

Kelli Charter
Sally Chege
Neuro 430
Model Outline
Feb. 7, 2003

Voltage-Gated Ion Channel Model

Purpose: To demonstrate the voltage-gated ion channel's role in the production of an action potential as well as the gross anatomy of a neuron.

Materials: A table, cardboard, plastic cylinder, wrapped candy, two stand used to hold equipment in the lab, ball labeled neurotransmitter, dial labeled threshold voltage, lever.

Procedure: Select six kids, one is the electrical stimulus, one is the soma, one is the axon hillock, one is the axon, one is the axon terminal, and the last one is the post-synaptic neuron. If there are more than six kids available, incorporate them as part of the axon. The "stimulus" is injected into the cell membrane bringing it to threshold, the voltage-gated sodium channel opens in response, and sodium ions flow through the newly opened channel into the soma. When the ions reach the soma, the soma sends an electrical signal to the axon hillock by squeezing the "axon hillock's" hand, the axon hillock transmits the signal to the axon, the signal flows down the axon to the axon terminal, the axon terminal receives the signal and then releases the neurotransmitter into the synapse, a receptor on the post-synaptic cell binds the neurotransmitter completing the signal transfer.

Issues: Ions are constantly moving within the cell. There is more than one type of ion involved in producing an action potential. More than one ion channel is involved in producing an action potential. The extracellular and the intracellular contents are not shown in this model. An actual electrical stimulus cannot be used.