

# EXERCISE AND THE MICROBIOME

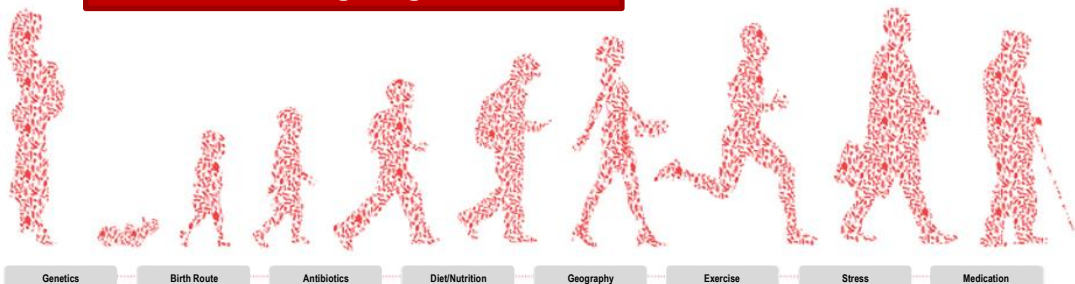


The human gut is home to approximately 100 trillion microbes including: bacteria, archaea, fungi, protozoans & viruses. The majority of these are found in the colon and have important functions within our bodies including producing vitamins, digesting fibre, and developing our immune systems. The different types of microbes living in our gut are influenced by a wide range of factors including our diets, antibiotic use, and exercise.

Exercise has the potential to alter a variety of factors within the human body, including the gut microbiome. Studying the impact of exercise on the gut microbiome could identify microbes which might be of importance to athlete health and could improve both general athlete health and possibly even performance.

Gastrointestinal complaints and asthma are common among athletes. These conditions have been linked with changes to the gut microbiome. Alteration of the gut microbiome could help to address these conditions to ensure good athlete health and subsequent performance

## Factors influencing the gut microbiome



## EXERCISE AND THE MICROBIOME RESEARCH – THE STORY SO FAR

Despite the huge wealth of knowledge surrounding the various factors influencing the gut microbiome, relatively little is known about the impact of exercise on the gut microbiome. Previously, it was only possible to study the gut microbiome after first growing the microbes on agar plates. The optimal conditions for the growth of these microbes are often difficult to recreate outside the body. However, with the advancement of DNA sequencing technologies it is now possible to study the genetic material of these microbes without first growing them in the lab. The majority of studies relating to the impact of exercise on the gut microbiome have involved using animals, with many of these studies giving inconsistent results. However, a number of recent human studies show that exercise has an impact on the different types of microbes inhabiting our guts as well as the functions in which they are involved.



## RESEARCH AT APC MICROBIOME IRELAND

- **Comparing elite athletes to non-athlete controls**

We have compared the gut microbiome of elite professional rugby players to people in the general public. We found the rugby players had greater microbial diversity, an indicator of good gut health. Differences were also detected in the types of microbes and their associated functions when comparing the athlete microbiome against that of the public. These differences were associated with exercise and higher protein intake in the rugby players.



- **Impact of exercise and protein on non-athletes**

Changes in physical activity are often accompanied with dietary alterations, which also impact the gut microbiome. Our study of these intersecting factors revealed that subtle changes occur in bacterial diversity with short-term exercise, while a considerable influence of protein on the viruses of the gut microbiome was seen.

- **Impact of different sports**

We are currently studying several athlete groups to determine if different types of sports vary with respect to their impact on the gut microbiome.

- **Impact of travel on the athlete gut microbiome**

Many athletes travel for international competition. We studied the gut microbiome of the Irish cricket teams during travel. We found travel resulted in a reduction in alpha diversity and changes to composition and functional potential of the gut microbiome.