Abstract

Adaptation to hypoxia or exercise training has cardioprotective effects against acute ischemic injury, but can potentially negatively influence heart function. Possible negative changes depend on the degree of hypoxia and exercise training intensity. It is therefore necessary to evaluate the effects of the specific adaptation protocols used. The ideal technique is echocardiography, which enables non-invasive, repeated and long-term measurements of the same individual allowing to study the development of changes in the course of adaptation.

The aim of this study was to determine the effects of selected protocols of adaptation to intermittent hypobaric hypoxia (corresponding to the altitude of 4,000 to 8,000 meters above sea level, for 15 weeks in total) and exercise training (running speed 30 m.min\(^{-1}\) for 60 min a day, 4 weeks in total) on the left ventricle geometry and systolic function in rats. We assessed basic echocardiographic parameters of the ventricle geometry and function such as fractional shortening, ejection fraction, stroke volume, cardiac output etc.

The adaptation of rats to intermittent hypobaric hypoxia lead neither to the impairment of systolic function nor to the development of left ventricle hypertrophy compared to controls; signs of moderate hypertrophy were observed only at the highest degree of hypoxia corresponding to 8,000 m above sea level. Adaptation to exercise training had no effects. In conclusion, the specific adaptation protocols, used to study cardioprotective mechanisms, are not associated with unfavorable changes in echocardiographic parameters of the left ventricle systolic function and geometry in rats.

Keywords: echocardiography, experimental cardiology, exercise training, chronic hypoxia, cardioprotection, left ventricle, systolic function, rat