ANATOMY

The regions of the CNS responsible for alertness and arousal are located in the brainstem and diffusely throughout the thalamus and cerebral cortex. The cerebral cortex has been described in earlier patterns (see Pattern B: Impaired Neuromotor Development, Pattern C: Impaired Motor Function and Sensory Integrity Associated With Nonprogressive Disorders of the Central Nervous System—Congenital Origin or Acquired in Infancy or Childhood, and Pattern D: Impaired Motor Function and Sensory Integrity Associated With Nonprogressive Disorders of the Central Nervous System—Acquired in Adolescence or Adulthood), and the brainstem will be detailed here. There are three major anatomical divisions of the brainstem. Starting inferiorly and working superiorly, the brainstem consists of the medulla oblongata, pons, and midbrain. A wide variety of structures are located within the three regions of the brainstem, in addition to the neural tracts that run through the brainstem on their way to or from the spinal cord, cerebrum, and/or cerebellum. For example, the corticospinal tract controlling voluntary movement passes through the ventral aspect of the brainstem, and the spinothalamic tract carrying pain and temperature sensation runs through the dorsal aspect of the brainstem.1

MEDULLA

The medulla oblongata is the most inferior portion of the brainstem and is contiguous with the spinal cord.1 Within the medulla, most of the corticospinal tract axons cross the midline at the pyramidal decussation. Sensory information regarding proprioception and light touch from the dorsal column medial lemniscal pathway synapses in the gracile and cuneate nuclei and then crosses the midline before ascending to the thalamus. Numerous cranial nerve nuclei connect to the brain and have nuclei in the medulla (Table 9-1), including the following cranial nerves: XII (hypoglossal), XI (accessory), X (vagus), and IX (glossopharyngeal). Due to the influence of the 10th cranial nerve (vagus), the medulla modulates HR, vasoconstriction, and vasodilation. Respiratory control is shared between the medulla and pontine regions. Portions of the nuclei for cranial nerves VII (facial) and V (trigeminal) also reside in the medulla.