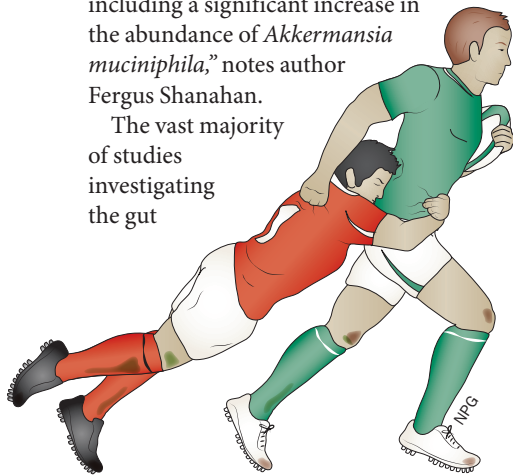


GUT MICROBIOTA

Tackling the effects of diet and exercise on the gut microbiota

A new study published in *Gut* highlights that high levels of exercise and an accompanying high-protein diet are associated with changes to the gut microbiota, with elite athletes having a more diverse range of microorganisms in their gut than control individuals. “In addition to microbial diversity, we also found specific compositional changes in the [gut] microbiota of the athletes, including a significant increase in the abundance of *Akkermansia muciniphila*,” notes author Fergus Shanahan.

The vast majority of studies investigating the gut



microbiota have focused on the effects of obesity, disease or dietary excess (high-fat diets). As awareness increases about the influence of the gut microbiota on health, attention has turned to how the modern lifestyle (such as poor diet and low levels of exercise) might have a role in maintaining a healthy gut microbiota.

Shanahan and colleagues examined the gut microbiota of professional rugby players at a preseason training camp ($n = 40$) as well as two different control groups of healthy individuals matched for age and gender, but split by BMI (low BMI ≤ 25 , $n = 23$; high BMI > 28 , $n = 23$) to account for the large physical size of the rugby players. Nutritional (including detailed information on diet) and clinical data were collected for all participants, as well as metagenomic compositional analysis of the faecal microbiota.

As expected, athletes had higher plasma levels of creatine kinase (a marker of extreme exercise) than controls; lower levels of inflammatory markers and improvements in metabolic markers were

also observed. Moreover, compared with controls, athletes had a more diverse range of microbes in their gut—22 distinct phyla versus only 11 and nine phyla in the low-BMI and high-BMI controls, respectively. Importantly, this change in diversity positively correlated with protein intake and creatine kinase levels.

“An important caveat to the study is that the athletes’ diet differed from that of the controls,” warns Shanahan. “They eat more of everything than the controls, but particularly protein supplements.” As such, further prospective studies are now planned to separate out the effects of exercise from the dietary changes that often accompany a healthy lifestyle in general. Crucially, more work is needed to prove that exercise has a direct effect on the gut microbiota and a causative role in changing the diversity of these microbes.

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Original article Clarke, S. F. *et al.* Exercise and associated dietary extremes impact on gut microbial diversity. *Gut* doi:10.1136/gutjnl-2013-306541