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TOTAL HEMOGLOBIN MASS, BLOOD VOLUME AND AEROBIC CAPACITY AFTER EXERCISE TRAINING INTERVENTION IN HEALTHY MEN AND MEN WITH TYPE 1 DIABETES

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Objectives

To examine whether men with type 1 diabetes (T1D) increase blood oxygen carrying capacity and aerobic capacity by exercise training similarly to healthy men (CON).

Methods

Thirteen of 18 CON (mean±SD; age 32±6, BMI 25±3) and 8 of 11 T1D (age 34±6, BMI 25±2) participated in individualized and combined aerobic and resistance exercise training program for 6-12 months, while the rest of them participated as non-training controls. Total hemoglobin mass (tHb-mass, g/kg), plasma volume (PV, ml/kg) and blood volume (BV, ml/kg) were measured by CO-rebreathing method. Maximal oxygen consumption (VO_{2max}, ml/kg/min) was determined by measuring alveolar gas exchange in incremental cycle ergometer test. Pre-post changes were tested by Wilcoxon signed-rank test.

Results

Training increased (mean±SD, p<0.05) tHb-mass from 10.6±1.2 to 11.3±1.0 in CON and from 10.7±1.2 to 11.2±1.2 in T1D, VO_{2max} from 43±6 to 46±6 in CON and from 38±4 to 41±3 in T1D, PV from 48±5 to 50±4 in CON and BV from 80±9 to 84±6 in CON only. Half of trained T1D did not have increase either in PV or BV. Non-trained CON and T1D had no significant changes.

Conclusion

Individualized exercise training was as effective in men with type 1 diabetes as in healthy men in increasing tHb-mass and VO_{2max}. However, PV and BV did not respond significantly in men with type 1 diabetes.