Arousal and Sleep

Arousal is a state of awareness of the external world. Sleep is a state in which external stimuli are received but not consciously perceived. Contrary to appearances, sleep is an active state, at least for the brain. By placing electrodes at multiple sites on the scalp, we can record patterns of electrical activity called brain waves in an electroencephalogram (EEG). These recordings reveal that brain wave frequencies change as the brain progresses through distinct stages of sleep.

Arousal and sleep are controlled in part by the reticular formation, a diffuse network formed primarily by neurons in the midbrain and pons. These neurons control the timing of sleep periods characterized by rapid eye movements (REMs) and by vivid dreams. Sleep is also regulated by the biological clock, and by regions of the forebrain that regulate sleep intensity and duration.

▼ **Figure 49.13 The reticular formation.** Once thought to consist of a single diffuse network of neurons, the reticular formation is now recognized as many distinct clusters of neurons. These clusters function in part to filter sensory input (blue arrows), blocking familiar and repetitive information that constantly enters the nervous system before sending the filtered input to the cerebral cortex (green arrows).