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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 ± 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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https://doi.org/10.14195/2182-7087_ex2018_43
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.

This research was funded by the Australian Institute of Sport High Performance Research Fund, the Menzies Health Institute of QLD, Griffith University, the Gold Coast University Hospital Foundation and the Queensland Academy of Sport Research Fund.

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