Evidence for an exercise induced increase of TNF-α and IL-6 in marathon runners.

Abstract:
Regular physical activity of moderate intensity improves cardiovascular risk factors including low-grade inflammation. However, acute vigorous exercise such as marathon running results in marked increases of circulating pro-inflammatory markers. Up to now, the origin of this pro-inflammatory boost is still debated equivocally. We analyzed the change of interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), and leptin from pre- to immediately post-race in 15 male runners (age 43 ± 10.9 years and body mass index 24.5 ± 2.7 kg/m²) both on the protein level in the plasma and on the messenger ribonucleic acid (mRNA) level in blood mononuclear cells (BMNC). We observed a significant increase of IL-6 (prerace 2.08 ± 0.10 ng/L and postrace 40.14 ± 24.85 ng/L, P< 0.001) and TNF-α (prerace 8.14 ± 1.38 ng/L and postrace 12.40 ± 3.15 ng/L, P< 0.001) and a decrease of leptin (prerace 1.64 ± 2.64 ?g/L and postrace 0.80 ± 1.70 ?g/L, P = 0.04) serum levels after the marathon race. Furthermore, TNF-α, IL-6, and leptin were expressed (mRNA level) in BMNC. However, no significant differences in mRNA levels were seen before and after the run in these cells. We found an up-regulation of TNF-α and IL-6 in the plasma during vigorous exercise. This increase is not attributable to BMNC. We assume a local production in, or release from, exercised tissues.