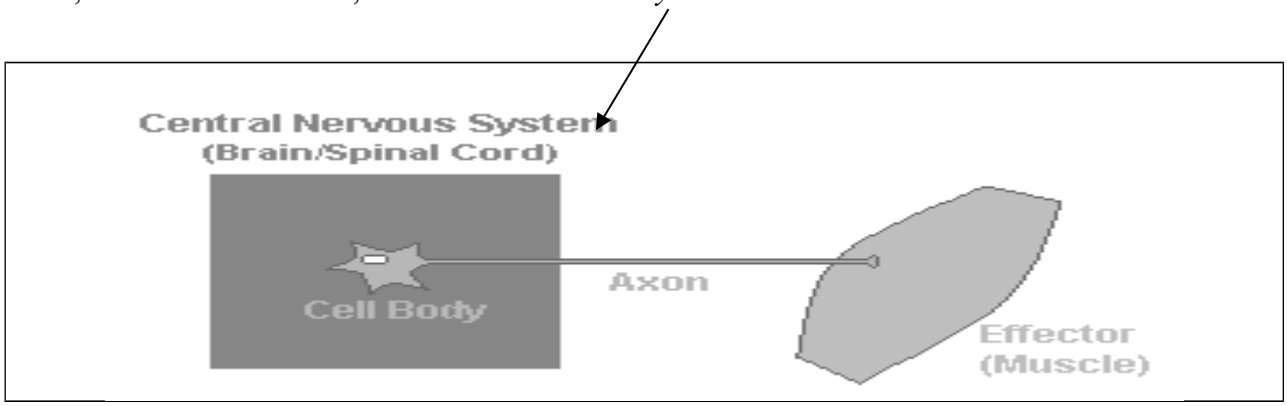
The Central Nervous System is divided into two parts, which are the brain and the spinal cord. On average the adult human brain weighs in at 1.3 to 1.4 kg, or about 3 pounds. The brain itself contains about 100 billion nerve cells that are referred to as *neurons*, and the brain has trillions of supporting cells called *glia* that support the neuron cells. The second part of the Central Nervous System is the Spinal Cord. The spinal cord is approximately 43 cm long in the adult woman and approximately 45 cm long in the adult mail and weighs in at about 35 to 40 grams. It is also relevant to point out that the vertebral column that houses the spinal cord is approximately 70 cm long. This tells us that the spinal cord is much shorter than the vertebral column, and that it extends from the skull (foramen magnum) to the first lumbar vertebra. But none the less the spinal cord has extended fibers that branch out in a wide array of webbing.

The Peripheral Nervous System is made up of 12 pair of cranial nerves and their related branches. This is then made up of 31 pair of spinal nerves and further subdivided into their correlated branches. There are two main divisions to the *Peripheral Nervous System*. The first is the *Somatic Nervous System*, which supplies and receives information from fibers connected to neurons throughout the body, to and from the skin, joints, tendons, and skeletal muscles. The somatic nervous system also consists of peripheral nerve fibers that act as sensory senders of information to the central nervous system. It also consists of motor nerve fibers that send information to the skeletal muscles. It is well to point out that at times these fibers are referred to as Axons, the delivery link to the cell body that is either located in the brain or spinal cord and to the skeletal muscles, which in turn sends information out to the tendons, joints, and skin. The second division of the *Peripheral Nervous System* is referred to as the *Viscera,* which are motor fibers. These fibers supply the cardiac muscles, smooth muscles, and the glands. The glands, smooth muscles and the cardiac muscles make up the *Autonomic Nervous System*. The Autonomic Nervous System is then made up of two divisions. The first is the *Parasympathetic Division*, which is important for the control of normal bodily functions, such as the heart, lungs, bladder, liver, kidneys, and other bodily related functions. The second is referred to as the *Sympathetic Division* and is also referred to as the Fight or Flight division, which in itself helps the body cope with both internal and external stress factors.

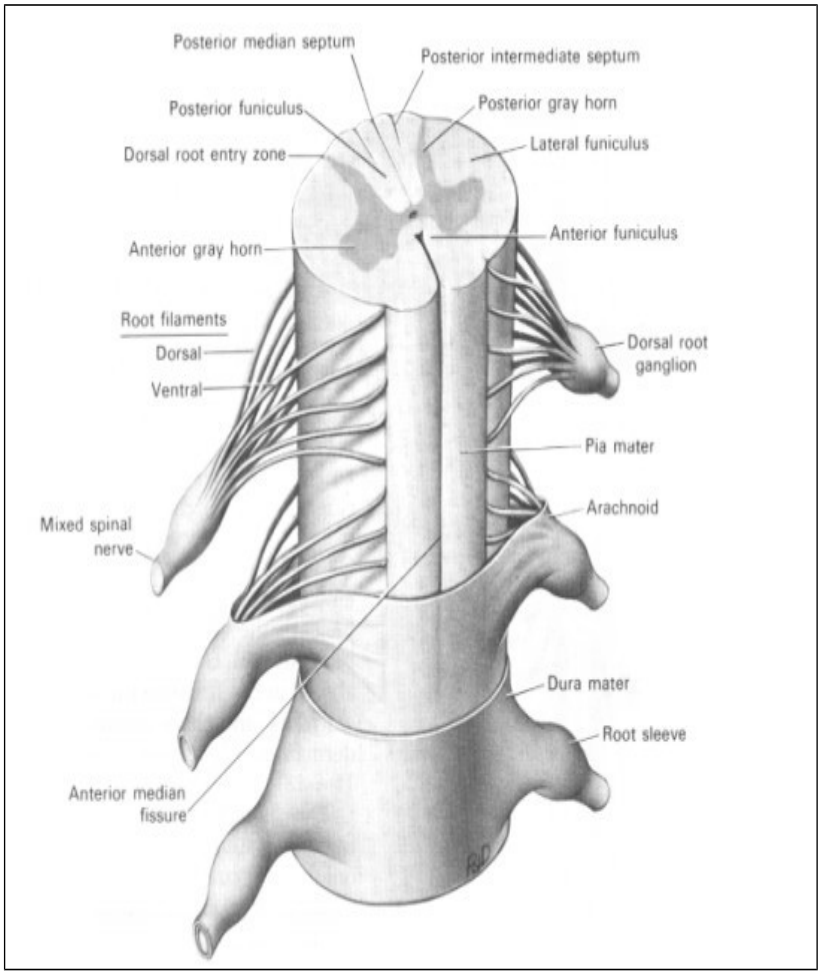
The nervous system is embedded within the cranium and its effect reaches all the way down to the smallest nerve endings in our toes. For our purpose here we focus on an overview of the nervous system and how it effects/ties into the function of the bodies well being. By doing so we will be able to clearly see the point of contact where subdexcation can take place and how it affects the entire skeletal structure.

Like the brain the spinal nervous system consists of both gray and white matter. The gray matter (Anterior gray horn) is made up of cell bodies and is centrally located and surrounded by *Myelinated Axons*, the white matter. The Myelinated Axons/white matter of the spinal cord is made up of descending and ascending fiber tracks that carry messages to and from the brain.

The ascending fiber tracks transmit sensory information from receptors in the tendons, joints, skin, and skeletal muscles, the *Somatic Nervous System.*

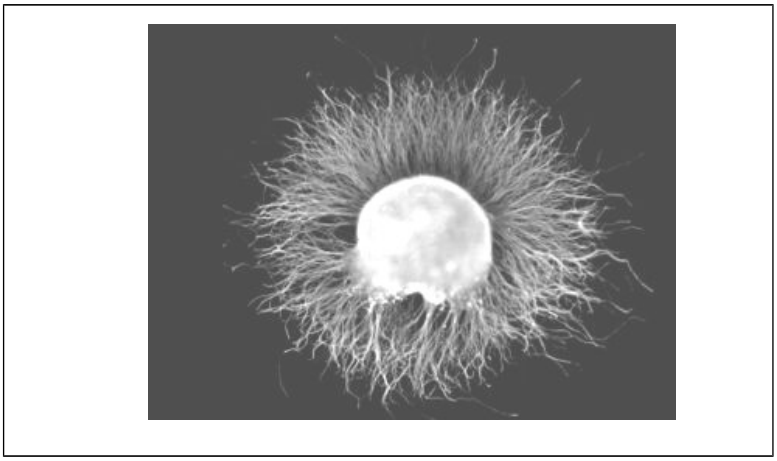


The descending fiber tracks transmit motor function information to the glands and to the skeletal cardiac, and the smooth muscle system of the body, the *Peripheral Nervous System.* These spinal column nerve fibers are also responsible for *reflex* toward the outward environment. In this description reflex refers to a multiple rapid unconscious response to changes in the external



and internal environment of ones body. These reflexes are the neural pathways that information and impulses flow/travel in any given response to stimuli within the bodies system and also to response to outward interaction. We can then conclude that these reflexes are the super fiber highway that carries impulse signals to the spinal column and to and from the brain. There are 5 components to these reflexes. The first is the receptor, which responds to the inner or outer stimulus. The second is the efferent pathway/sensory neuron, which transmits impulses into the spinal cord. The third is the central nervous system, the part of the nerves that are intertwined within the spinal cord and where information is processed. The forth reflex is the efferent pathway, which is the motor neuron that transmits impulses and information out of the spinal cord. The fifth reflex is the effector, which can either be a muscle or take the form of a gland. This effector receives the impulse/information from the motor neuron/efferent pathway and then carries out the desired response to either the outside element or an internal response to the bodies many functions.

There are 31 pair of spinal nerves and each one of them has a *dorsal root* and a *ventral root.* The dorsal root is a sensory nerve that conducts impulses into the spinal cords central nervous system. The dorsal root has a ganglion, which is a tissue mass that makes up and provide relay points for the neurological functions of the body. These ganglions contain the cells bodies of



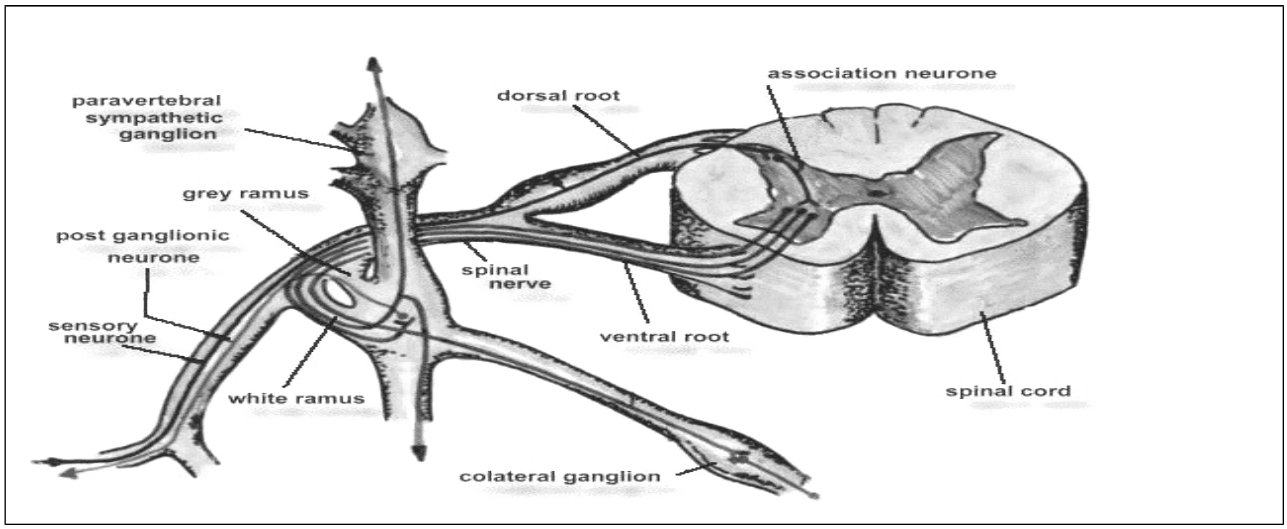
the sensory neurons. These sensory neuron fibers pass through the dorsal root. Each single spinal nerve includes multiple sensors/efferent neurons. Many of these sensory/efferent neurons conduct impulses to form somatic structures. Those structures are the joints, tendons, skin, and skeletal muscles. The ventral root is motor related and conducts impulses of information out of the spinal cords central nervous system. The ventral structures are made up of glands, cardiac muscles and smooth muscles.

The spinal nerves and the peripheral nervous system can be divided into four categories. The Somatic afferent, the Somatic efferent, the Visceral afferent, and the Visceral efferent. Somatic afferent neurons are sensory indicators that conduct impulses and send information to and from receptors in the skin, tendons, joints, and the skeletal muscles. The Neurons/receptors that are located in the skin are responsible for sensing touch, pain, pressure, and temperature. These seniority receptors are referred to as *exteroceptors*. Neurons/receptors that are located in the joints, tendons and the skeletal muscles provide the brain with information relating to the bodies position and movement. These seniority receptors are referred to as proprioceptors. These somatic afferent neurons are uni-polar and enter the spinal cord through the dorsal root. The cell bodies for these fibers are located in the dorsal root ganglia.

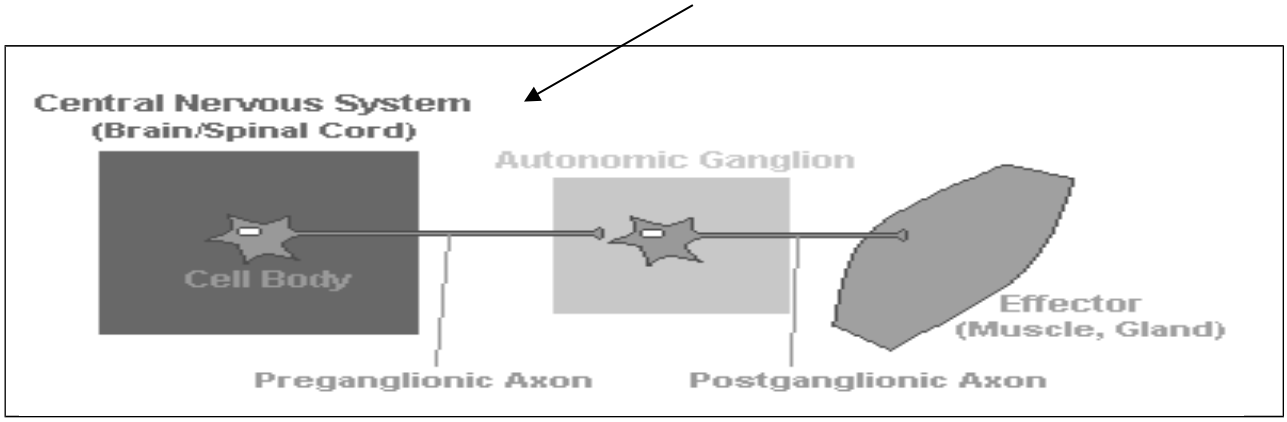
The somatic efferent neurons are motor related and conduct impulses originating from the spinal cord to the skeletal muscles. The somatic efferent neurons are multi-polar and have cell bodies located strategically within the gray matter of the spinal cord. These somatic efferent neurons leave the spinal cord through the vertral root and through the spinal nerves.

The visceral afferent neurons are mainly sensory neurons that indeed conduct impulses originated in receptors within the smooth muscle and the cardiac muscle. These visceral neurons are collectively referred to as visceroceptors or as interceptors. Visceral neurons are uni-polar and they enter the spinal cord through the dorsal root and their cell bodies are housed and located in the dorsal root ganglia, much like the somatic neurons.

Visceral efferent neurons conduct motor impulses to the smooth muscle, the cardiac muscle, and to various glands. Some of these visceral neurons begin in the brain others are located and begin in the spinal cord. It is well to mention that it takes two visceral neurons to conduct and impulse, these impulses are then broken down into two categories, the visceral efferent 1 and the visceral efferent 2. The visceral efferent 1 is also referred to as the preganglionic neuron. It is a multi-polar neuron that begins in the spinal cords gray matter. The preganglionic neuron leaves the spinal cord through the ventral root then leaves the spinal nerve through the white ramus and ends up in an autonomic ganglion. The ramus acts as a gate/doorway for impulse signals to travel on. In the ganglion the visceral efferent 1 neuron connects/sparks with the visceral efferent 2 neuron. The visceral efferent 2 neuron is also referred to as the postganglionic neuron and is also considered to be multi-polar and begins in the sympathetic ganglion where its cell body is located. Visceral efferent 2 neurons exit the ganglion through the gray matter of the spinal cord then precede to the cardiac muscle, the smooth muscle, or to various glands.



