The cranial nerves are 12 pairs of nerves that can be seen on the ventral (bottom) surface of the brain. Some of these nerves bring information from the sense organs to the brain; other cranial nerves control muscles; other cranial nerves are connected to glands or internal organs such as the heart and lungs.

I. Olfactory nerve

The olfactory nerve sends sensory information to your brain about smells that you encounter.

When you inhale molecules with a scent, known as aromatic molecules, they dissolve in a moist lining at the roof of your nasal cavity.

This lining is called the olfactory epithelium. It stimulates receptors that generate nerve impulses that move to your olfactory bulb. Your olfactory bulb is an oval-shaped structure that contains specialized groups of nerve cells.

From the olfactory bulb, nerves pass into your olfactory tract, which is located below the frontal lobe of your brain. Nerve signals are then sent to areas of your brain concerned with memory and recognition of smells.

II. Optic nerve

The optic nerve is the sensory nerve that involves vision.

When light enters your eye, it comes into contact with special receptors in your retina called rods and cones. Rods are found in large numbers and are highly sensitive to light. They're more specialized for black and white or night vision.

Cones are present in smaller numbers. They have a lower light sensitivity than rods and are more involved with color vision.

The information received by your rods and cones is sent from your retina to your optic nerve. Once inside your skull, both of your optic nerves meet to form something called the optic chiasm. At the optic chiasm, nerve fibers from half of each retina form two separate optic tracts.

Through each optic tract, the nerve impulses eventually reach your visual cortex, which then processes the information. Your visual cortex is located in the back part of your brain.

III. Oculomotor nerve

The oculomotor nerve has two different motor functions: muscle function and pupil response.

- **Muscle function.** Your oculomotor nerve provides motor function to four of the six muscles around your eyes. These muscles help your eyes move and focus on objects.
- **Pupil response.** It also helps to control the size of your pupil as it responds to light.

This nerve originates in the front part of your midbrain, which is a part of your brainstem. It moves forward from that area until it reaches the area of your eye sockets.

IV. Trochlear nerve

The trochlear nerve controls your superior oblique muscle. This is the muscle that's in charge of downward, outward, and inward eye movements.

It emerges from the back part of your midbrain. Like your oculomotor nerve, it moves forward until it reaches your eye sockets, where it stimulates the superior oblique muscle.

V. Trigeminal nerve

The trigeminal nerve is the largest of your cranial nerves and has both sensory and motor functions.

The trigeminal nerve has three divisions, which are:

- **Ophthalmic.** The ophthalmic division sends sensory information from the upper part of your face, including your forehead, scalp, and upper eyelids.
- **Maxillary.** This division communicates sensory information from the middle part of your face, including your cheeks, upper lip, and nasal cavity.
- **Mandibular.** The mandibular division has both a sensory and a motor function. It sends sensory information from your ears, lower lip, and chin. It also controls the movement of muscles within your jaw and ear.

The trigeminal nerve originates from a group of nuclei — which is a collection of nerve cells — in the midbrain and medulla regions of your brainstem. Eventually, these nuclei form a separate sensory root and motor root.

The sensory root of your trigeminal nerve branches into the ophthalmic, maxillary, and mandibular divisions.

The motor root of your trigeminal nerve passes below the sensory root and only connects to the mandibular division.

VI. Abducens nerve

The abducens nerve controls another muscle that's associated with eye movement called the lateral rectus muscle. This muscle is involved in outward eye movement. For example, you would use it to look to the side.

This nerve, also called the abducens nerve, starts in the pons region of your brainstem. It eventually enters your eye socket, where it controls the lateral rectus muscle.

VII. Facial nerve

The facial nerve provides both sensory and motor functions, including:

- moving muscles used for facial expressions as well as some muscles in your jaw
- providing a sense of taste for most of your tongue
- supplying glands in your head or neck area, such as salivary glands and tear-producing glands
- sending sensations from the outer parts of your ear

Your facial nerve has a very complex path. It originates in the pons area of your brainstem, where it has both a motor and sensory root. Eventually, the two nerves fuse together to form the facial nerve.

Both within and outside of your skull, the facial nerve branches further into smaller nerve fibers that stimulate muscles and glands or provide sensory information.

VIII. Vestibulocochlear nerve

Your vestibulocochlear nerve has sensory functions involving hearing and balance. It consists of two parts, the cochlear portion and vestibular portion:

- **Cochlear portion.** Specialized cells within your ear detect vibrations from sound based on the sound's loudness and pitch. This generates nerve impulses that are sent to the cochlear nerve.
- **Vestibular portion.** Another set of special cells in this portion can track both linear and rotational movements of your head. This information is transmitted to the vestibular nerve and used to adjust your balance and equilibrium.

The cochlear and vestibular portions of your vestibulocochlear nerve originate in separate areas of the brain.

The cochlear portion starts in an area of your brain called the inferior cerebellar peduncle. The vestibular portion begins in your pons and medulla. Both portions combine to form the vestibulocochlear nerve.

IX. Glossopharyngeal nerve

The glossopharyngeal nerve has both motor and sensory functions, including:

- sending sensory information from your sinuses, the back of your throat, parts of your inner ear, and the back part of your tongue
- providing a sense of taste for the back part of your tongue
- stimulating voluntary movement of a muscle in the back of your throat called the stylopharyngeus

The glossopharyngeal nerve originates in a part of your brainstem called the medulla oblongata. It eventually extends into your neck and throat region.

X. Vagus nerve

The vagus nerve is a very diverse nerve. It has both sensory and motor functions, including:

- conveying sensation information from your ear canal and parts of your throat
- sending sensory information from organs in your chest and trunk, such as your heart and intestines
- allowing motor control of muscles in your throat
- stimulating the muscles of organs in your chest and trunk, including those that move food through your digestive tract
- providing a sense of taste near the root of your tongue

Out of all of the cranial nerves, the vagus nerve has the longest pathway. It extends from your head all the way into your abdomen. It originates in the part of your brainstem called the medulla.

XI. Accessory nerve

Your accessory nerve is a motor nerve that controls the muscles in your neck. These muscles allow you to rotate, flex, and extend your neck and shoulders.

It's divided into two parts: spinal and cranial. The spinal portion originates in the upper part of your spinal cord. The cranial part starts in your medulla oblongata.

These parts meet briefly before the spinal part of the nerve moves to supply the muscles of your neck. The cranial part follows the vagus nerve.

XII. Hypoglossal nerve

Your hypoglossal nerve is the 12th cranial nerve. It's responsible for the movement of most of the muscles in your tongue.

It starts in the medulla oblongata and moves down into the jaw, where it reaches the tongue.