

Aerobic Exercise Increases Circulating Hematopoietic Stem Cells and Endothelial Progenitor Cells

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Abstract : Physical activity activates a variety of adult stem cells which might be released into the circulation or might be activated in their organ-resident state. A variety of stimuli such as metabolic, mechanical, and hormonal stimuli might be responsible for the mobilization. This study was done to know the changes in hematopoietic stem cells and endothelial progenitor in athletes in the 24 hours following 30 min of aerobic exercise. Methods: Ten healthy male's athlete's (age 20.7 ± 0.61 y) performed moderate running with 30 min at 80% of velocity of The IAT. Blood samples taken pre-, and immediately, 30 min, 2h, 6h and 24h post-exercise were analyzed for hematopoietic stem cells (HSCs), endothelial progenitor cells (EPCs), vascular endothelial growth factor (VEGF), nitric oxide (NO), lactic acid (LA), and white blood cells. HSCs and EPCs were quantified by flow cytometry. Results: After 30min of aerobic exercise significant increases in HSCs, EPC, VEGF, NO, LA and WBCs ($p < 0.05$). This increase will be at different rates according to the timing of taking blood sample and was in the maximum rate of increase after 30 min of aerobic exercise. HSCs, EPC, NO and WBCs were in the maximum rate of increase 2h post exercise. In addition, VEGF was in the maximum rate of increase immediately post exercise and LA concentration not affected after exercise. Conclusion: These data suggest that HSCs and EPCs increased after aerobic exercise due to increase of VEGF which play an important role in mobilization of stem cells and promotes NO increase which contributes to increase EPCs.

Keywords : physical activity, hematopoietic stem cells, mobilization, athletes

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