Visceral efferent neurons are motor neurons that conduct pulses to smooth muscles and to cardiac muscles. These neurons make up the *Autonomic Nervous System*.



The autonomic nervous system is entirely motor related, controls the smooth muscle of the internal organs. It also controls the glands and consists of three divisions. The *Sympathetic Division*, the P*arasympathetic Division,* and the *Enteric Nervous System*. The rhythmic impulses, from these divisions always travels along two neurons, the preganglionic (visceral efferent 1) and the postganglionic (visceral efferent 2).

The *Sympathetic Division* leaves the central nervous system through a series of spinal nerves/fibers and extends into the thoracic and lumbar regions of the spine. The sympathetic neurons also prepare the body for intense physical activity in the case of stressful situations. The sympathetic is comprised of two different neurons, the preganglionic neurons/fibers, which are rather short, and the postganglionic neurons/fibers, which are rather long. The parasympathetics neurons help regulate the body's functions such as in digestion and the slow down/relaxation after a given stressful situation. These neurons leave the central nervous system through cranial nerves as well as spinal nerves located in the sacral region of the spinal cord.

The *Parasympathetic Division* is important for the control of normal bodily functions, such as the heart, lungs, bladder, liver, kidneys, and other bodily related functions and its preganglionic neurons/fibers are rather long and its postganglionic neurons/fibers are short.

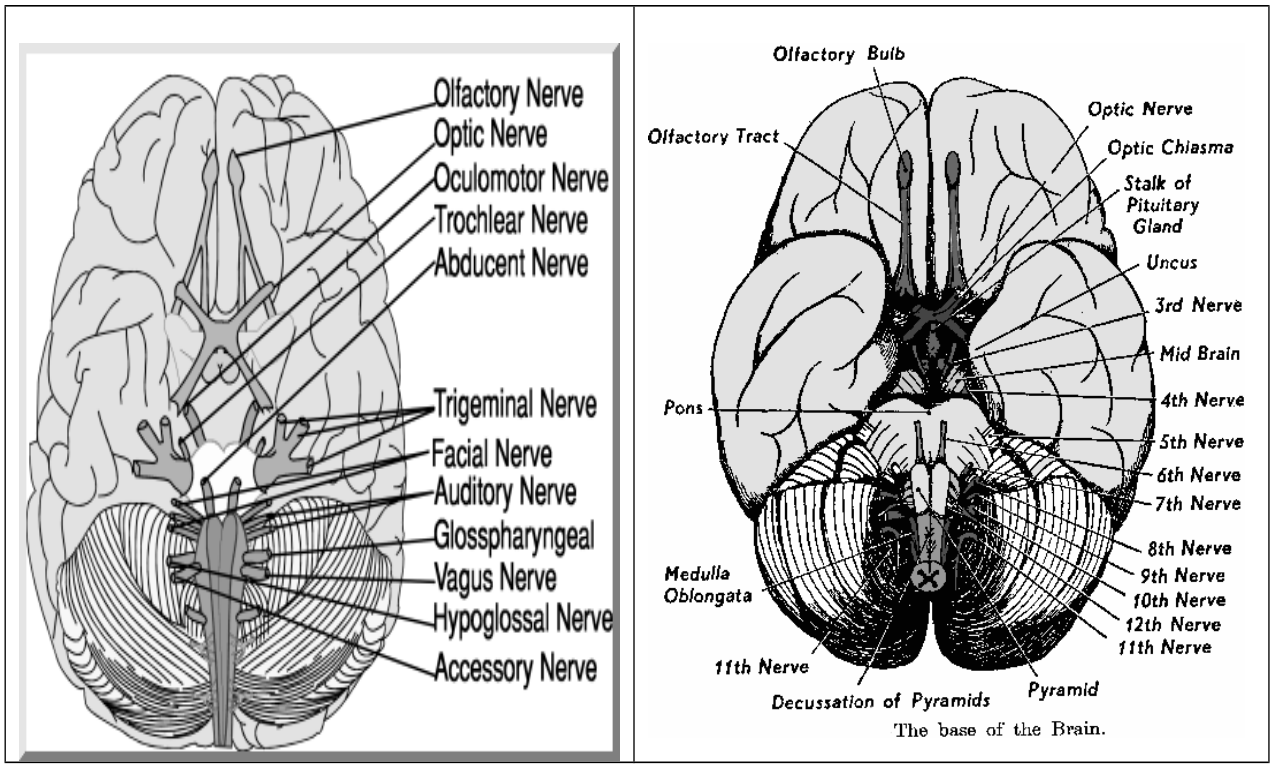
The *Enteric Nervous System* is the third division of the autonomic nervous system. It is a collective mass of nerve fibers that interact with the viscera, which connect and operate the gastrointestinal track, the pancreas, and the gall bladder.

We now turn our focus towards identifying some slight differences between the Central Nervous System and the Peripheral Nervous System. In the central nervous system groups of neurons/fibers are referred to as *nuclei.* In the peripheral nervous system groups of neurons/fibers are referred to as *ganglia*. As well groups of axons are referred to as tracks in the central nervous system, and in the peripheral nervous system they are referred to as nerves.

In the peripheral nervous system neurons/fibers can be divided into three groups. The sensory (afferent) group that carry information into the center of the nervous system from sensory organs and the motor (efferent) group carry the information back out and away from the central nervous system towards the muscle to give it the command and control desired. The second of these peripheral divisions is referred to as the cranial division. It connects the brain to the periphery fibers and to the spinal cord. The third of these is the somatic, which connects the skin and muscles with the central nervous system as well as providing connections to the internal organs from the central nervous system.

The Nervous System of the Brain:

The human brain is truly an independent and amazing structure comprised and made up with millions of cells. All too often we take our brains capabilities for granted. Not only does the brain allow in our ability to think, learn, and process thought but it also acts as the central area of function for the entire body. We see this in the correlation of the cranial nervous system, where more than not true causes/roots of dysfunction take shape and manifest themselves.



From the illustrations above we can see that the there are 12 different pair of cranial nerves.

I the *Olfactory Nerve*; is responsible for smell.

II the *Optic Nerve*; is responsible for vision.

III the *Oculomoter Nerve*; is responsible for eye movement and for pupil dilation.

IV the *Trochlear Nerve*; is responsible for eye movement.

V the *Trigeminal Nerve*; process sensory information, such as touch and pain from the face and head and from the muscles that are used for chewing.

VI the *Abducens Nerve*; is also responsible for eye movement.

VII the *Facial Nerve*; is responsible for the interior 2/3rds of the tongue and is related to taste, as well as sensory information for the ears, and also controls the muscles that are used in facial expressions.

VIII the *Vestibulocochlear Nerve*; is responsible for hearing and balance.

IX the *Glossopharyngeal Nerve*; is responsible for 1/3rd of the taste in the tongue, responsible for processing sensory information from the tongue, the tonsils, and from the pharynx The pharynx is the segment/portion of the neck and throat that is also a part of the respiratory system. It also controls some muscles used in swallowing.

X the *Vagus Nerve*; is responsible for motor functions and the automatic functions of the viscera, which include the heart rate, various glands, and digestion.

XI the *Spinal Accessory Nerve*; is responsible for the control of muscles that are used during head movement.

XII the *Hypoglossal Nerve*; is responsible for controlling the muscles of the tongue.

The structure of the brain is made up of eight different regions, the Medullar, the Ponds, Cerebral Cortex, Cerebellum, Hypothalamus, the Thalamus, the Limbic System, and the Midbrain region.

