BMC Pharmacology

Meeting abstract

Contribution of potassium channels in human umbilical artery contractions

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from 14th Scientific Symposium of the Austrian Pharmacological Society (APHAR)
Innsbruck, Austria. 21–22 November 2008

Published: 5 November 2008

BMC Pharmacology 2008, **8**(Suppl 1):A1 doi:10.1186/1471-2210-8-S1-A1

This abstract is available from: http://www.biomedcentral.com/1471-2210/8/S1/A1

Bradykinin (BK) and serotonin (5-HT) are vasoactive agents that significantly contribute to the normal functioning of fetoplacental blood flow, including modulation of smooth muscle tone in umbilical vein and arteries. Accordingly, umbilical artery is a crucial component of fetoplacental circulation with the vital function of providing suitable perfusion and nutrition for placenta. The aim of this study was to investigate the effect of potassium channel blockers, namely glibenclamide (an ATP-sensitive K^+ channel blocker), tetraethylammonium (a non-selective K^+ channel blocker), Ba^{2+} (an inwardly rectifying K^+ channel blocker) and apamin (a small conductance Ca^{2+}-activated K^+ channel blocker) in BK- and 5-HT-induced actions on isolated human umbilical artery (HUA) in normal pregnancy. The experiments were performed on vascular rings of HUA isolated from umbilical cords that were obtained immediately after vaginal delivery in women with uncomplicated pregnancy. Only the remnant tissue, which would have been otherwise disposed of, has been utilized. Isometric tension of suspended artery rings was continuously recorded. BK (1 nM – 1 μM) and 5-HT (1 nM – 30 μM) produced concentration-dependent contractions of HUA. Control contractions produced by BK were notably ($p < 0.05$) enhanced only in the presence of apamin (20 μM), while unaltered by other inhibitors. 5-HT-induced effect was not influenced by any of applied blockers. Our results suggest that small conductance Ca^{2+}-activated potassium channels contribute to the fine regulation of maximal BK-induced contraction of HUA in normal pregnancy. On the other hand, potassium channels do not seem to be involved in 5-HT-evoked contractile response of umbilical artery.

Acknowledgements

The Ministry of Science of Serbia supported this research with grant 145015B.