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Relationship between fasting insulin resistance index (FIRI) and plasma glycerol and free fatty acid levels in physically active males and females

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It is well known that whole-body insulin sensitivity is greater in sedentary women than in men. However, data concerning insulin sensitivity in physically active males and females are not available. This study aimed at evaluation of insulin sensitivity expressed as fasting insulin resistance index (FIRI) and its relationship with plasma glycerol and free fatty acid levels in physical education students of both sexes not engaged in high-performance sport, but highly active (7 h/week) due to the obligatory study program. Blood was withdrawn from the antecubital vein after an overnight fast. Plasma glucose, glycerol and free fatty acids (FFA) were assayed colorimetrically using Randox commercial kits (Randox Laboratories, United Kingdom). Plasma insulin was determined by a standard radioimmunoassay method and Bio-Source commercial kits (Belgium) with monoclonal antibodies against insulin. Plasma glucose and insulin concentrations in females were found to be significantly lower than in males and in consequence the FIRI value in the former was markedly lower than in the latter indicating greater insulin sensitivity in females vs. males of matched physical activity. Plasma glycerol and FFA concentrations did not differ between the sexes. However, in women, but not in men there was a significant and positive correlation between plasma glycerol and FFA levels ($r=0.55$, $p<0.01$) indicating a balance between lipolytic activity and FFA uptake by peripheral tissue. In men, but not in women plasma FFA levels were significantly and inversely correlated with FIRI ($r=-0.59$, $p<0.01$). The above data suggest that FIRI values in males are more sensitive to the fluctuation in plasma FFA concentrations than in females. On the other hand, it could not be excluded that in physically active males both FFA release from adipose tissue and uptake by peripheral tissue is more sensitive to insulin action than in females.

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