ANNALS OF RESEARCH IN SPORT AND PHYSICAL ACTIVITY

2 adrenergic regulation of the phagocytic activity of peritoneal macrophages in obese mice: effect of an acute intense exercise

Autor(es): Gálvez, I; Martín-Cordero, L; Álvarez-Barrientos, A; Ortega, E

Publicado por: Imprensa da Universidade de Coimbra

URL persistente: URI:<http://hdl.handle.net/10316.2/44162>

DOI: DOI:https://doi.org/10.14195/2182-7087_ex2018_98

Accessed : 26-Apr-2023 09:03:17

A navegação consulta e descarregamento dos títulos inseridos nas Bibliotecas Digitais UC Digitalis, UC Pombalina e UC Impactum, pressupõem a aceitação plena e sem reservas dos Termos e Condições de Uso destas Bibliotecas Digitais, disponíveis em <https://digitalis.uc.pt/pt-pt/termos>.

Conforme exposto nos referidos Termos e Condições de Uso, o descarregamento de títulos de acesso restrito requer uma licença válida de autorização devendo o utilizador aceder ao(s) documento(s) a partir de um endereço de IP da instituição detentora da supramencionada licença.

Ao utilizador é apenas permitido o descarregamento para uso pessoal, pelo que o emprego do(s) título(s) descarregado(s) para outro fim, designadamente comercial, carece de autorização do respetivo autor ou editor da obra.

Na medida em que todas as obras da UC Digitalis se encontram protegidas pelo Código do Direito de Autor e Direitos Conexos e demais legislação aplicável, toda a cópia, parcial ou total, deste documento, nos casos em que é legalmente admitida, deverá conter ou fazer-se acompanhar por este aviso.

ANNALS OF
**RESEARCH IN SPORT
AND
PHYSICAL ACTIVITY**

β₂ ADRENERGIC REGULATION OF THE PHAGOCYTIC ACTIVITY OF PERITONEAL MACROPHAGES IN OBESE MICE: EFFECT OF AN ACUTE INTENSE EXERCISE

Gálvez I¹; Martín-Cordero L²; Álvarez-Barrientos A³; Ortega E¹

KEYWORDS: acute exercise, adrenergic receptor, obesity, phagocytosis.

Obesity is a worldwide epidemic and it is associated with comorbid conditions that involve alterations of the innate immune response. It is also correlated with changes in the function of the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenal (HPA) axis. Catecholamines secreted by the SNS and the adrenal glands are important immunoregulatory molecules, and adrenergic agonists interfere with the inflammatory response. In addition, exercise, besides activating the SNS and HPA axis, is an event that can reverse pathologies arising from obesity⁽¹⁾. However, the influence of obesity on the adrenergic regulation of the innate immune response, and the role of physical activity on the mechanisms underlying this regulation in obesity, are still not well understood. The aim of this study was to investigate the influence of obesity, and the effects of a single bout of acute exercise (running, 35 min at 16 m/min) on the β₂ adrenergic regulation of the phagocytic capacity of peritoneal macrophages. A group of 20 ten-week old C57BL/6J mice were fed a diet containing either 5% (lean group, n=10) or 40% of fat –60% of the kcal from fat– (obese group, n=10) for 18 weeks. Then, 5 animals from each group were subjected to the acute exercise. The macrophages' phagocytic capacity against opsonized bacteria was evaluated by flow cytometry in peritoneal macrophages, in the presence or absence of the β₂ adrenergic agonist terbutaline. The results showed a lower phagocytic macrophage percentage in the obese mice than in the lean mice. Acute intense exercise de-

• 249

¹ Immunophysiology Research Group, Department of Physiology, University of Extremadura, Spain.

² Immunophysiology Research Group, Department of Nursing, University of Extremadura, Spain

³ Facility of Bioscience Applied Techniques, University of Extremadura, Badajoz, Spain.

Email: orincon@unex.es; leticiamartin@unex.es; igalvez@unex.es

creased the phagocytic percentage and increased the phagocytic activity of macrophages in both groups. In addition, terbutaline seemed to decrease the phagocytic percentage and phagocytic activity of macrophages in both groups, irrespective of performing exercise or not. In conclusion, these results suggest that obesity presents a deteriorated phagocytic capacity of peritoneal macrophages, probably contributing to an impaired defence against bacterial infections. The exercise-induced decrease in the percentage of the phagocytic macrophages seems to be compensated by an increased activity of these cells, irrespective of obesity. The activation of β_2 adrenergic receptors seems to decrease the phagocytic capacity of macrophages, irrespective of weight and of performing exercise or not.

This investigation has been supported by "Ministerio de Economía y Competitividad" (DEP2015-66093-R). We would like to thank the STAB (UEx) for technical and human support.

REFERENCES

1. Ortega, E., Martín-Cordero, L., García-Roves, P.M., Chicco, A.J., González-Franquesa, A., Marado, D. (2015). Diabetes Mellitus and Metabolic Syndrome. In: Palavra, F., Reis, F., Marado, D., Sena, A. ed. Biomarkers of Cardiometabolic Risk, Inflammation and Disease. Switzerland: Springer International Publishing, pp. 55-79