Sneeze Reflex Encyclopedia Article

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Sneeze Reflex

The sneeze reflex is a coordinated neural and muscular response to the irritation of the upper **respiratory system**, especially the nasal orifice (opening) and nasal passages. As with the **cough reflex**, sneezing is a reflex action that does not require conscious direction or control. Sneezing is a nociceptive reflex, designed to protect the body from injury and maintain respiratory integrity.

Sneezing is initiated by irritation of the afferent sensory lining of the respiratory passages. These afferent neural impulses travel via the fifth cranial nerve to the medulla of the **brain** and result in the appropriate muscular excitations to produce a violent expulsion of air designed to clear the respiratory passages. Irritation of the respiratory passages may result from debris, dust, mechanical obstruction of the airway, or by an excessive buildup of fluid that obstructs the nasal passages.

The coordinate sneeze reflex involves the depression of the uvula so that air is forced out of the **nose** and mouth. The forceful contraction of abdominal muscles, **diaphragm**, and intercostal muscles (muscles between the ribs) produce the high pressure needed to generate the air velocity required to expel the source of irritation.

Just as with other forms of neural transmission, the transmission of sneeze producing neural **reflexes** occurs via well established mechanisms and pathways of alternating electrical and chemical neural transmission. Within the neuron cell body (axon), neural impulses travel electrically via an **action potential** that moves down the axon to the presynaptic terminal end of the presynaptic neuron. At the **synapse** (the intercellular gap or space between **neurons**), the neural signal is transmitted through the release of **neurotransmitters** from the presynaptic neuron, diffusion of neurotransmitters across the synaptic gap, and the site-specific binding of neurotransmitters to the dendrites of the next neuron in the neural chain. Reflex impulses are limited to pathway dependent physical limitations (e.g., the physical attributes of the nerve fibers) and are subject to reflex rebound and reflex fatigue.

The sneeze reflex works to maintain a relatively free flow of air. In addition to foreign bodies and specific allergens, irritation by corrosive gases and chemicals may induce a sneeze reflex designed to expel the irritating particles or gas that initiate the reflex.