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Characteristics of CCh-activated Nonselective Cation Channel in Gastric Smooth Muscle Cells.

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In the present study, we recorded CCh-activated nonselective cation (NSC) current in guinea-pig gastric smooth muscle cells and investigated the characteristics of the current. In whole-cell voltage-clamp mode, CCh activated NSC current. The same NSC current could be activated by internal dialysis of GTPγS. CCh induced no NSC current in cells pretreated with pertussis toxin (PTX). Both in outside-out and whole-cell patch clamp modes, single NSC channel activity could be recorded, and the conductance was about 30 pS in symmetric Cs⁺ solution. Amplitude of the whole-cell current was dependent both on the composition of external monovalent cations and the concentration of Ca²⁺. These are due to the change of NPo of the channel with no change of single channel conductance. Intracellular Ca²⁺ concentration ([Ca²⁺]_i) and whole-cell NSC current were simultaneously recorded. The changes in [Ca²⁺]_i followed changes in NSC current closely. Replacement of external Cs⁺ with Na⁺ reduced NSC current amplitude as well as [Ca²⁺]_i. This result indicates the NSC channel has a permeability to Ca²⁺. In addition, NSC current which is activated by CCh or GTPγS was strongly facilitated by the increase of [Ca²⁺]_i.