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Characterization of a novel protein interacting with rat large-conducatance Ca^{2+}-actived K^+ channel α-subunit, rSlo

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Large-conductance Ca^{2+}-actived K^+ channels (BK_{Ca} channels) play a key role in setting the pace of contractile activity in muscle and are involved in the regulation of neurotransmitter release in neuron. BK_{Ca} channels are activated by depolarizing membrane potential and the elevated level of intracellular calcium. Using yeast-two hybrid assay, we have identified a novel protein interacting with the cytosolic carboxyl terminus of rSlo, the brain isoform of rat large-conductance Ca^{2+}-activated K^+ channel α-subunit. The novel gene encodes 51 kDa protein and is named as SIRK(rSlo-interacting RGS-like protein). SIRK is expressed in various tissues and localized in the cytosolic and the membrane fraction. Biochemical and immunological studies indicated that SIRK physically interacted with the cytosolic region of rSlo. To investigate whether SIRK can modulate the activity of rSlo, GFP-fused SIRK and rSlo were transiently transfected into COS-7 cells and the effects of SIRK was studied using electrophysiological means. We concluded that the overexpression of SIRK alters the surface expression of rSlo channel with only a limited effect on the biophysical characteristics of the channel.