Circulating inflammatory miRNA signature in response to different doses of aerobic exercise

De Gonzalo-Calvo D.

Dávalos A.

Montero A.

García-González Á.

Tyshkovska I.

González-Medina A.

Soares S.M.A.

Martínez-Camblor P.

Casas-Agustench P.

Rabadán M.

Díaz-Martínez Á.E.

Úbeda N.

Iglesias-Gutiérrez E.

While moderate acute exercise has been associated with strong anti-inflammatory mechanisms, strenuous exercise has been linked to deleterious inflammatory perturbations. It is therefore fundamental to elucidate the mechanisms that regulate the exercise-induced inflammatory cascade. Information on novel regulators such as circulating inflammatory microRNAs (c-inflammamiRs) is incomplete. In this study, we evaluated the response of a panel of c-inflammamiRs to different doses of acute aerobic exercise. We first studied the exercise-induced inflammatory cascade in serum samples of nine active middle-aged males immediately before and after (0 h, 24 h, 72 h) 10-km, half-marathon, and marathon races. Next, we analyzed the circulating profile of 106 specific c-inflammamiRs immediately before) and after (0 h, 24 h) 10-km (low inflammatory response) and marathon (high inflammatory response) races. Analysis of classical inflammatory parameters revealed a dose-dependent effect of aerobic exercise on systemic inflammation, with higher levels

detected after marathon. We observed an increase in miR-150-5p immediately after the 10-km race. Levels of 12 c-inflammamiRs were increased immediately after the marathon (let-7d-3p, let-7f-2-3p, miR-125b-5p, miR-132-3p, miR-143-3p, miR- 148a-3p, miR-223-3p, miR-223-5p, miR-29a-3p, miR-34a-5p, miR- 424-3p, and miR-424-5p). c-inflammamiRs returned to basal levels after 24 h. Correlation and in silico analyses supported a close association between the observed c-inflammamiR pattern and regulation of the inflammatory process. In conclusion, we found that different doses of acute aerobic exercise induced a distinct and specific c-inflammamiR response, which may be associated with control of the exercise-induced inflammatory cascade. Our findings point to c-inflammamiRs as potential biomarkers of exercise-induced inflammation, and hence, exercise dose.

Circulating microRNAs

Exercise

Inflammation

biological marker

microRNA

adult

blood

exercise

human

inflammation

male

physiology

running

Adult

Biomarkers

Exercise

Humans

Inflammation

Male

MicroRNAs

Running