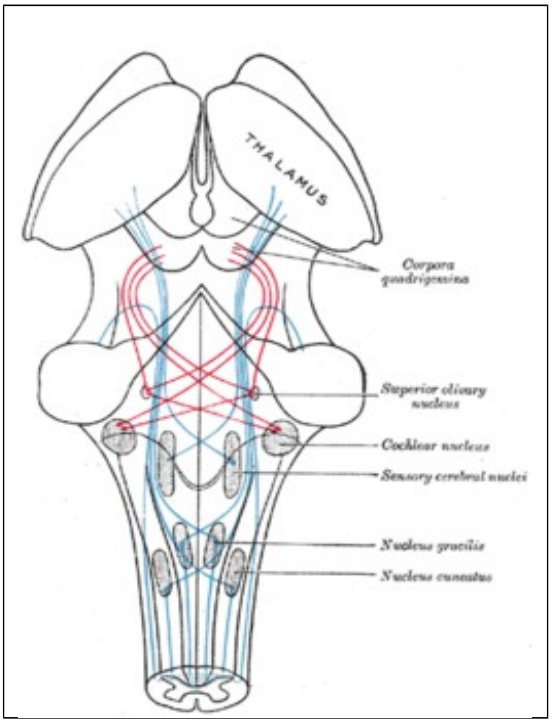
The *Medulla* runs continuously throughout the spinal cord and contains ascending and descending neuron fiber tracks that relay information between the spinal cord and various parts of the brain. The medulla contains three critical centers. The first of which is the carioinhibitory center, which regulates the heart beat. The second is the respiratory center, which regulates the natural rhythm of breathing, and the third is the vasomotor center, which regulates the diameter of the blood vessels. The medulla originate out of five of the cranial nerves, VIII the vestibulocochlear, IX the glossopharyngeal, X the vagus nerve, XI the accessory, and XII the hypoglossal.

There are also various *Pons* in the structure of the brain. Their function is to bridge the connections of the spinal cord with the brain and with each other. The pons originate out of four cranial nerves, V the trigeminal, VI the abducens, VII the facial, and VIII the vestibulocochlear nerve. The pons also contains the pneumotaxic center, which is part of the respiratory center.

The *Cerebral Cortex* functions include the throat, thought, reasoning, perception, language, and voluntary movement. The cerebral cortex is a thin sheet of tissue that makes up the outer layer of the brain. Its thickness varies from 2 to 6 mm. The right and left sides of the cerebral cortex are connected with a thick array of nerve fibers that are referred to as corpus callosum. In the human anatomy the cerebral cortex looks like it has many bumps and grooves in it. These bumps are referred to as *gyrus* and the grooves are referred to as *sulcus*.

The *Cerebellum* operates balance, posture, and movement and is located behind the brainstem. The cerebellum is also divided into two hemispheres and has a cortex that surrounds these hemispheres. The brainstem provides function to ones breathing pattern, the heart rate, and the blood pressure. The brainstem is a general term for the area located between the thalamus and spinal cord. The thalamus is comprised and made up of a series of fibers that are then further subdivided into subparts. The thalamus has mutual functions. It carries blood supply to a number of arteries, including the inferolateral arteries, the polar and paramedian arteries and to posterior arteries, which are sub branches of the posterior cerebral artery. The thalamus also acts

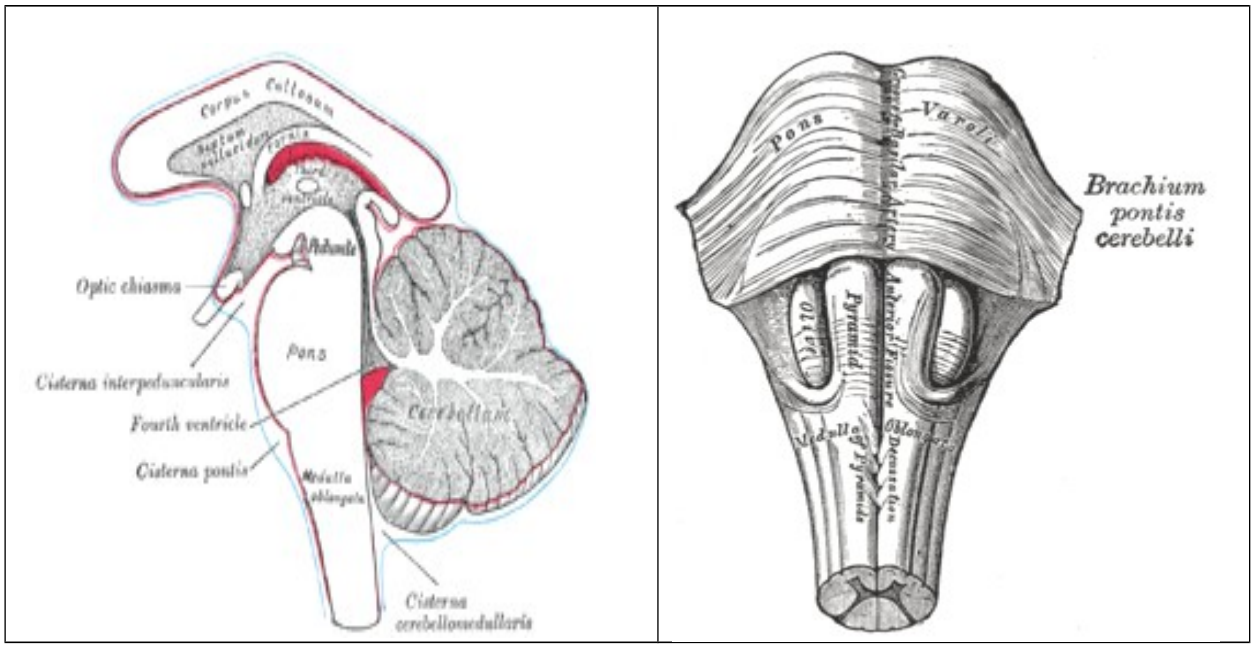
as a translator where variopus neuroligical input signals are processed into a recognizable form that is read by the cortex. It is also well to point out that the thalamic sensory signals reach one or several regions that are located deep inside the cortex. The thalamus also plays a key role in the regulation of sleep and the state of being awake as well as playing a major role in the level of awareness and sentitual arousal activity, lack of this operation is recognized as the state of comatose, or the state of being in a coma.



Elements within the brain stem include the medulla, pons, tecum, reticular, formation, the tegmentum, the cerebral cortex, medullary body, and the basal ganglia.

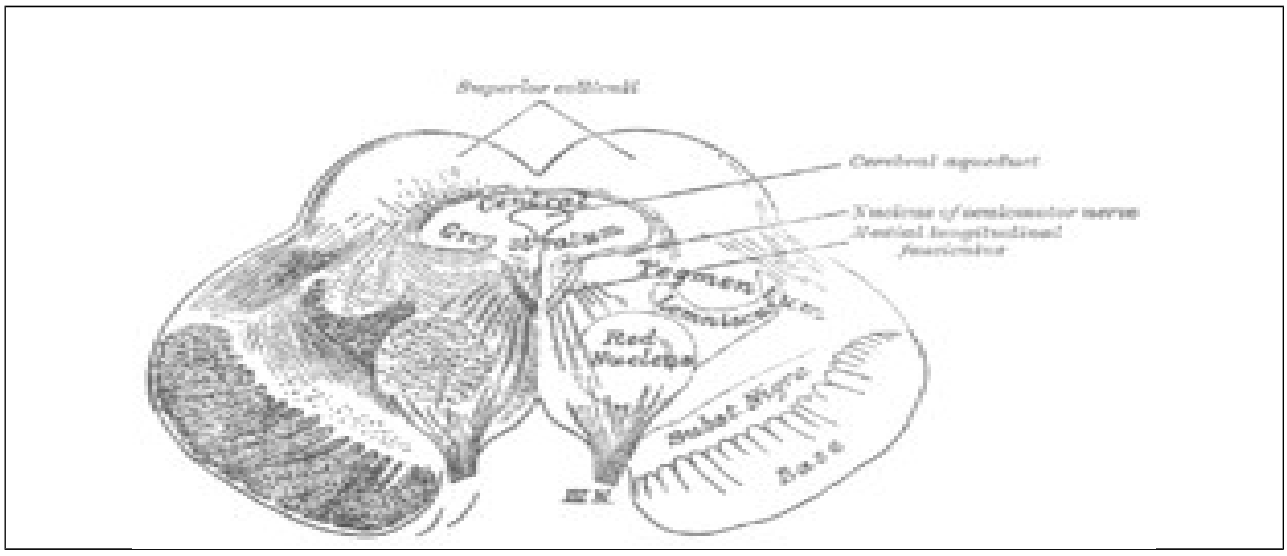
The *Medulla Oblongata* is considered to be the lower portion of the brainstem. It is located above the spinal cord, and below the Pons. The medulla is considered to be divided up into two portions. The first being an open port that is relatively close to the pons and the second is considered to be a closed port and is located further down on the spinal column.

