Kv1.3 POTASSIUM CHANNELS INVOLVED IN THE ANTIHYPERTENSIVE EFFECTS OF RESVERATROL

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Vascular diseases such as hypertension, atherosclerosis, pulmonary hypertension and diabetes mellitus (DM) are commonly associated with functional changes of vascular smooth muscle cells (VSMC) mostly caused by decreased function of certain potassium (K) channels. VSMCs Kv1.3 channels, on contrary, tend to be upregulated, which can contribute to phenotypic modulation (PM) and unwanted vascular remodelling. Besides, Kv1.3 channels represent potential target for macrophage-dependent endothelial dysfunction in angiotensin II-induced hypertension. Resveratrol (RSV), for decades main research object in the fields of cardioprotection, oncology and endocrinology, represents specific drug which useful features are exerted predominantly through modulation of different ion channels, including Kv1.3. This might explain important pharmacological actions attributed to RSV, such as reducing blood pressure. In a clinical setting, addition of RSV to standard antihypertensive therapy was sufficient to reduce blood pressure without the need for additional antihypertensive drugs. Further, meta-analysis have confirmed its antihypertensive efficacy, mostly when used in high doses (>300 mg/day) and in diabetic patients. This is due to upregulation of endothelial NO and, in case of DM, improving insulin sensitivity and acting on VSMCs ion channels, probably Kv1.3. Additionally, in a smooth muscle cells of human umbilical vein, altered expression of Kv1.3 in a model of pregnancy-induced hypertension (PIH) might contribute to adverse pregnancy outcomes. Also, inhibition of Kv1.3 in human lymphocyte might suppress inflammation, contributive factor in all of the above mentioned diseases. All together, it is important to investigate the precise mechanism of RSV modulation of Kv1.3 and the impact of that synergy in other models of VSMSc, such as bypass grafts of diabetic patients.

Keywords: resveratrol, hypertension, vascular smooth muscle cell, Kv1.3, cardioprotection.

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