

Cilium-attached and excised patch-clamp recordings of odourant-activated Ca²⁺-dependent K channels from chemosensory cilia of olfactory receptor neurons

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It has previously been proposed that a Ca²⁺-dependent K⁺ conductance is implicated in the inhibitory odourant response in rat and toad olfactory receptor neurons. Previous whole-cell and single-channel measurements on inside-out excised patches, in addition to immunochemical evidence, indicated the presence of Ca²⁺-dependent K⁺ channels in olfactory cilia, the transducing structures of these sensory cells. Ca²⁺-dependent K⁺ channels opened in 'on-cilium' membrane patches from *C. caudiverbera* upon odourant stimulation. Furthermore, after excision in the inside-out configuration, the channel could be opened by micromolar Ca²⁺, in a Ca²⁺-dependent fashion, but it was unresponsive to cyclic AMP. We estimated that the Ca²⁺ concentration in the proximity of a Ca²⁺-dependent K⁺ channel within the cilia reaches at least 100 μM during the odour response. The K⁺ channel displayed a higher selectivity for K⁺ than for Na⁺. Our results support a role for this Ca²⁺-dependent K⁺ channel in chemotra