Pharmacological Reports
2011, 63, 1450–1459
ISSN 1734-1140

Acute myocardial ischemia enhances the vanilloid TRPV1 and serotonin 5-HT_3 receptor-mediated Bezold-Jarisch reflex in rats

Sebastian Ł. Łupiński[1], Eberhard Schlicker[2], Anna Pędzińska-Betiuk[1], Barbara Malinowska[1]

[1]Department of Experimental Physiology and Pathophysiology, Medical University of Białystok, Mickiewicza 2A, PL 15-089 Białystok, Poland

[2]Department of Pharmacology and Toxicology, University of Bonn, Sigmund-Freud-Strasse 25, 53105 Bonn, Germany

Correspondence: Barbara Malinowska, e-mail: bmalin@umwb.edu.pl

Abstract:
The Bezold-Jarisch reflex is characterized by a sudden bradycardia associated with hypotension induced by the activation of the vanilloid TRPV1 and serotonin 5-HT_3 receptors. This reflex is associated with several health conditions, including myocardial infarction. The aim of the present study was to elucidate the influence of acute experimental myocardial ischemia on the reflex bradycardia induced by anandamide and phenylbiguanide, agonists of the TRPV1 and 5-HT_3 receptors, respectively.
In urethane-anesthetized rats, the rapid *iv* injection of anandamide (0.6 μmol/kg) or phenylbiguanide (0.03 μmol/kg) decreased heart rate (HR) by about 7–10% of the basal values. Myocardial ischemia (MI) was induced by ligation of the left anterior coronary artery. The agonists were injected 5 min before MI (S_1) and 10, 20 and 30 min thereafter (S_2–S_4).
MI potentiated the anandamide-induced reflex bradycardia by approximately 105% at S_2 and 70% at S_3 but had no effect at S_4. This amplificatory effect of MI was virtually abolished by the TRPV1 receptor antagonist capsazepine (1 μmol/kg) and was not modified by the cannabinoid CB_1 receptor antagonist rimonabant (0.1 μmol/kg). MI also amplified the reflex bradycardia elicited by phenylbiguanide by approximately 110, 60 and 90% (S_2, S_3 and S_4, respectively), and this effect was sensitive to the 5-HT_3 receptor antagonist ondansetron (3 μmol/kg).
In conclusion, our results suggest that acute myocardial ischemia augments the Bezold-Jarisch reflex induced *via* activation of TRPV1 and 5-HT_3 receptors located on sensory vagal nerves in the heart.

Key words:
Bezold-Jarisch reflex, TRPV1 receptors, 5-HT_3 receptors, anandamide, phenylbiguanide, myocardial ischemia