1-P-070

Poster Sessions

Molecular mechanism underlying regulation of vascular smooth muscle phenotype switching by TRPC6

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Vascular smooth muscle cells (VSMCs) play critical roles in vascular homeostasis regarding stability and tonic regulation. VSMCs can switch their phenotype back and forth between highly proliferative synthetic and fully differentiated contractile in response to changes of vessel environment. Although critical for vascular homeostasis, this so-called phenotype switching is a cause of vascular diseases such as atherosclerosis and hypertension. In pathological conditions, proliferation of VSMCs are accelerated, which adversely affects prognosis. Therefore, the mechanism underlying transition from active synthetic to quiescent contractile phenotype has attracted attention but is largely unknown. In this study, we investigated the importance of canonical transient receptor potential 6 (TRPC6) in VSMCs phenotype switching. TRPC6 deficient (TRPC6(-/-)) VSMCs was more sensitive to the differentiation stimuli. We revealed that TRPC6(-/-) VSMCs have more polarized membrane potential and higher Akt activity than wild type cells under the differentiation pressure. TRPC6 physically and functionally coupled with lipid phosphatase PTEN, a negative regulator of Akt activation. These findings indicate suppression of TRPC6 can facilitate VSMCs differentiation and novel therapeutic strategy for several vascular diseases.