

The **Spinal Ganglia** (*ganglion spinale*) are collections of nerve cells on the posterior roots of the spinal nerves. Each ganglion is oval in shape, reddish in color, and its size bears a proportion to that of the nerve root on which it is situated; it is bifid medially where it is joined by the two bundles of the posterior nerve root. The ganglia are usually placed in the intervertebral foramina, immediately outside the points where the nerve roots perforate the dura mater, but there are exceptions to this rule; thus the ganglia of the first and second cervical nerves lie on the vertebral arches of the atlas and axis respectively, those of the sacral nerves are inside the vertebral canal, while that on the posterior root of the coccygeal nerve is placed within the sheath of dura mater.

**Structure** (Fig. 638).—The ganglia consist chiefly of unipolar nerve cells, and from these the fibers of the posterior root take origin—the single process of each cell dividing after a short course into a central fiber which enters the medulla spinalis and a peripheral fiber which runs into the spinal nerve. Two other forms of cells are, however, present, viz.: (a) the cells of Dogiel, whose axons ramify close to the cell (type II, of Golgi), and are distributed entirely within the ganglion; and (b) multipolar cells similar to those found in the sympathetic ganglia.

The ganglia of the first cervical nerve may be absent, while small *aberrant ganglia* consisting of groups of nerve cells are sometimes found on the posterior roots between the spinal ganglia and the medulla spinalis.

Each nerve root receives a covering from the pia mater, and is loosely invested by the arachnoid, the latter being prolonged as far as the points where the roots pierce the dura mater. The two roots pierce the dura mater separately, each receiving a sheath from this membrane; where the roots join to form the spinal nerve this sheath is continuous with the epineurium of the nerve.

**Size and Direction.**—The roots of the upper four *cervical* nerves are small, those of the lower four are large. The posterior roots of the cervical nerves bear a proportion to the anterior of three to one, which is greater than in the other regions; their individual filaments are also larger than those of the anterior roots. The posterior root of the first cervical is an exception to this rule, being smaller than the anterior root; in eight per cent. of cases it is wanting. The roots of the first and second cervical nerves are short, and run nearly horizontally to their points of exit from the vertebral canal. From the second to the eighth cervical they are directed obliquely downward, the obliquity and length of the roots successively increasing; the distance, however, between the level of attachment of any of these roots to the medulla spinalis and the points of exit of the corresponding nerves never exceeds the depth of one vertebra.

The roots of the *thoracic* nerves, with the exception of the first, are of small size, and the posterior only slightly exceed the anterior in thickness. They increase successively in length, from above downward, and in the lower part of the thoracic

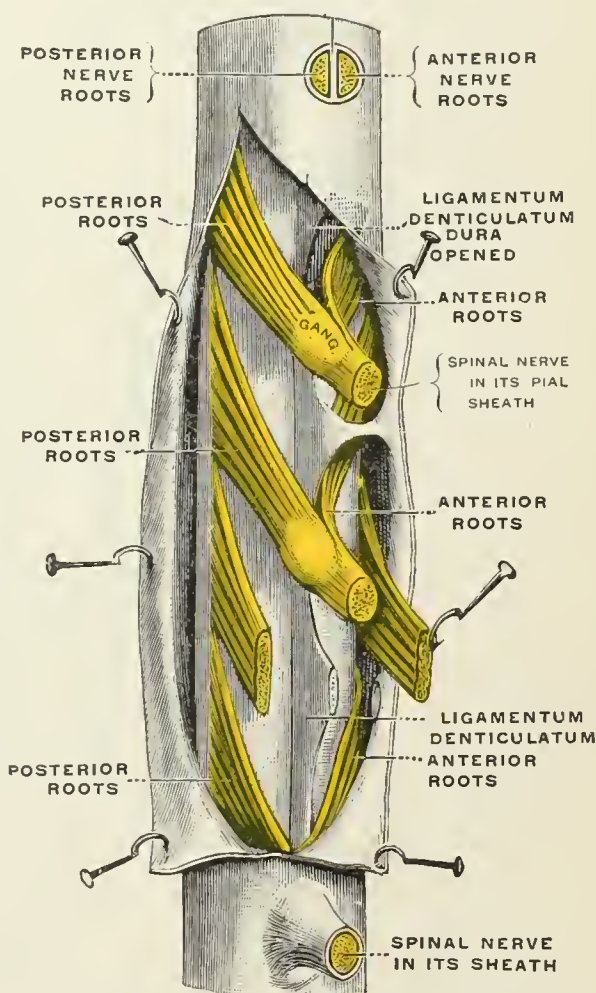


FIG. 796.—A portion of the spinal cord, showing its right lateral surface. The dura is opened and arranged to show the nerve roots. (Testut.)