ANNALS OF RESEARCH IN SPORT AND PHYSICAL ACTIVITY

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AND
PHYSICAL ACTIVITY**

EXERCISE, THE MICROBIOTA AND IMMUNE REGULATION

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INTRODUCTION

Exercise and the microbiota exert strong influence on the immune system. Evidence from animal models suggests that exercise may alter the composition of the microbiota, suggesting a further mechanism to explain the beneficial effects of physical activity ⁽¹⁾. We examined differences in faecal microbial composition and whole blood immune cell profiles between healthy adults, well trained recreational athletes and a cohort of elite athletes selected for the Rio 2016 Olympics.

METHODS

A cross-sectional study compared gut microbiota and peripheral blood immune cell profiles in 12 healthy adults (age 42 ± 11 yrs; body mass index (BMI) 22 ± 1.2 kg/m²; mean $\pm$ SD), 12 well-trained recreational athletes (age 27 ± 6.3 ; BMI 22 ± 2.0 kg/m²) and 12 elite athletes selected for the Rio 2016 Olympic Games (age 24 ± 3.62 , BMI 23 ± 1.5 kg/m²). Peripheral blood innate and adaptive immune cell abundance was determined by

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the nCounter® PanCancer Immune Profiling panel (NanoString Technologies, WA, USA). Microbiome composition was assessed using 16s rRNA gene sequencing.

RESULTS

Preliminary analysis indicates a significantly greater diversity of microbes in elite and recreational athletes compared to healthy individuals. Elite athletes displayed a considerably smaller variation in total microbial diversity compared to both recreational athletes and healthy individuals. Elite athletes had significantly lower abundance of CD8⁺, exhausted T-cells, NK cells (dim) and Th-1 cells. Both recreational and elite athletes had a significantly lower abundance of macrophages than healthy individuals. Recreational athletes had a significantly higher abundance of regulatory T cells, dendritic cells and Th-2 cells than elite athletes and healthy individuals.

DISCUSSION

Differences in immune and microbial composition between the groups was evident, with elite athletes characterised by a Th-1 profile and recreational athletes by a Th-2 profile. Further analysis on the relationship between microbial operational taxonomic units and immune cell subsets may provide further information in humans for an exercise – diet interaction in relation to gut bacteria.

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