
Abstract

BACKGROUND: Exercise affects growth and development through a complex interaction between the endocrine, immune, and nervous systems. To date very little is known about how these systems respond to exercise in children or adolescents. Moreover, there are few studies that have examined growth factors, pro-inflammatory cytokines, and peripheral blood mononuclear cell responses to 'real-life' or field exercise solely in girls.

AIM: To determine the acute exercise-induced alterations in the growth hormone (GH)-insulinlike growth factor-I (IGF-I) axis, inflammatory cytokines, and certain aspects of immune function (white blood cell [WBC] subpopulations and their associated adhesion molecules) in a group of adolescent girls following a typical cross country practice.

METHODS: Eight, healthy, postpubertal, high school females, 15-18 years old, performed a single, typical, one hour cross-country practice session. Blood was sampled before and after the session.

RESULTS: Following exercise, lactate increased by 364 +/- 67% (p < 0.001). Significant increases were noted in circulating IL-6 (p < 0.023), TNF-alpha (p < 0.027), IL-1beta (p < 0.047) and IL-1ra (p < 0.002), as well as a substantial increase in GH (p < 0.007). The exercise led to significant increases in all WBC subpopulations and platelets. The most significant changes were observed for natural killer cells (p < 0.0005). The exercise significantly influenced adhesion molecules (such as CD62L, CD54).

CONCLUSIONS: These data demonstrate that an intense exercise bout in adolescent females leads to profound increases in inflammatory cytokines, with substantial changes in WBC and adhesion molecules. The role of these frequent, almost-daily perturbations on growth, development and immunity has yet to be determined.