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Associations between metabolic and inflammatory changes in obese middle-age men after 24 weeks of combined training

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ASSOCIATIONS BETWEEN METABOLIC AND INFLAMMATORY CHANGES IN OBESE MIDDLE-AGE MEN AFTER 24 WEEKS OF COMBINED TRAINING

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KEYWORDS: Metabolomics, inflammatory markers, obesity, physical exercise, metabolism

Obesity increases the circulating levels of pro-inflammatory markers, and the incidence of non-communicable diseases (NCDs). In contrast, physical exercises may have a major role in modulating levels of pro and anti-inflammatory markers deregulated by an excess of adipose tissue. In a previous study, we concluded that 24 wk of combined training (CT) in obese men were effective to reduce pro-inflammatory markers, and provided an anti-inflammatory effect on metabolism⁽¹⁾. In another study (in press), we observed a different metabolic profile between obese men that performed or not 24 weeks of CT, suggesting new metabolites candidate biomarkers. Thus, the aim of this study was to associate the changes (%Δ) in inflammatory markers and metabolites, after 24 weeks of CT. Twenty-two obese middle-aged men (48.2 ± 6.1 years; Body Mass Index 31 ± 1.4 kg/m²) participated in the study. The CT was performed with moderate-to-high-intensity, three times a week (resistance and aerobic training in the same session) during 24 weeks. The pro and anti-inflammatory markers (TNF-α, CRP, IL-6, IL-10, IL-15, resistin, leptin, and adiponectin) measurements were determined by enzyme-linked immunosorbent assay (ELISA). The metabolites were identified by ¹H NMR-based metabolomics. A PLS-DA model was conducted with fold change values (post/pre). Twenty metabolites with higher VIP score were selected as the most significant in the segregation of groups (tyrosine, 2-oxoisocaproate, histidine, pyruvate, phenylalanine, isoleucine, choline, betaine, carnitine, lysine, glucose, creatinine, ornithine, valine, alanine, leucine, glutamine, asparagine, 2-aminobutyrate, and lactate). Pearson's or Spearman correlations coefficients were used to associations between metabolites and inflammatory markers changes (%Δ). The software used was Prism GraphPad

• 105

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5.0. The significance criterion adopted was 5% ($p < 0.05$). There was a negative correlation between adiponectin, 2-aminobutyrate ($r = -0,750$) and pyruvate ($r = -0,641$); IL-6, alanine ($r = -0,618$) and lysine ($r = -0,666$); leptin and glutamine ($r = -0,782$). Positive correlations were also observed between IL-6 and isoleucine ($r = 0,600$); IL-10 and glutamine ($r = 0,866$); CRP, glucose ($r = 0,809$) and ornithine ($r = 0,724$) were showed. These results showed that the changes in the metabolic profile, induced by 24 weeks of CT, in the metabolism of obese men are related to concomitant changes in the inflammatory profile.

ACKNOWLEDGEMENTS

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