The P*ons* are structures located on the brain stem. The pons are located above the medulla, but below the midbrain section of the central nervous system pons play a critical role in acting as the relays sensory information center between the cerebellum and cerebrum or between the spinal column and the brain.



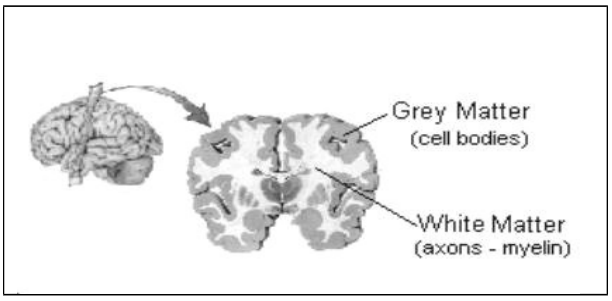
The reticular are fibers that are made up of one or more very thin and delicately woven strands referred to as type III collagen, but for our purposes we will refer to them as thinly woven fiber strands. These fibers build a structured and highly developed ordered network of cellular connections as well as also provide a supportive network of fibers connected to neurons. These fibers then act as the relay system in which signals are transmitted and carried from one point in the body to the next. Such as sensory information from the spinal column to the brain.

The *Tegmentum* is the part of the midbrain that extends from the substantia nigra to the cerebral aqueduct. The tegmentum forms the floor of the midbrain, which surrounds the cerebral aqueduct.



The *Cerebral Cortex* sends electronic signals referred to as connections (efferents) and receiver connections (afferents) from mutual regions of the brain and spinal column, including the thalamus and basal ganglia. The body's ability to have sensory stimulation arrives in the cerebral cortex through different thalamic nuclei. Such as in the case of touch, vision, and sound. The two hemispheres of the cerebral cortex receive information from the opposite sides of the body. For example, the right cortex on the right side of the brain receives information from the left side of the body and the left cortex side of the brain receives information from the right side of the body. This helps us determine which areas control cretin neurological movements and functions. It also helps us determine which areas of the brain that may be under greater pressure or have suffered damage.

The cortex is the outer 2 to 4 mm of the cerebrum it contains and consists of gray matter (cell bodies) and white matter (axons/myelin).

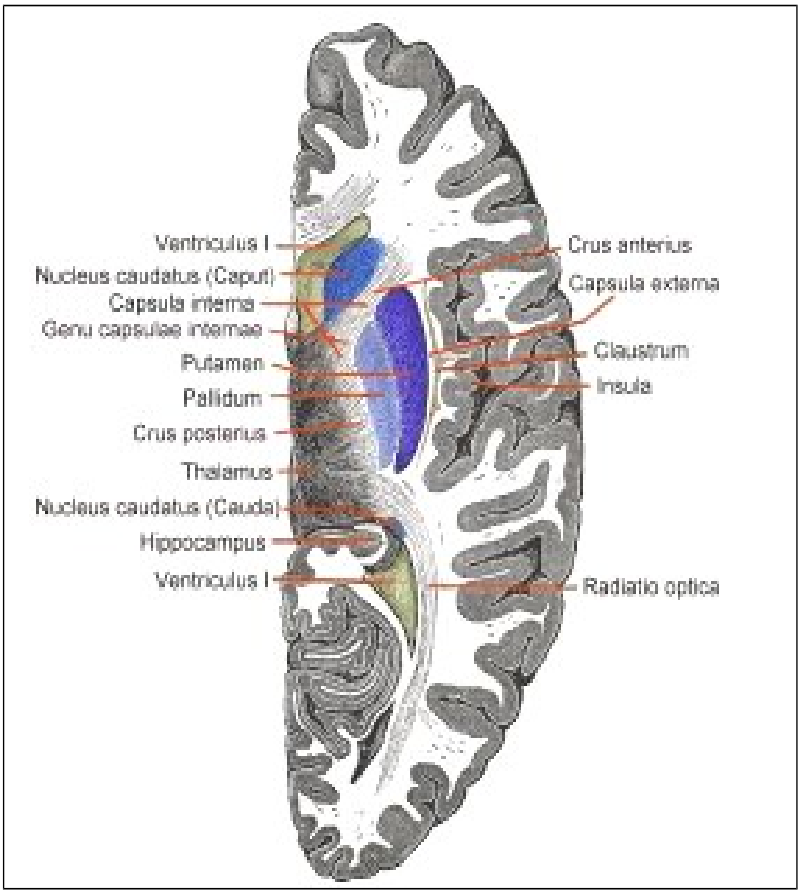


The *Medullary Body* is an inspiratory neuron that is located in the inspiratory center of the medula. Signals to the medullary neuron come from the peripheral chemoreceptors, the carotid body, the aortic body, and the central chemoreceptors. Its prime function is to regulate breathing and breathing patterns.

The *Basal Ganglia* is responsible for the control of voluntary muscle movement. The basal ganglia are groups that include the golbus pallidus, caudat nucleus, subthalamic nucleus, putamen, and the substania nigra.

The *Golbus Pallidus* is one of three nuclei that make up the basal ganglia and is divided into two sections, the globus pallidus externa and the globus pallidus interna. Its main function is to receive input signals from other nuclei that are associated to the nervous system and then acts as a transmitter through the globus pallidus interna to relay/send this information on to other nuclei and to the thalamus.

The caudat nucleus is a telencephalic nucleus that is located within the basal ganglia. The caudate



nuclei's are located near the center of the brain, located in each hemisphere and sit on top of the thalamus. The caudate nucleus was once thought of as the primarily source involved with control and voluntary movement. It is now considered to be a crucial part of the brain's learning process and memory system.

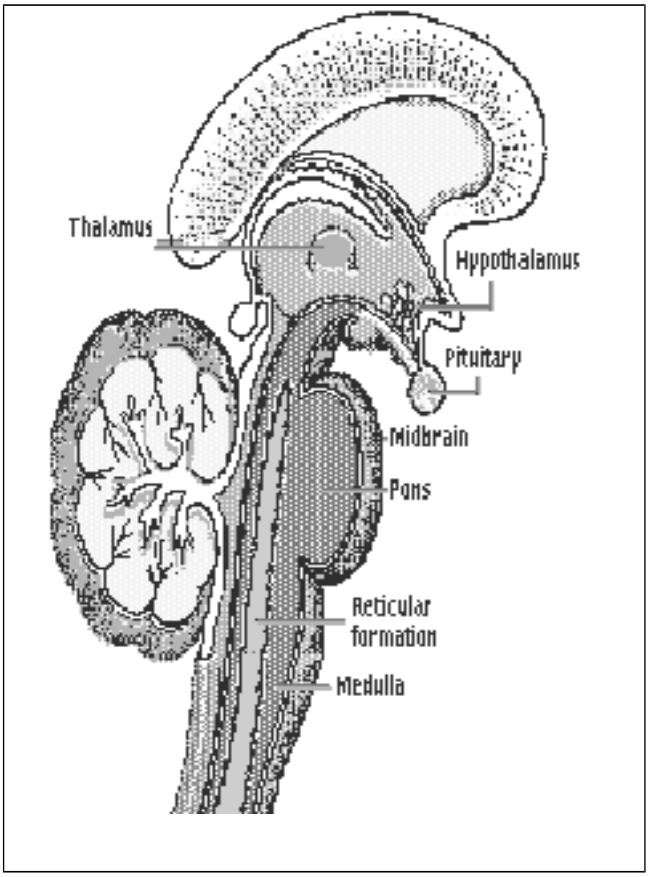
The *Subthalamic Nucleus* is considered to be a small thin lens shaped nucleus and is a part of the basal ganglia system. The subthalamic nucleus is located next to the thalamus and is used to help stimulate and regulate impulse/signal flow to and from the brain and the spinal column.

