Functional transplantation of chloride channels from the human syncytiotrophoblast microvillous membrane to Xenopus oocytes

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The materno-fetal transfer of metabolites and nutrients requires the operation of specific transport mechanisms through syncytiotrophoblast membranes. Electrophysiological studies on these cells are scarce and, because of their syncytial nature, whole-cell current recordings have not been carried out. We have now studied whether or not ion channels from the human syncytiotrophoblast microvillous (hSM) membrane can be transplanted to Xenopus oocytes. Sixty-two percent of hSM-injected oocytes displayed lower resting potential and higher membrane conductance than uninjected cells. The increased membrane conductance was due to the incorporation of Cl- channels, because neither replacing Na+ in the bathing solution by N-methyl-D-glucamine or K+, nor withdrawing Ca2+ had any significant effect on the currents elicited by voltage pulses. In contrast, substitution of Cl- by different anions markedly affected the membrane conductance, giving an anion selectivity sequence of I->Br->Cl-> methanos