

Nerve, muscle, and certain other cell types such as the islet cells of the pancreas of vertebrates exhibit a special property called electrical excitability. As the action potential passes the recording electrode, the voltmeter or oscilloscope will display a characteristic pattern of membrane potential changes. An electrode called the stimulating electrode is connected to a power source and inserted into the axon some distance from the recording electrode (see Figure 13-3b). Alan Hodgkin and Andrew Huxley used micro electrodes and the squid giant axon to learn how action potentials are generated; for their work, they received a share of the Nobel Prize in 1963. A brief impulse from this stimulating electrode depolarizes the membrane by about 20 mV (i.e., from -60 to about -40 mV), bringing the neuron beyond the threshold potential. To understand how nerve cells use action potentials to transmit signals, we must first examine how cells generate a resting membrane potential and how the membrane potential changes during an action potential. This triggers an action potential that propagates away from the stimulating electrode.