Satellite cells
- Surround neuron cell bodies in ganglia
- Regulate O₂, CO₂, nutrient, and neurotransmitter levels around neurons in ganglia

Schwann cells
- Surround axons in PNS
- Are responsible for myelination of peripheral axons
- Participate in repair process after injury

Peripheral Nervous System

Central Nervous System

Ependymal cells
- Line ventricles (brain) and central canal (spinal cord)
- Assist in producing, circulating, and monitoring of cerebrospinal fluid

Oligodendrocytes
- Myelinate CNS axons
- Provide structural framework

Astrocytes
- Maintain blood-brain barrier
- Provide structural support
- Regulate ion, nutrient, and dissolved gas concentrations
- Absorb and recycle neurotransmitters
- Form scar tissue after injury

Microglia
- Remove cell debris, wastes, and pathogens by phagocytosis
### SUMMARY TABLE 12–3  Generation of Action Potentials

**STEP 1: Depolarization to Threshold**
- A graded depolarization brings an area of excitable membrane to threshold (~60 mV).

**STEP 2: Activation of Sodium Channels and Rapid Depolarization**
- The voltage-regulated sodium channels open (sodium channel activation).
- Sodium ions, driven by electrical attraction and the chemical gradient, flood into the cell.
- The transmembrane potential goes from ~60 mV, the threshold level, toward +30 mV.

**STEP 3: Inactivation of Sodium Channels and Activation of Potassium Channels**
- The voltage-regulated sodium channels close (sodium channel inactivation occurs) at +30 mV.
- The voltage-regulated potassium channels are now open, and potassium ions diffuse out of the cell.
- Repolarization begins.

**STEP 4: Return to Normal Permeability**
- The voltage-regulated sodium channels regain their normal properties in 0.4–1.0 msec. The membrane is now capable of generating another action potential if a larger than normal stimulus is provided.
- The voltage-regulated potassium channels begin closing at ~70 mV. Because they do not all close at the same time, potassium loss continues, and a temporary hyperpolarization to approximately ~90 mV occurs.
- At the end of the relative refractory period, all voltage-regulated channels have closed, and the membrane is back to its resting state.