

Changes in intestinal immune system after training and exhausting physical exercise in rats

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Background and objectives:

An exhausting physical exercise induces adverse effects on the immune system including the gut-associated lymphoid tissue. In this situation, nutrition may play a role by reducing the exercise-induced immunodepression. This study aimed to develop a suitable rat model for training and exhausting exercise in which biomarkers of intestinal immune system could be defined.

Methodology:

Three-week-old female and male Wistar rats were distributed into runner and sedentary groups. Runner rats were progressively trained in a treadmill for 4 weeks. In the last week, intestinal permeability was measured through the oral administration of β -lactoglobulin, and its further quantification in serum samples collected every 30 min. At the end, an exhausting test was carried out and samples were immediately collected. Immunoglobulin A (IgA) concentration was quantified in serum and caecal content by ELISA. The proportion of caecal IgA-coated bacteria was determined with fluorescent-labelled anti-rat IgA followed by flow cytometry analysis.

Results and conclusions:

Although rats' training and exhausting exercise did not affect serum IgA concentration, it induced changes at intestinal level. In particular, runner rats had lower intestinal permeability than the sedentary group. In addition, caecal IgA content was lower in runners than the sedentary group. Nevertheless, the proportion of caecal IgA-coated bacteria increased in male runners.

In conclusion, these results suggest the influence of physical exercise on the rat intestinal immunity and represent a first approach to establish biomarkers of intestinal changes.

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