

Pharmacology of Endothelium and Vascular Smooth Muscle in Vascular System: The Comparison of Human Internal Mammary Artery (IMA) and Rat Aorta (RA)

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Vascular smooth muscle (VSM) and endothelium (ET) activities are the important determinants of vascular tone. This presentation evaluates the regulatory functions of VSM and ET in human internal mammary artery (IMA) and rat aorta (RA).

Potassium (K^+) channels contribute to the regulation of the membrane potential in VSM cells. Membrane hyperpolarization due to efflux of K^+ results from the opening of K^+ channels and consequently vasodilation takes place. Various endogenous and exogenous substances, which form contraction and relaxation, alter the vascular tone by interacting with their receptors in the VSM and ET.

The contraction and relaxation responses of the IMA and RA can be analyzed in vitro organ baths. Acetylcholine (ACh) produces endothelium-mediated relaxation while potassium chloride (KCl), phenylephrine (PE), and 5-hydroxytryptamine (5-HT) produce VSM-mediated contraction. ET-denuded vessels do not relax sufficiently by acetylcholine. ACh relaxes the ET-intact IMA and RA, it does not relax the ET-denuded IMA and RA. The KCl-induced contractions are more stable and they last longer than those of the PE and 5-HT. However, the percentage of the PE and 5-HT induced contractions are greater than that of KCl.

ET and VSM play an important role in the relaxation and contractions mechanisms of the IMA and RA. The physiological characteristics of IMA and RA in the formation of vascular tone are similar to each other. Different substances, which induce the relaxation and contraction in these vessels, also cause varied responses.

Keywords: Endothelium, Vascular Smooth Muscle, Internal Mammary Artery, Rat Aorta

Biography:

Dr. Arslan is the head of pharmacology Department in the Ankara Yildirim Beyazit University. His research interests focus on the experimental pathophysiology and inflammation of pulmonary and cardiovascular systems. He is the PhD supervisor for pharmacology and toxicology students.