



Exercise Biochemistry Review

Proceedings of IBEC 2018, Beijing, China, October 23-25
PO-249

Does High Serum MG53 Level Associates with Better Cardiorespiratory Function?

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Objective To investigate the association between the endogenous human serum MG53 level and cardio-respiratory function in response to graded exercise test (GXT).

Methods Sixteen healthy male volunteers (23.1 ± 2.9 yrs, 169.5 ± 6.0 cm in height, 63.2 ± 5.9 kg in weight, $12.2 \pm 3.1\%$ in %FAT, 53.2 ± 5.4 ml/min/kg in VO_{2max}) fully acknowledged and signed informed consent and participated in this study. Fasting blood samples were drawn before each VO_{2max} test, serum MG53 was measured by ELISA kits (LifeSpan, USA). Two VO_{2max} tests were performed on each of these sixteen participants with cycle ergometer, and they had a 7 weeks regular physical training (all individuals performed a same routine summer camp exercise training) between the two tests.

Difference between groups was determined by UNIANOVA and the correlation coefficient (r) between the cardiorespiratory parameters and serum MG53 value was determined by pearson test.

Results Results were divided into 3 groups according to serum MG53 levels, they are Low serum MG53 (n=5, 0.60 ± 0.45 ng/ml) group (L), Medium serum MG53 (n=6, 2.08 ± 0.75 ng/ml) group (M) and High serum MG53 (n=4, 4.23 ± 1.80 ng/ml) group (H). There is no significant difference between M and L when comparing end tidal gas component. However, we found M had higher red blood cell count (RBC) than L (4.98 ± 0.22 vs $4.65 \pm 0.31 \times 10^{12}/L$, $p < 0.01$), higher hemoglobin (Hb) than L (155.3 ± 7.6 vs 141.5 ± 8.1 g/L, $p < 0.01$), and higher hematocrit (HCT) than L (46.6 ± 2.1 vs $43.1 \pm 2.6\%$, $p < 0.01$). Moreover, we found that H had higher ventilation threshold (VT) than L (47.5 ± 6.5 vs 38.6 ± 3.9 ml/min/kg, $p < 0.01$) and M (47.5 ± 6.5 vs 42.5 ± 2.8 ml/min/kg, $p < 0.05$). Similarly, we found H had higher VO_{2max} than L (59.6 ± 4.7 vs 51.6 ± 6.7 ml/min/kg, $p < 0.05$), higher workload at VT than L (13.2 ± 3.7 vs 11.1 ± 1.7 Watts, $p < 0.05$), higher RBC than L (5.20 ± 0.18 vs $4.65 \pm 0.31 \times 10^{12}/L$, $p < 0.01$), higher Hb than L (158.8 ± 4.2 vs 141.5 ± 8.1 g/L, $p < 0.01$), and higher HCT than L (47.4 ± 1.5 vs $43.1 \pm 2.6\%$, $p < 0.01$). Correlation analysis demonstrated that VO_{2max} ($r = 0.43$, $p < 0.05$), workload at VT ($r = 0.41$, $p < 0.05$), RBC ($r = 0.53$, $p < 0.01$), Hb ($r = 0.57$, $p < 0.01$) and HCT ($r = 0.47$, $p < 0.01$) are positively correlated with Serum MG53.

Conclusions It suggested that human serum MG53 level might be positively correlated with cardiorespiratory parameters that have been tested (e.g. VO_{2max} , workload at VT, RBC, HCT and Hb).