

Petrosal ganglion: A more complex role than originally imagined

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The petrosal ganglion is a peripheral sensory ganglion, composed of pseudomonopolar sensory neurons that innervate the posterior third of the tongue and the carotid sinus and body. According to their electrical properties petrosal ganglion neurons can be ascribed to one of two categories: i) neurons with action potentials presenting an inflection (hump) on its repolarizing phase and ii) neurons with fast and brisk action potentials. Although there is some correlation between the electrophysiological properties and the sensory modality of the neurons in some species, no general pattern can be easily recognized. On the other hand, petrosal neurons projecting to the carotid body are activated by several transmitters, with acetylcholine and ATP being the most conspicuous in most species. Petrosal neurons are completely surrounded by a multi-cellular sheet of glial (satellite) cells that prevents the formation of chemical or electrical synapses between neurons. Thus, petrosal ganglion neurons are regarded as mere wires that communicate the periphery (i.e., carotid body) and the central nervous system. However, it has been shown that in other sensory ganglia satellite glial cells and their neighboring neurons can interact, partly by the release of chemical neuro-glio transmitters. This intercellular communication can potentially modulate the excitatory status of sensory neurons and thus the afferent discharge. In this mini review, we will briefly summarize the general properties of petrosal ganglion neurons and the current knowledge about the glial-neuron communication in sensory neurons and how this phenomenon could be important in the chemical sensory processing generated in the carotid body. © 2014 Retamal, Reyes and Alcayaga.

Action potential

Chemosensory

Mechanosensory

Petrosal ganglia

Sensory modality

acetylcholine

gap junction protein

muscarinic receptor

neurotransmitter

nicotinic receptor

purinergic P2X1 receptor

purinergic P2X2 receptor

purinergic P2X3 receptor

purinergic P2X5 receptor

purinergic P2X7 receptor

tyrosine 3 monooxygenase

brain electrophysiology

brain function

carotid sinus nerve

cell communication

cell function

nerve cell

nerve projection

neuromodulation

neurophysiology

neuroscience

neurotransmission

nonhuman

petrosal ganglion

sensory ganglion

Short Survey

signal transduction