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Cardioprotective effects of bilberry extract on ischemia-reperfusion-induced injury in isolated rat heart

Lovro Žiberna¹, Mojca Lunder¹, Špela Može², Andreja Vanzo³ and Gorazd Drevenšek¹

¹*Institute of Pharmacology and Experimental Toxicology, Faculty of Medicine, University of Ljubljana, 1000 Ljubljana, Slovenia*

²*Department of Food Science and Technology, Biotechnical Faculty, University of Ljubljana, 1000 Ljubljana, Slovenia*

³*Department of Oenology, Agricultural Institute of Slovenia, 1000 Ljubljana, Slovenia*

E-mail: lovro.ziberna@mf.uni-lj.si

Background

Bilberries (*Vaccinium myrtillus* L.) are recognized as a good source of flavonoids, especially anthocyanins, which have strong antioxidative activity. Therefore, they may have a strong potential as cardioprotective agents in ischemic-reperfusion injury.

Methods

Anthocyanins from the prepared bilberry extract were analyzed using the HPLC-DAD system and were expressed as a standard of cyanidine-3-glucoside (mg/L). Experiments were carried out on the isolated hearts from Wistar rats of both sexes according to the Langendorff method. Post-ischemic myocardial injuries during reperfusion were determined by changes in coronary flow rate, lactate dehydrogenase (LDH) release rate, electrocardiogram analysis, incidence and duration of arrhythmias.

Results

Bilberry extract (0.01–5 mg/L) increased coronary flow and decreased LDH release rate during reperfusion. Coronary flow was increased up to 2.5-fold ($p < 0.001$) at 0.1 mg/L and up to 2.0-fold ($p < 0.01$) at 1 mg/L compared to the control values. The LDH release rates were decreased 3.7-fold ($p < 0.001$) at 0.1 mg/L and 6.7-fold ($p < 0.001$) at 1 mg/L compared to the control. Furthermore, the application of bilberry extract was also effective in the prevention of arrhythmias. The duration of arrhythmias was maximally shortened at 0.1 mg/L to $3.2 \pm 0.2\%$ ($p < 0.001$) and at 1 mg/L group to $4.4 \pm 0.3\%$ ($p < 0.001$) of the control value from the untreated group. However, the bilberry extract had no significant effect on heart rate and on left ventricular developed pressure.

Conclusions

Our results show that bilberry extract has anti-ischemic and anti-arrhythmic activity on ischemia-reperfusion-induced injury in isolated rat hearts.