The *Putamen* is a portion/segment of the basal ganglia that forms the outer part of the lenticular nucleus and it plays a key functional role in ones ability to have reinforced learning capabilities.

The *Substania Nigra* separates the pes (foot) from the tegmentum (covering). The substania nigra is a major portion of the basal ganglia system. It is responsible for the production of

dopamine in the brain. The dopamine neurons are activated by unexpected stimuli, the stimuli act as primary rewards in the absence of predictive stimuli and during the process of learning.

The *Hypothalamus* is responsible for providing function to the regulation of the body



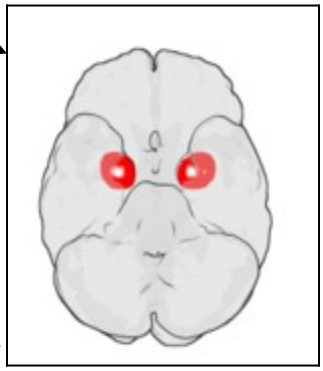
temperature, hunger, thirst, emotions, the pituitary gland, and to the circadian rhythms, natural rhythmic patterns within the body. The hypothalamus also controls the autonomic nervous system; it regulates the reception and sensory impulses from the viscera, the internal organs of the body, and assists as an intermediary between the nervous system and the endocrine system and also is responsible for the regulation of food intake. The hypothalamus is made up of several different areas and it is located at the base of the brain. One of the important functions that the hypothalamus is responsible for is the regulation of the body's temperature, it acts as a thermostat by sending regulating pulses to the brain to either warm or cool the body. When we are too hot the hypothalamus sends singles to the brain that allows the pours/capillaries in the skin to expand, this expansion of pours allows the blood to cool at a faster rate.

The *Thalamus* is responsible for sensory processing and movement and is the relay station for all sensory impulses except for the olfaction, the sense of smell. The thalamus also receives sensory

information and then relays this information to the cerebral cortex. The cerebral cortex also sends information to the thalamus, which then is transmitted into other areas of the brain and spinal cord.

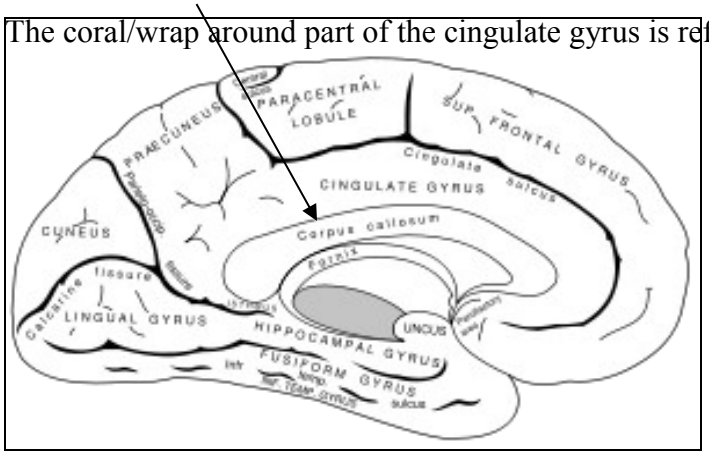
The *Limbic* system is responsible for the control of ones emotions that include aggression, fear, hunger, and regulation of sexual drive and behavior. The limbic system is a group of nuclei and fiber tracks that are located in various parts of the cerebral cortex, the thalamus, and the hypothalamus. The Lumbar system also includes the amygdale, the hippocampus (important for memory), mammillary bodies, and the cingulated gyrus.

The *Amygdale* are a pair of almond shaped neurons located deep inside the temporal lobes of the brain. The amygdale is vital to the ability to process memory and emotional reactions.



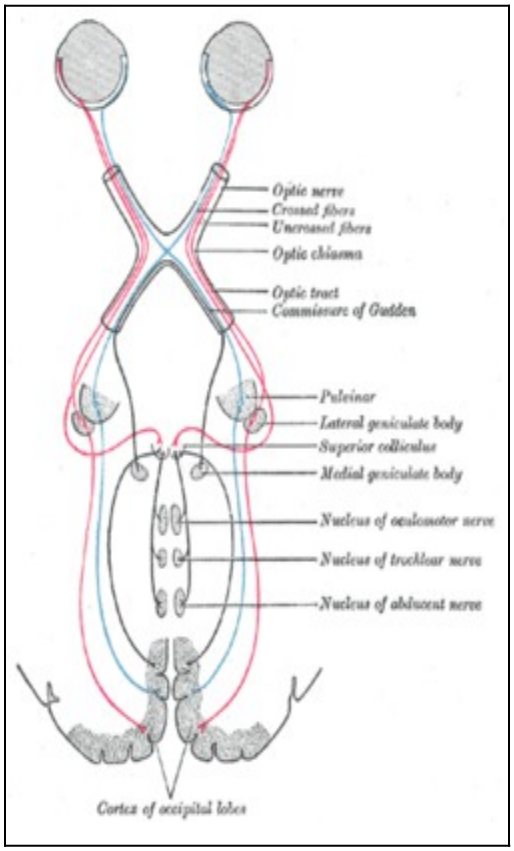
The *Mammillary Bodies* are small, round in shape, and are located on the undersurface of the brain; these mammillary bodies form a portion of the limbic system and contain two groups of nuclei. The *medial mammillary nuclei* and the *lateral mnmmillary nuclei*. The mammillary bodies act as a relay for impulse signals that travel through the brain, the thalamus, and on to the nervous system and spinal cord. The mammillary bodies also play a critical role in the development and retention/recalling of memory and sensory memory movements.

The *Cingulated Gyrus* wraps around the corpus callosum and is located above the cingulate sulcus. The coral/wrap around part of the cingulate gyrus is referred to as the cingulate cortex. The cingulate gyrus receives signals from the anterior nucleus, which is a portion of the thalamus. It also receives signals from the somatosensory areas of the cerebral cortex. The cingulated gyrus then projects/ sends these signals/impulses to the entorhinal cortex via/through the cingulum. The cingulated gyrus functions as an integral part of the limbic system, which is involved with emotion formation and processing, learning, and memory. These specific areas are important for controlling the emotional responses in any given situation. It is



well to note that the *Hippocampus* is responsible for learning and memory and it makes up only one part of the limbic system.

The *Reticular Formation* is responsible for the ability to awakening from sleep and to maintain consciousness. It is located in various portions of the spinal cord, the medulla, pons, midbrain, and in the hypothalamus.

