Streszczenie w języku angielskim

In recent years, there have been more and more reports on the interaction between the endocannabinoid system (ECS) and the renin-angiotensin system (RAS), which are involved, among other things, in the pathophysiology of the cardiovascular system. Components of both are present in the paraventricular nucleus of the hypothalamus (PVN), which takes part in the central regulation of blood pressure and heart rate by modifying the activity of the sympathetic nervous system.

The aim of my study was to investigate the potential interaction between involved in cardiovascular regulation cannabinoid CB_1 receptors and AT_1 and AT_2 receptors for angiotensin II and Mas receptors for angiotensin 1-7 in the PVN of conscious rats, and to determine the effect of primary hypertension on the pressure effect stimulated by activation of the above receptors.

I performed the experiments on conscious male rats with spontaneous primary hypertension (SHR) and their normotensive controls Wistar Kyoto (WKY) rats. Microinjection of the AT_1/AT_2, Mas, and CB_1 receptor agonists angiotensin II (Ang II), angiotensin 1-7 (Ang 1-7), and CP55940 into the PVN, respectively, stimulated an increase in blood pressure (BP) higher in SHR than in WKY. Ang II had the strongest effect while Ang 1-7 had the weakest effect. AT_1 receptor antagonist losartan and AT_2 receptor antagonist PD123319 inhibited the pressure response induced by Ang II and CP55940. The Mas receptor antagonist A-779 decreased the BP elevation stimulated by Ang 1-7 and CP55940. The CB_1 receptor antagonist AM251 attenuated the increase in BP in response to Ang II and Ang 1-7. The pressor effects of Ang II, Ang 1-7, and CP55940 after their administration into the PVN were stronger in SHR than in WKY, which may in part be due to the higher expression of AT_1 and CB_1 receptors and lower expression for AT_2 and Mas receptors in the PVN, rostral ventrolateral medulla (RVLM) and the nucleus tractus solitarii (NTS) in SHR than in WKY.

In summary, my results demonstrated the existence of a more pronounced interaction in the PVN between the AT_1/AT_2 receptors for Ang II, Mas for Ang 1-7, and CB_1 for (endo)cannabinoids involved in inducing the pressure response. In contrast, a detailed review of the available literature on the interaction between the ECB and RAS systems allowed us to draw two additional conclusions indicating the potential importance of this interaction: (1) cannabinoid CB_1 receptor antagonists modify the effects of AT_1 receptor stimulation for Ang II depending on whether stimulation of both receptors induces effects directed

in the same or opposite direction, and (2) the occurrence of a potential pharmacodynamic or pharmacokinetic interaction between them should be considered when compounds affecting the (endo)cannabinoid system and the renin-angiotensin system are used therapeutically.