Cantu Syndrome

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Kir6.1 and SUR2 are subunits of ATP-sensitive potassium (K

ATP

) channels expressed in a wide range of tissues. Extensive study has implicated roles of these channel subunits in diverse physiological functions. Together they generate the predominant K

ATP

conductance in vascular smooth muscle and are the target of vasodilatory drugs. Roles for Kir6.1/SUR2 dysfunction in disease have been suggested based on studies of animal models and human genetic discoveries. In recent years, it has become clear that gain-of-function (GoF) mutations in both genes result in Cantú syndrome (CS)-a complex, multisystem disorder. There is currently no targeted therapy for CS, but studies of mouse models of the disease reveal that pharmacological reversibility of cardiovascular and gastrointestinal pathologies can be achieved by administration of the K

ATP

channel inhibitor, glibenclamide. Here we review the function, structure, and physiological and pathological roles of Kir6.1/SUR2B channels, with a focus on CS. Recent studies have led to much improved understanding of the underlying pathologies and the potential for treatment, but important questions remain: Can the study of genetically defined CS reveal new insights into Kir6.1/SUR2 function? Do these reveal new pathophysiological mechanisms that may be important in more common diseases? And is our pharmacological armory adequately stocked?