Phospholipase D1 is involved in α1-adrenergic contraction of murine vascular smooth muscle.

Abstract:
α1-Adrenergic stimulation increases blood vessel tone in mammals. This process involves a number of intracellular signaling pathways that include signaling via phospholipase C, diacylglycerol (DAG), and protein kinase C. So far, it is not certain whether signaling via phospholipase D (PLD) and PLD-derived DAG is involved in this process. We asked whether PLD participates in the α1-adrenergic-mediated signaling in vascular smooth muscle. \(\alpha_1\)-Adrenergic-induced contraction was assessed by myography of isolated aortic rings and by pressure recordings using the hindlimb perfusion model in mice. The effects of the PLD inhibitor 1-butanol (IC50 0.15 vol%) and the inactive congener 2-butanol were comparatively studied. Inhibition of PLD by 1-butanol reduced specifically the \(\alpha_1\)-adrenergic-induced contraction and the \(\alpha_1\)-adrenergic-induced pressure increase by 10 and 40% of the maximum, respectively. 1-Butanol did not influence the aortic contractions induced by high extracellular potassium, by the thromboxane analog U46619, or by a phorbol ester. The effects of 1-butanol were absent in mice that lack PLD1 (Pld1(-/-) mice) or that selectively lack the CaV1.2 channel in smooth muscle (sm-CaV1.2(-/-) mice) but still present in the heterozygous control mice. \(\alpha_1\)-Adrenergic contraction of vascular smooth muscle involves activation of PLD1, which controls a portion of the
?1-adrenergic-induced CaV1.2 channel activity.

Zeitschriftentitel / Abkürzung:
FASEB J

Jahr: 2014

Band: 28

Heft / Issue: 3

Seiten: 1044-8

Sprache: eng


Print-ISSN: 0892-6638

TUM Einrichtung:
Institut für Pharmakologie und Toxikologie

Occurences:

- Einrichtungen > Fakultäten > Fakultät für Medizin > Kliniken und Institute > Institut für Pharmakologie und Toxikologie > 2014

entries: