ARACHIDONIC ACID BUSTLE ON CHEMOSENSORY NEURONS

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Chemosensory neurons respond to stimulation induced by gasses, volatile and non-volatile compounds. Neuronal excitation mediated via second messenger involve typically: cGMP, cAMP or IP3. Transduction pathways based on cyclic nucleotide have tree-phosphate nucleotide as substrate. While IP3, mechanisms based, have membrane lipid substrate. This compounds are signaling molecule with modulator effects on many proteins, including membrane ion channels (Piomelli & Greengard, 1990; Axelrod, 1990; Liu et al, 2001). Mouse isolated chemosensory neurons were used in this electrophysiological study. In current-clamp and voltage-clamp mode from whole cell was recorded neuronal electrical activity under 50?M of arachidonic acid (AA), and 50 mM KCl (control condition) administration. In current-clamp mode, whole-cell configuration, and spontaneous firing activity (Fig. 1) were recorded from isolated chemosensory neurons, as well as induced responses to current injections of 2-10 pA for 1 s. Voltage-gated inward and outward currents elicited by voltage steps, 10mV increments from -80 to +50 mV, were measured also. We record response to the administration of 50 mcM of AA (Fig. 2), and 50 mM KCl, control condition. Chemosensory neuron respond with an inward depolarizing current to an AA application suggesting its role in a putative transduction mechanisms mediated by IP3.

References

Piomelli D, Greengard P. (1990) Lipoxygenase metabolites of arachidonic acid in neuronal signalling. Trends Pharmacol Sci 11, 367-373.

Liu Y, Liu D, Heath L, Meyers DM, Krafte DS, Wagoner PK, Silvia CP, Yu W, Curran ME. (2001) Direct activation of an inwardly rectifying potassium channel by arachidonic acid. Mol Pharmacol 59, 1061-1068.

Axelrod J. (1990) Receptor-mediated activation of phospholipase A2 and arachidonic acid release in signal transduction. Biochem Soc Trans 18, 503-507.