Body mass is regulated by a powerful homeostatic system that, in response to weight loss, triggers compensatory changes in appetite and energy expenditure to promote weight regain (1). The aim of this study was to investigate the changes in selected endocrinological parameters that stand for energy homeostasis in male bodybuilders during the preparation for national championships. 16 male bodybuilders (7 competitors: 28.29 ± 10.27 years, 175.27 ± 5.42 cm, 82.24 ± 9.25 kg, and 9 as control: 23.98 ± 5.42 years, 183.46 ± 6.37 cm, 89.07 ± 11.74 kg) participated in this study. The subjects were tested three times – 10 weeks (TEST1), 5 weeks (TEST2) and three days (TEST3) prior the national championships. The testing procedure included: dual-energy X ray absorptiometry scan, and venous blood sampling for fasting ghrelin, leptin and adiponectin concentrations. The body builders’ group was in the negative energy balance of -174.7 ± 660 Kcal/day at TEST1 and reaching to -933.9 ± 658.3 Kcal/day just few days prior to competition during TEST 3. The competitors presented quite low body fat% values already at the beginning of the study, yet they were capable to decrease it to 6.54 ± 1.54% that resulted in significant (p<0.05) 2.87 kg loss of, while the body mass was not changed in the control group during the 10 week period. Ghrelin increased significantly by 12.6% by Test 2. By Test 3 ghrelin was further increased by 6% (p>0.05). The pattern of leptin was opposite, with a significant 27.7% decrease at TEST 2 and no further change in leptin levels at TEST 3 (p>0.05). No significant change was observed in adiponectin concentration during the study. In control group no significant changes in biochemical parameters were observed. In conclusion, ghrelin concentrations significantly increase in the conditions of negative energy balance that is accompanied by significant body mass lost in male subjects with initial low body fat values. However, despite further negative energy balance, ghrelin levels did not change significantly that could suggest an upper limit exists in ghrelin levels during conditions of very low body fat mass.

Keywords: Hormones, Body Composition, Energy Expenditure