

the anterior nerve roots, by which they are carried to the sympathetic nerves: they constitute the white rami and are sympathetic or visceral efferent fibers; they are also known as **preganglionic fibers of the sympathetic system**; the axons of others pass into the anterior and lateral funiculi, where they become longitudinal.

Nerve Cells in the Posterior Column.—1. The **dorsal nucleus** (*nucleus dorsalis; column of Clarke*) occupies the medial part of the base of the posterior column, and appears on the transverse section as a well-defined oval area. It begins below at the level of the second or third lumbar nerve, and reaches its maximum size opposite the twelfth thoracic nerve. Above the level of the ninth thoracic nerve its size diminishes, and the column ends opposite the last cervical or first thoracic nerve. It is represented, however, in the other regions by scattered cells, which become aggregated to form a **cervical nucleus** opposite the third cervical nerve, and a **sacral nucleus** in the middle and lower part of the sacral region. Its cells are of medium size, and of an oval or pyriform shape; their axons pass into the peripheral part of the lateral funiculus of the same side, and there ascend, probably in **dorsal spinocerebellar** (*direct cerebellar*) **fasciculus**. 2. The **nerve cells in the substantia gelatinosa of Rolando** are arranged in three zones: a posterior or marginal, of large angular or fusiform cells; an intermediate, of small fusiform cells; and an anterior, of star-shaped cells. The axons of these cells pass into the lateral and posterior funiculi, and there assume a vertical course. In the anterior zone some Golgi cells are found whose short axons ramify in the gray substance. 3. **Solitary cells** of varying form and size are scattered throughout the posterior column. Some of these are grouped to form the **posterior basal column** in the base of the posterior column, lateral to the dorsal nucleus; the posterior basal column is well-marked in the gorilla (Waldeyer), but is ill-defined in man. The axons of its cells pass partly to the posterior and lateral funiculi of the same side, and partly through the anterior white commissure to the lateral funiculus of the opposite side. Golgi cells, type II, located in this region send axons to the lateral and ventral columns.

A few star-shaped or fusiform nerve cells of varying size are found in the substantia gelatinosa centralis. Their axons pass into the lateral funiculus of the same, or of the opposite side.

The nerve fibers in the gray substance form a dense interlacement of minute fibrils among the nerve cells. This interlacement is formed partly of axons which pass from the cells in the gray substance to enter the white funiculi or nerve roots; partly of the axons of Golgi's cells which ramify only in the gray substance; and partly of collaterals from the nerve fibers in the white funiculi which, as already stated, enter the gray substance and ramify within it.

White Substance (*substantia alba*).—The white substance of the medulla spinalis consists of medullated nerve fibers imbedded in a spongelike net-work of neuroglia, and is arranged in three funiculi: anterior, lateral, and posterior. The anterior funiculus lies between the anterior median fissure and the most lateral of the anterior nerve roots: the lateral funiculus between these nerve roots and the posterolateral sulcus; and the posterior funiculus between the posterolateral and the posterior median sulci (Fig. 672). The fibers vary greatly in thickness, the smallest being found in the fasciculus gracilis, the **tract of Lissauer**, and inner part of the lateral funiculus; while the largest are situated in the anterior funiculus, and in the peripheral part of the lateral funiculus. Some of the nerve fibers assume a more or less transverse direction, as for example those which cross from side to side in the anterior white commissure, but the majority pursue a longitudinal course and are divisible into (1) those connecting the medulla spinalis with the brain and conveying impulses to or from the latter, and (2) those which are confined to the medulla spinalis and link together its different segments, *i. e.*, intersegmental or association fibers.