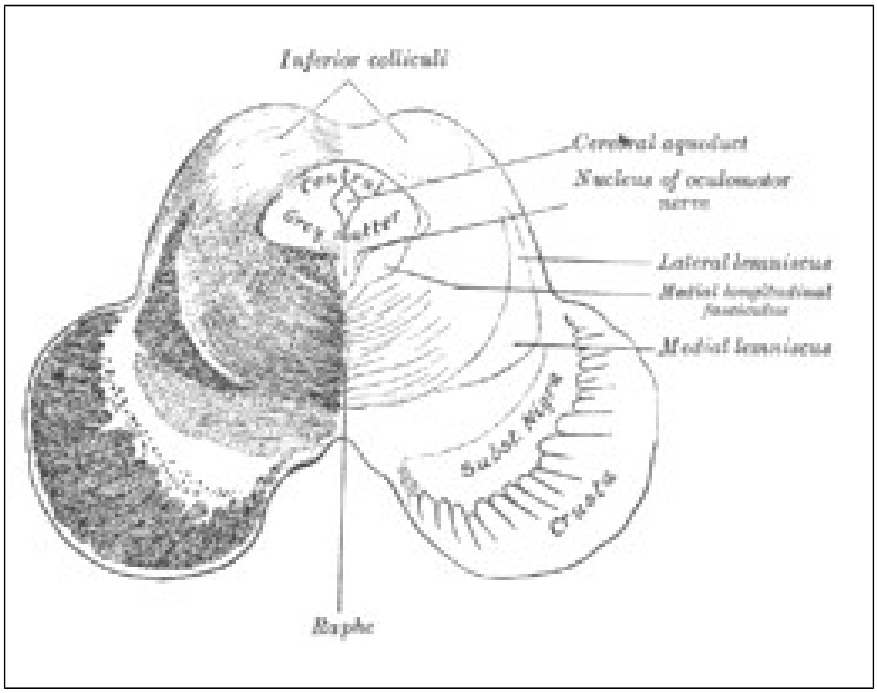


The *Midbrain* is responsible for providing visual reflexes, body movement, eye movement, and is the relay center for auditory/hearing information and are referred to as the corpora quadrigemina. There are two pairs of rounded knobs on the surface of the midbrain these rounded knobs are the corpora quadrigemina, and they contain the centers for certain visual reflexes such as movement in the eyes to be able to view an item as the head rotates/turns. It also contains the hearing reflex center that operates the head in movement towards a sound so that the sound can be picked up and heard better. The midbrain is made up of ascending and descending neuron fiber tracks referred to as cerebral peduncles, and the midbrain is the origin of two cranial nerves, the III cranial nerve, the oculomotor and the IV crainia nerve the trochlear.

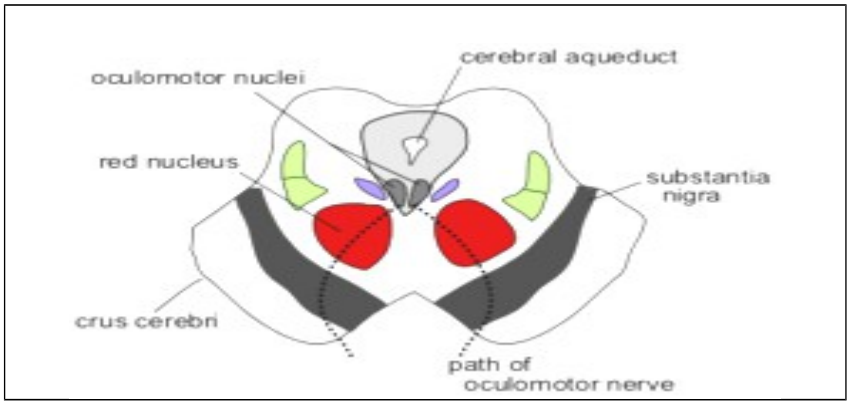
The midbrain also includes the superior and inferior colliculi and the red nucleus. The superior colliculls are located directly below the thalamus and surround the pineal gland. The superior colliculus is indeed involved in the placement of the eye when there are slight adjustments of eye movement and eye-head coordination. The superior colliculus revives visual and auditory impulses/signals in its superficial layers, its outer layers. In the deeper layers of the superior colliculus it is connected and intertwined with the sensorimotor fibers of the brain. Working as a healthy body and as a whole this segment is responsible for the ability of the head and eyes to turn toward something seen or heard.

The *Inferior Colliculi* are located next to the superior colliculus located right above the trochlear nerve. The inferior colliculus is the primary midbrain of the auditory pathway. It receives

impulse signals from several different brain steam nuclei as well as signals from the auditory cortex.



The *Red Nucleus* is located inside the rostral midbrain and is involved in the body's motor coordination. In the human body this motor control is mainly centralized and responsible for the controls and movement capabilities of some of the lower arm and hand movement but its main function is to provide movement control to the upper arms and to the shoulders. It is well to point out that in infancy when a child starts to crawl; this motor function is regulated and controlled by the red nucleus. The red nucleus receives thousands of sensory pulses/signals from the cerebellum and from the body's motor cortex. Once these signals are received the red nucleus then processes and transmits these signals/commands down and out through the spinal cord.



Now that we have a general overview of the cranial nerves we can point out a few important elements that are worth noting. These elements will lead us in a general direction and help us form our ability to understand dysfunction that may in many cases manifest itself in the forms of disabilities. The *Hiatal Hernia Syndrome* is the pinching of the (X) Vagus nerve this pinching restricts the flow of cerebrospinal fluid causing varing degrees of dysfunction. The pinching of this nerve causes the *Vagus Nerve Imbalance* (VNI). This imbalance usually causes hyperexcitability, however there have been cases where decreases in energy flow have occurred. From this imbalance and enhanced state of excitability any given number of organs can begin to tighten/wind up and malfunction. The diaphragm will be directly affected and normal breathing patterns no longer occur. Children with learning disabilities and behavioral disorders, such as Attention Deficit Disorder and Dyslexia almost always have this imbalance. In this case the pinched nerve causes a winding tension that aggravates the body and causes other neurological impulse/information systems to likewise tighten up/tense up, to the point that the individual is wound so tight that you think they were about to break. To unwind the tension in these types of cases gentle massaging of the cranium and adjustments in the spinal column will work wonders, also endonasal/nasal specific will dramatically release this tension and will help unwind and lessen the tension that these individuals are in. Over time as the body unwinds regular breathing patterns will return, directly affecting the functional capabilities of the cranial nerves and the spinal nerves. The results are indeed effective, the individual/child will be able to concentrate better, hold attention, be able to sit for longer periods of time, and their mental reasoning will be able to grow. It is very important to work towards the effects of unwinding the tension in the individual before one is able to help and further enhance their overall development.

The (V) cranial nerve, the Trigeminal Nerve, starts at the base and travels along the front part of the skull as well as it travels along the ear. It forms the ganglion and then separates into three divisions. The *ophthalmic division*, which supplies cerebrospinal fluid to most of the scalp, upper eyelid, cornea, and to the tear glands. The *maxillary division*, which supplies cerebrospinal fluid to the cheek and to the upper jaw, and the *mandibular division*, which supplies cerebrospinal fluid to the tongue, the lower jaw, and to the corresponding jaw muscles. These three branches then separate off into multiple branches or into multiple fibers.

Anesthesia Doloras is when the nerve fibers that provide the ability to touch and feel are damaged, pinched off, and result in lessened sensory feeling or totally eliminated/paralyzed.

This happens in the sensory nerve fiber that allows the sense of touch. However the pain fibers and neurons remain intact. This then leaves the individual with the sensation of numb pain.

Neuropathic Pain is caused by multiple types of strain and damage upon the nervous system, including brain trauma, traumatic brain injuries, inflammation, and exerted pressure that results in intense compression or crushing. Out of these compressions comes the term of *trigeminal neuralgia*, which is the swelling or enlarging of the blood vessels pushing against any given nerve. We see this effect in stress related conditions such as neck pain, headache, and other various traumas that cause blood to flow quickly to a damaged area. Migraines are also caused by the release of biochemical substance referred to as serotonin, which is housed and stored within the blood platelets. The blood vessels narrow when serotonin is released; when the kidneys absorb this fluid into their system the level needed to support optimum brain function is depleted. This causes and results in a strain on the amount of serotonin in the brain, thus causing the blood vessels to expand. This expansion in the blood vessels then puts direct force on the nerve fibers; the result is the formation and actuality of headaches, and migraines. Over 90% of the blood supply that is used to stimulate the brain is drained through our major blood vessels that pass through the jugular, the space between the temporal and occipital cranial plates. Likewise there are three cranial nerves that also pass through the jugular. They are, (IX) the glossopharyngeal, which is responsible for 1/3rd of the taste in the tongue, responsible for processing sensory information from the tongue, the tonsils, and from the pharynx. It also controls some muscles used in swallowing. (X) the vagus, which is responsible for motor functions and the automatic functions of the viscera, which include the heart rate, various glands, and digestion and the (XI) spinal accessory, which is responsible for the control of muscles that are used during head movement. At this point it is worth while to mention that the vagus nerve also goes on to provide function and control to the sensations, activities and function of many of the bodies organs and movements. Some of them include breathing, respiratory function, circulation, and digestion. When the blood vessels that pass through the jugular are agitated it pressurizes the nerves that also pass through the jugular, when this happens dysfunction sets in The breathing pattern is so important to point out here, do to the fact that it is absolutely critical to have optimum respiratory function in order to maintain homeostasis and equality, stimulation, and proper nerve and neuron/fiber function throughout the body. In short, the lack of optimum breathing leads to lessened respiratory patterns, which then leads to lessened articulation in the vomer bone and directly affects the sphenoid cranial plate. When this happens the master gland decreases its pulsation of cerebrospinal fluid, due to the decrease rocking movement in the

vomer bone. This decrease in respiratory function then causes the secretion of the master gland, the cerebrospinal fluid to decrease in rotation and proper flow throughout the entire nervous system, which in turn decreases the neuron/fiber ability to properly function. Out of this, this author knows of two things that can set in. The body starts to tighten/wind up, creating unnecessary tension, anxiety, and hypertension. The second is that dysfunctions start to work against the normal flow and development of the body, causing cramps, arthritis, and paralysis, loss of feeling, decreased motor skills, and loss of optimum function in the bodily organs, such as the kidneys, the bladder, and decreased feeling in the bowels or in the colon.

