three major subdivisions of the brainstem. Knowledge of their location and function will provide key information that will help you localize neurological injury and dysfunction in clinical patients.

The internal anatomy of the brainstem

The internal organization of the brainstem is considerably more complicated than that of the spinal cord. However, two factors work in your favor as you study its features. First, important general principles of organization of the spinal cord also hold true for the brainstem. Second, much of the complexity of the brainstem is contributed by cell groups and axon tracts that will not be considered in this course. In the following discussion, the general plan of organization of the brainstem is presented first. Then, the prominent internal features that characterize each subdivision are identified.

It would be convenient if each subdivision of the brainstem were sufficiently homogeneous along its length that one cross-section could serve as a 'typical' representative for the entire subdivision. However, the brainstem changes continuously along its length—the subdivision into three parts is somewhat arbitrary. As a compromise between examining three sections (one for each subdivision) and hundreds, seven sections of the brainstem are shown to serve as representatives (**Figure 2**).

Once you understand the organization of these seven levels and the way various pathways traverse them, you should be able to identify the location of any section through the brainstem and the important pathways represented in it.

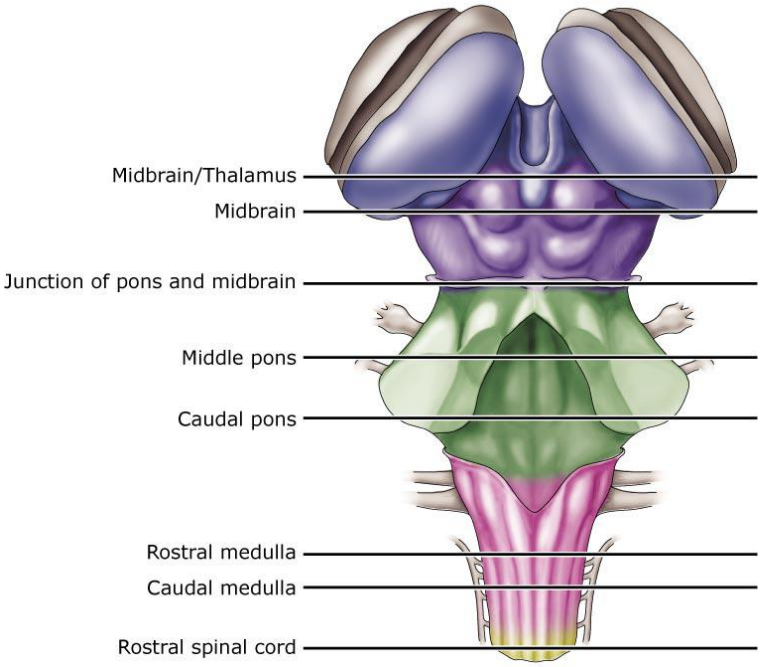

Figure 2. Drawing of the dorsal surface of the brainstem with lines to indicate the seven levels that will be illustrated in the following pages. These same sections are also annotated in the **Brainstem Cross Sectional Atlas** in ***Sylvius4 Online***. (Illustration courtesy of Pyramis Studios, Durham NC)

A schematic overview of the levels of the brainstem to be discussed is presented in **Figure 3**. At this stage, it is not important to study the details; we will come back to them. For now, three points should be taken from the figure. (1) All of the sections are shown at the same magnification. In most atlases (including ***Sylvius4 Online***), the smaller sections are magnified more than the larger ones, and it is easy to lose sight of the relative proportions of the different subdivisions. (2) The cranial nerve nuclei lie in the tegmentum of the brainstem, as do many of the major ascending and descending tracts. (3) Just as in the spinal cord, the nuclei that receive sensory inputs via the cranial nerves are spatially separate from those that give rise to motor output. The sensory nuclei are located laterally in the brainstem, whereas the motor nuclei are located medially. The spatial segregation of sensory and motor functions provides an important clue for localization of focal damage in the brainstem.