Neuron Resting Potential

Neuron resting potential describes the maintenance of a resting potential state in neurons prior to action potential generation. Initially, there is more sodium outside of the cell and more potassium inside the cell. These salt concentration gradients are maintained by a sodium-potassium pump that uses ATP to pump three sodium out of the cell for every two potassium pumped in. However, potassium also leaks out of the cell across the concentration gradient through leaky potassium channels. The voltage at resting potential is -70 millivolts. At that level, voltage-gated sodium channels are closed. When the channels open, they allow sodium influx, which triggers depolarization and action potential generation.

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Characteristics

More Na+ Outside

Salt-shakers outside

There is a higher concentration of sodium outside of the cell membrane of neurons than inside the cell membrane.

Sodium-Potassium Pump

Salt-shaker-Banana pump

The sodium potassium pump is an ATP-based pump that sends three sodium out of the cell for every two potassium sent in. Because the pump transports salts against the gradient, it requires ATP to function. The salts travel by active transport.

K+ Leaks Out

Bananas leaking Out

Potassium leaks out of the cell through potassium channels, which is movement with the concentration gradient.

More K+ Inside

Bananas Inside cheeks

There is a higher concentration of potassium inside the cell membrane of neurons than outside.

About -70mV

Alarm-clock at About -70mV

The voltage of the cell at resting potential is about -70 millivolts.

Voltage-Gated Sodium Channels are Closed

Salt-shaker Gate Closed

At the resting potential, voltage-gated sodium channels are closed, which prevents sodium from flooding into the cell and causing depolarization.