A crucial and essential part of the nervous system is the *neurotransmitters,* which, are chemically based and allow the nerves to send and receive electronic pulse signals amongst themselves. The neurotransmitters flow across the gaps between adjacent cranial nerves as well as flow throughout the cerebrospinal fluid. This then allows those nerves and neurons/fibers in the farthest corners of the spinal column the ability to communicate with one another.

We know that the brain is like a sponge, soaking up information also soaking up functioning materials such as the blood and various chemicals needed to stimulate the brain and the brains growth. Under normal condition's the brain expands and contracts in its own rhythmic pattern in relation to the inner energy that is housed within our being. This expansion and contraction are referred to rhythmic cycles that occur every 10 to 14 time a minute, it can be argued that the rhythmic patterns can fluctuate or speed up or have more cycles when the brain is highly active. Such as in hypertension/erotic behavior caused by irregular cycle flow, which is excessive expanding and contracting is actually caused by improper respiratory patterns. The motion of the brain in these recurring cycle patterns, have been observed many times by neurosurgeons. In the process of expansion and contraction, cerebrospinal fluid is taken in through the cavities of the brain and then squeezed out into the spinal column. This then provides a constant fluctuation and flow of cerebrospinal fluid throughout the brain and spinal column. There are roughly only 5 ounces of cerebrospinal fluid, which is a clear blood type liquid that serves to protect, nourish, suspend, and lubricate the nervous system. The cerebrospinal fluid also carries away wastes from the cells in the central nervous system. Cerebrospinal fluid provides 60% of the needed nourishment for the spinal nerves in the lower back alone. In short the impulses from the brain the expanding and contracting, the pumping of blood, body movement, and the repertory breathing pattern all help stimulate and transmit/carry the cerebrospinal fluid to and through the joint/membranes to various parts of the body.

Interference with the natural flow of cerebrospinal fluid is the main cause for dysfunction in the human body. Every function of our bodies depends on some neurological impulse that is generated within the brain. When there is no impulse created or if the impulse is weak then the spinal column has little to nothing to go on, and signals needed to support the organ functions of the body are hindered or damaged. A couple of elements that can affect this balance and optimum function occur in brain injuries such as in brain swelling. Brain swelling can occur in many forms, including adverse impact from an outside force, such as falling down the stairs, or getting hit in the head. Brain swelling is also caused by fever, and chemical imbalance, that result in expanded blood vessels. Also the key relation to the brain not functioning properly, in many if not all cases is the imbalance of the head in relation to the spinal cord, as well tied to this is the relation of the cranial plates. If the cranial plates are compressed, locked, or fused the brain still try's to expand and contract. In doing so the brain keeps pushing into locked cranial plates unable to fully expand and this puts direct pressure not only on the blood vessels but more so, on the nerves that are housed within the brain. The effect is nothing short than a chain reaction throughout the body. Because of the locked or compressed cranial plate's the brain presses on the nerves and likewise is unable to properly and adequately feed the nervous system with cerebrospinal fluid. The end result is complete dysfunction and in server cases the shutting down of bodily functions, or the paralysis of these functions, including complete or partial paralysis of feeling, and limb movement, due to the drying out of pinched nerves. We see these symptoms most noticeably observed in individuals and children with cerebral palsy.

Cranial subluxation occurs when one or more of the 8 cranial plates becomes locked, stuck, compressed, or fused with another cranial plate. Subluxation can occur in and on any given segment along the cranial faults, where the joints /membrane are. The resulting lockups restrict the cycle function of the brain and puts pressure on the brain as well as the brainstem. There are many ways that the cranial plates can become locked or stuck together and are usually caused by head injuries. Such as *Chronic Regional Encephalitis*, which is the swelling of various regions in the brain, birth trauma, football impacts, auto accidents, falls from just about anything, like falling off a horse, a bike or falling down a set of stairs, lack of oxygen, an elevation in blood pressure, and inflamed or damaged brain tissue. Even just a regular old fall could jar the spine enough to offset the brainstem and cause subluxation in various regions of the cranial plates. In this instance the tension would be most noticeable/predominant in the occipital, where the occipital membrane/joints connect with the parietal cranial plate and where the occipital membrane/joints connect with the sphenoid. The resulting symptom feels like a light pressure

has been placed upon that region of the head making it feel heavier than the rest of the head. If not corrected and treated it will in time usually within a few months start to manifest itself as joint dysfunction and nervous dysfunction in other parts of not only the spine but also in other parts of the body. In this authors case this was noticeable in the paralysis and re-stiffening of the legs as well as lessened feeling capabilities when it was time to make a bowel movement.

Neurotoxins such as chemical, common house hold cleaners, medical approved drugs, other various drugs, uppers, snuffers, and various metals, solvents, dental fillings, food additives, and perfumes can also effect the function of proper brain cycles. Because of this it is strongly recommended to use plenty of fresh or circulating air when working with neurotoxins. Infections also can cause disruptions in proper respiratory and brain cycle patterns. The common cold is one of the biggest factors due to the increased body temperature or the lack there of and the lack of proper breathing respiratory function. Bacterial viruses such as molds and yeast also contribute to dysfunction and improper pulsating cycles of the brain.

Cranial and Spinal sacral nerves are the primary automatic controls that operate all of the body's sense, the movement of its organs, and the secretion of the glands. The nervous system, the peripheral nerves, and the spinal column are the master coordination and the main control center for the body. Sometimes there may be added stress in any given part of the body, this then causes the neurons/fibers to either swell, or become pinched. There may even be instances where the neurons/fibers are dried out do to subdexation in the cranium level, thus interfering with the flow of cerebrospinal fluid. The lack of this fluid then deprives the nervous system of its required nutrients, and thus alters the function of the nervous system in tern alters the function of the entire body, and many times manifests itself in reduced mobility and in the form of aches and pain. The ability for the nervous system to function properly is determined by the flow of not only blood but also the flow of cerebrospinal fluid. The locking or compression, extra strain on a joint/membrane results in compression and extra pressure upon the nerve fiber. This pressure then causes restraint and interference with the normal transfer of not only information to and from various parts of the body through the neuron fibers but also decreases the cerebrospinal fluid that lubricates and feeds these fibers. This nerve interference causes a breakdown in the communication link between the brain and the ending desired location, such as the liver, pancreas, intestines, lungs, eyes, ears, or muscles that control mobility just to name a few. These nerve pressures are referred to as subdexations and the causes of the nerve pressure is usually do to misaligned bones or stuck joints/membranes in various locations throughout the cranial plates

and spinal column. These subluxations are the reasons for loss of normal joint movement, because interference in nerve and neuron/fiber signals and in many cases can be corrected with gentle therapeutic chiropractic adjustments, applied controlled force to a specific area of the body that allows the joint to unlock, usually with a popping sound. This restores normal motion, in a locked vertebrae, and also releases the built up tension that was interfering with proper bodily function, such as in bladder control. This applied controlled force is non surgical and even though recovery time varies from person to person the results are long lasting, many times permanent and in many cases recovery is instant. [7, 13, 29]