INFLUENCE OF ALTITUDE TRAINING OF THE MIGRATORY ACTIVITY OF MESENCHYMAL STEM CELLS
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Introduction
Controlled physical training (CPT) is a balanced alternation of high impact phases and regeneration. An essential part of the regeneration is tissue repair, which is connected with the activity of stem and progenitor cells. It is evident that endothelial progenitor cells (EPC) have some impact on the repair of endothelial tissues; mesenchymal stem cells (MSC) could differentiate into muscle (heart), bone, cartilage tissues. Some studies displayed the influence of physical activity to EPC [1] and mesenchymal stem cells [2]. The aim of the study was to highlight the influence of hypoxic training on the migratory activity of mesenchymal stem cells.

Methods
Highly trained junior swimmers (8 subjects each experimental and control group) participated in the study. The athletes of the experimental group underwent a three week altitude training camp at 2300 meters above see level following the living high training high design. Before the training camp, two incremental tests on a cycle ergometer under sea level conditions and under artificial hypoxic conditions with 2 blood samples (before and after, respectively) were carried out. Incremental tests were repeated twice during the training period and in the first and second week after the training camp. The same protocol was carried out in both groups. Chemokines like basic fibroblast growth factor (bFGF) and vascular endothelial growth factor (VEGF) were measured by ELISA. The blood samples were also used for migration assay of MSCs.

Results
Compared to pre-test values the concentration of VEGF was higher after each incremental test, but there was no additional effect after the hypoxia training. For bFGF no acute changes were induced by physical activity, but we observed the highest values in the altitude group during and after the training camp. The migratory activity was higher after each incremental test, but no additional effect was caused by the hypoxic training.

References

Keywords: Altitude Training