

Each spinal nerve receives a gray ramus communicans from the sympathetic trunk, but white rami are not supplied by all the spinal nerves. White rami are derived from the first thoracic to the first lumbar nerves inclusive, while the visceral branches which run from the second, third, and fourth sacral nerves directly to the pelvic plexuses of the sympathetic belong to this category. The fibers which reach the sympathetic through the white rami communicantes are medullated; those which spring from the cells of the sympathetic ganglia are almost entirely non-medullated. The sympathetic nerves consist of efferent and afferent fibers, the origin and course of which are described on page 920).

The **three great gangliated plexuses** (*collateral ganglia*) are situated in front of the vertebral column in the thoracic, abdominal, and pelvic regions, and are named, respectively, the **cardiac**, the **solar** or **epigastric**, and the **hypogastric plexuses**. They consist of collections of nerves and ganglia; the nerves being derived from the sympathetic trunks and from the cerebrospinal nerves. They distribute branches to the viscera.

Development.—The ganglion cells of the sympathetic system are derived from the cells of the neural crests. As these crests move forward along the sides of the neural tube and become segmented off to form the spinal ganglia, certain cells detach themselves from the ventral margins of the crests and migrate toward the sides of the aorta, where some of them are grouped to form the ganglia of the sympathetic trunks, while others undergo a further migration and form the ganglia of the prevertebral and visceral plexuses. The ciliary, sphenopalatine, otic, and submaxillary ganglia which are found on the branches of the trigeminal nerve are formed by groups of cells which have migrated from the part of the neural crest which gives rise to the semilunar ganglion. Some of the cells of the ciliary ganglion are said to migrate from the neural tube along the oculomotor nerve.

THE CEPHALIC PORTION OF THE SYMPATHETIC SYSTEM (PARS CEPHALICA S. SYMPATHICI).

The **cephalic portion** of the sympathetic system begins as the **internal carotid nerve**, which appears to be a direct prolongation of the superior cervical ganglion. It is soft in texture, and of a reddish color. It ascends by the side of the internal carotid artery, and, entering the carotid canal in the temporal bone, divides into two branches, which lie one on the lateral and the other on the medial side of that vessel.

The **lateral branch**, the larger of the two, distributes filaments to the internal carotid artery, and forms the **internal carotid plexus**.

The **medial branch** also distributes filaments to the internal carotid artery, and, continuing onward, forms the **cavernous plexus**.

The **internal carotid plexus** (*plexus caroticus internus; carotid plexus*) is situated on the lateral side of the internal carotid artery, and in the plexus there occasionally exists a small gangliform swelling, the **carotid ganglion**, on the under surface of the artery. The internal carotid plexus communicates with the semilunar ganglion, the abducent nerve, and the sphenopalatine ganglion; it distributes filaments to the wall of the carotid artery, and also communicates with the tympanic branch of the glossopharyngeal nerve.

The communicating branches with the abducent nerve consist of one or two filaments which join that nerve as it lies upon the lateral side of the internal carotid artery. The communication with the sphenopalatine ganglion is effected by a branch, the **deep petrosal**, given off from the plexus on the lateral side of the artery; this branch passes through the cartilage filling up the foramen lacerum, and joins the greater superficial petrosal to form the nerve of the pterygoid canal (*Vidian nerve*), which passes through the pterygoid canal to the sphenopalatine ganglion.