



Proceedings of IBEC 2018, Beijing, China, October 23-25
PO-120

Research on the fluctuation of Reticulocyte during different altitude training patterns in swimming athletes

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Objective To explore the fluctuation of reticulocyte during different altitude training in swimming athletes and their difference between altitude training focused on special aerobic capacity and altitude training focused on high load and sprint, to provide the theory basis for further analyze the altitude training improve the physiological function and athletic performance.

Methods Twenty female swimming athletes participated in altitude training for four weeks, which could be divided into two patterns, special aerobic capacity group(G1, n=9) and intensity and sprint group(G2, n=11). Fasting venous blood samples were drawn for each week were determined using Beckman Coulter LH780 automated hematology analyzer, including Reticulocyte related parameters such as Reticulocyte percentage (Ret%), Reticulocyte count (Ret#) and immature Reticulocyte fraction (IRF) and also erythrocyte related parameters.

Results (1) In G1, Ret%, Ret# and MRV showed continuous decline and represented minimum level in 4th week. While IRF increased during 2nd and 3rd, and then decreased in 4th week. (2) In G2, Ret%, Ret# and MRV were relatively steady during 1st and 2nd week. Ret% and Ret# gave an increased in 3rd week, and then decreased in 4th week, while MRV decreased in 3rd week and increased in 4th week. IRF significantly decreased in latter period compared to earlier period. (3) There were no significant changes for RBC, HCT and HGB in both G1 and G2. MCV, MCH, MCHC and RDW showed improved in later stages compared to their in earlier stages for all in G1, while MCV increased and then decreased, MCH and MCHC continued decline, and RDW kept at sustaining higher levels in G2.

Conclusions (1) Reticulocytes were not in accordance with the trend of erythrocyte during different altitude training. Compared to erythrocyte, the behavior of Reticulocyte could reflect erythropoiesis, and IRF could more sensitively detect the change of bone marrow stimulation in particular.

(2) The variability of Reticulocytes during altitude training was influenced by hypoxia, training and especially their interactive effects. In aspect of training type, it was crucial for considering the fluctuation of training load and athletes' adaptation during different patterns.