TITLE: Insufficiency of cardioprotection at adaptation to chronic hypoxia and at remote postconditioning in rats with metabolic syndrome, the role of metabolic disorders or opioid signaling

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ABSTRACT

Background: Ealey our data established the links between cardioprotection at chronic hypoxia (CH), opioid receptor activation, and following signaling – protein kinase C (PKC) and nitric oxide synthase (NOS). However, recent studies have shown low efficacy of cardioprotection at chronic hypoxia in rats with metabolic syndrome (MetS). We hypothesize that the reasons for this inefficiency's may be metabolic and opioid system disorders.

The purpose of the study was to determine the possible relationship between the decrease in the effectiveness of adaptation to chronic hypoxia, disorders of carbohydrate, lipid metabolism, opioid peptides level, opioid receptor expression in myocardium, and opioid signaling in myocardium.

Design: The study was carried out on Wistar rats 60 day old. MetS was induced by high-carbohydrate high-fat diet, 90 days. Rats were subjected to chronic hypoxia for 21 days at 12% O2 and 0.3% CO2 after complete of diet.

All animals were subjected to 45 min coronary occlusion and 120 min reperfusion, infarct size was determined.

Results: Modeling MetS led to the formation of obesity, hypertension, impaired lipid and carbohydrate metabolism, hyperleptinaemia. CH along resulted in a 38% reduced in infarct size in metabolically intact rats. The dependence of cardioprotection in rats with metabolic syndrome during chronic hypoxia on glucose tolerance, serum triglyceride level, opioids in the blood serum and myocardium, PKC and NOS was found.

Conclusion: The infarct-limiting efficiency of adaptation to chronic hypoxia is reduced at rats with metabolic syndrome. The increase in the infarction in this case directly depends on the disturbances in carbohydrate, lipid metabolism and opioid signaling.

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BIOGRAPHY

Natalia V Naryzhnaya has completed his PHD at the age of 27 years from Cardiology Research Institute, Tomsk, Russia. She is the leading researcher of laboratory of Experimental Cardiology of this Institute. She has over 120 publications that have been cited over 450 times, and she's publication h-index is 11.