EXPANDED ABSTRACT**K⁺ channels on resting duct cells from rat pancreas**

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Abstract : The ductal system of the exocrine pancreas produces HCO₃⁻-rich fluid in response to secretin and other stimuli. HCO₃⁻ efflux across the luminal membrane is mediated by a Cl⁻-HCO₃⁻ exchanger operating in parallel with the cystic fibrosis transmembrane conductance regulator (CFTR) Cl⁻ channel. Basolateral K⁺ channels provide an exit pathway for K⁺ and play a vital role in maintaining the membrane potential, which is a crucial component of the driving force for anion secretion. Measurements of membrane potential with intracellular microelectrodes suggested that Ba²⁺-sensitive K⁺ conductance accounts for more than 60% of the total basolateral ionic conductance in resting ducts (1). To identify the Ba²⁺-sensitive K⁺ channels, we isolated ducts from normal rat pancreas by collagenase digestion. We first demonstrated that the ducts did not express a vascular endothelial marker PECAM-1 (platelet/endothelial cell adhesion molecule-1), but expressed cytokeratin 20, a marker of duct cells (2), using immunofluorescent staining. In addition, monoclonal anti-CFTR antibody was detected near the luminal membrane of these cells. In cell-attached single-channel recordings, we observed three types of K⁺ channels on basolateral membrane in unstimulated duct cells. The 40 pS K⁺ channels are likely to mediate whole-cell inwardly rectifying K⁺ (Kir) currents, which were blocked by extracellular Ba²⁺ in a voltage-dependent manner. The properties of 90 pS and 170 pS K⁺ channels are similar to those of Ca²⁺-activated K⁺ channels. We then identified Kir2.0 and SK4/IK1 (intermediate conductance Ca²⁺-activated K⁺ channel) subunits as molecular candidates of the K⁺ channels using RT-PCR analysis. The present results suggest that these subunits may mediate native K⁺ currents in resting duct cells. Further functional studies with specific blockers are required to evaluate which of these K⁺ channels contribute to the resting membrane potential and might be involved in HCO₃⁻ secretion. *J. Med. Invest.* 56 Suppl. : 354, December, 2009

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