ANNALS OF RESEARCH IN SPORT AND PHYSICAL ACTIVITY

Whole blood cultures from continuous exercises performed at different intensities in well-trained men

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CYTOKINE PRODUCTION IN LPS-STIMULATED WHOLE BLOOD CULTURES FROM CONTINUOUS EXERCISES PERFORMED AT DIFFERENT INTENSITIES IN WELL-TRAINED MEN

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KEYWORDS: Physical exercise, Metabolism, Inflammation, Health

BACKGROUND

Exhaustive exercise can promote changes in inflammatory response, and lead to pro-inflammatory (higher TNF- α levels) or anti-inflammatory (higher IL-10 levels) status. The inflammatory responses can be influenced by exercise intensity, duration, and physical fitness level. However, it is unknown the better intensity to promote anti-inflammatory response in well-trained men.

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OBJECTIVE

To evaluate the effects of acute exercise sessions performed at moderate, heavy, and severe intensity on cytokines responses in well-trained men.

METHODS

Seven healthy male volunteers ($\text{Age}_{\text{mean}}=31\pm6.3$; $\text{Weight}_{\text{mean}}=79.4\pm13.7$; $\text{BMI}_{\text{mean}}=25.5\pm2.8$) performed an incremental protocol in cycle ergometer to determine the

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intensities domain of rectangular tests. The moderate (90% of lactate threshold (PLac)), heavy (PLac + 50% Δ between Anaerobic threshold (PLan) and PLac), and severe (PLan + 50% Δ between maximum power output (W_{peak}) and PLan) intensity domain was performed until voluntary exhaustion or when the subject completed 1 hour of testing. Blood samples were collected at rest, immediately and 60-min after different exercise sessions. We used whole blood in short time (1h) LPS-stimulated cultures for analyses IL-6, IL-10, and TNF- α levels. For statistic treatment, the comparison between the intensities was performed by ANOVA one-way and Bonferroni post-hoc was used; for all cases we adopted $p < 0.05$.

Results: When compared the intensities, no difference was observed between them in the alterations of IL-6 and TNF- α levels; however, heavy intensity session showed a tendency to cause a greater decrease in TNF- α ($\Delta_{heavy} = -86.13 \text{ pg/mL}$; $F = 2.953$; $p = 0.079$) when compared with moderate ($\Delta_{moderate} = 3.44 \text{ pg/mL}$) and severe intensities ($\Delta_{severe} = 148.55 \text{ pg/mL}$). On the other hand, there was a significant increase in the IL-10 levels immediately after exercise sessions performed at moderate and heavy intensity, with higher values in both intensities ($\Delta_{moderate} = 11.44 \text{ pg/mL}$; $\Delta_{heavy} = 11.93 \text{ pg/mL}$) when compared with severe intensity ($\Delta_{severe} = -6.38 \text{ pg/mL}$; $F = 4.632$; $p = 0.025$); however, only the session training performed at heavy intensity was able to sustain increased IL-10 levels 60-minutes post-exercise ($\Delta_{heavy} = 6.65 \text{ pg/mL}$; $F = 5.340$; $p = 0.016$).

CONCLUSION

The anti-inflammatory response promoted by acute exercise session is time and intensity-dependent in well-trained men given that, when compared the intensities, only the session exercise performed at heavy intensity was able to provide a trend of reduction in TNF- α parallel with significant increase of IL-10 concentrations.

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