

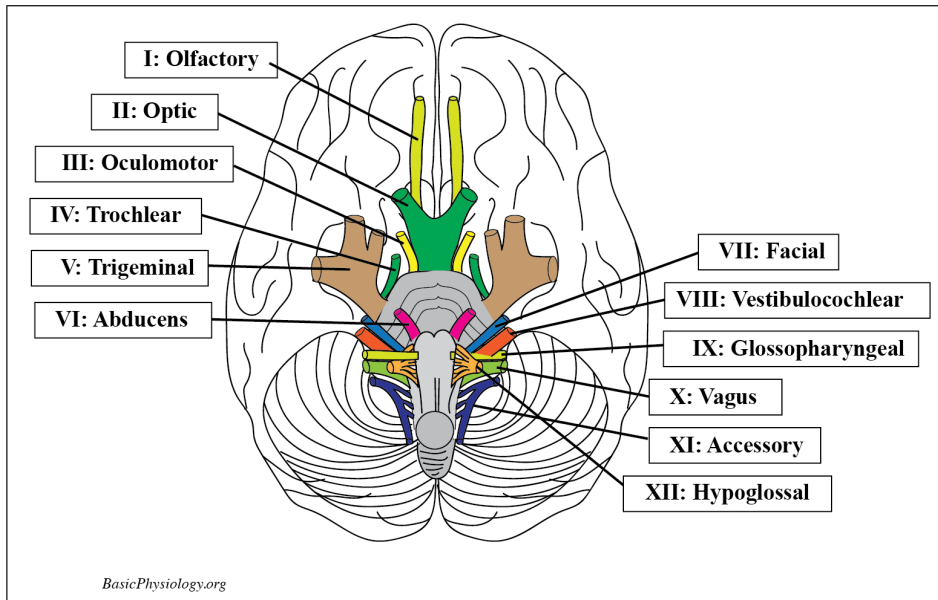
## H.2.2. Cranial Nerves

### A. Cranial Nerves:

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| 1.<br>There are numerous connections between the (central) brain and the body but one of the most important ones are the <b>cranial nerves</b> . | 2.<br>As the name implies, these are nerves that come from the cranium (= skull), hence the name 'cranial'.               |
| 3.<br>There are <b>12</b> pairs of cranial nerves!                                                                                               | 4.<br>Pairs? Yes, every cranial nerve comes as a pair; left and right. So, in fact, we have a total of 24 cranial nerves. |

5. These are the 12 cranial nerve pairs:

|                        |                                |                             |
|------------------------|--------------------------------|-----------------------------|
| I – Olfactory nerve    | V – Trigeminal nerve           | IX – Glossopharyngeal nerve |
| II – Optic nerve       | VI – Abducens nerve            | X – Vagal nerve             |
| III – Oculomotor nerve | VII – Facial nerve             | XI – Accessory nerve        |
| IV – Trochlear nerve   | VIII – Vestibulocochlear nerve | XII – Hypoglossal nerve     |

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| 6.<br>Whew! That's a lot! And, of course, we have to discuss them ...                                      | 7.<br>I drew a picture of all these nerves where they emerge from the bottom of the brain.   |
|                        |                                                                                              |
| 8.<br>You don't have to remember all these structures (unless you want to become a cranial nerve doctor!). | 9.<br>The idea is just to show you how all these nerves come out of the bottom of the brain. |

**B. The function of all 12 cranial nerves; one by one!**

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I: Olfactory nerve:            | This is a sensory nerve bundle that connects the sensory cells in your nose to the olfactory bulb in the brain.                                                                                                                                                                                                                                                                                                                                                                        |
| II: Optic nerve:               | This is a sensory nerve bundle that connects the light receptors in your eye (retina) to the visual cortex, located in the back of the brain.                                                                                                                                                                                                                                                                                                                                          |
| III: Oculomotor nerve:         | This is a motor nerve bundle, from the midbrain, to the eye (=oculo) that controls a) eye movements and b) pupil diameter                                                                                                                                                                                                                                                                                                                                                              |
| IV: Trochlear nerve:           | This is also a motor nerve bundle, also from the midbrain, that controls the oblique movements (downward, out- and inward view) of the eye.                                                                                                                                                                                                                                                                                                                                            |
| V: Trigeminal nerve:           | As you can guess (=tri!); this cranial nerve consists of <b>three</b> separate bundles: <ul style="list-style-type: none"> <li>a. Ophthalmic: sensory signals from the upper part of your face, around the eyes</li> <li>b. Maxillary: sensory signals from the middle part of your face, cheek and upper lip</li> <li>c. Mandibular: sensory signals from the lower part of your face, chin, lower lip and ears but also has a motor function of your jaw muscles and ear.</li> </ul> |
| VI: Abducens nerve:            | This is a motor nerve bundle that controls the outward movements of the eye (abduct= move away from the axis of the body).                                                                                                                                                                                                                                                                                                                                                             |
| VII: Facial nerve:             | This nerve provides both sensory and motor functions such as: <ul style="list-style-type: none"> <li>a. Contracting several muscles in the face and jaw</li> <li>b. Innervating glands such as the salivary glands and tears</li> <li>c. Innervating taste sensors in the tongue</li> <li>d. Sensory information from the skin of the ear</li> </ul>                                                                                                                                   |
| VIII: Vestibulocochlear nerve: | This nerve consists of two sensory parts: <ul style="list-style-type: none"> <li>a. the cochlear part; sensory information about the sound from your ear</li> <li>b. the vestibular part; transmits information about your movements of your head</li> </ul>                                                                                                                                                                                                                           |

|                             |                                                                                                                                                                                                                                                                                                                                                 |
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| IX: Glossopharyngeal nerve: | This nerve consists of both sensory and motor functions: <ul style="list-style-type: none"> <li>a. sensory information from the throat, from the sinuses in the skull and part of the tongue</li> <li>b. stimulating the stylopharyngeus muscles in your throat</li> </ul>                                                                      |
| X: Vagus nerve:             | Contains also both sensory and motor nerves: <ul style="list-style-type: none"> <li>a) sensory information from the ear canals</li> <li>b) sensory information from heart and intestines</li> <li>c) motor control of the throat muscles</li> <li>d) motor control of the intestines</li> <li>e) sensory information from the tongue</li> </ul> |
| XI: Accessory nerve:        | Motor nerve that controls the muscles in the neck                                                                                                                                                                                                                                                                                               |
| XII: Hypoglossal nerve:     | Motor nerve that controls the movements of the tongue                                                                                                                                                                                                                                                                                           |

### C. What are the most important cranial nerves?

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| 1.<br>Whowww! That's a lot of nerves! Do we have to know all of them? <b>NO</b> .                                                    | 2.<br>Unless you want to become a cranial nerve specialist, most 'medical persons' only know/remember a few cranial nerves.                     |
| 3.<br>It depends very much on your speciality which nerves are really important, just like anything else in medical sciences.        | 4.<br>For the basic physiologist, I have listed those nerves that are most prominent in our field.                                              |
| content5.<br>These are (in my mind) the most important cranial nerves:<br>X: Vagus nerve<br>II: Optical nerve<br>I: Olfactory nerve  | 6.<br>The vagus nerve (X) is so crucial to our body function that I have dedicated a special page for this nerve ( <i>coming ....</i> ).        |
| 7.<br>The optical nerve (II) is also very important and quite complicated which necessitated another page! ( <i>H.4.1. Vision</i> ). | 8.<br>The olfactory nerve (I) is much simpler and easier but important too; therefore, another dedicated page ( <i>H.4.4. Taste and Smell</i> ) |