

### Why runners need to have guts

#### Yummy, I've got bugs in my tummy

In one of our previous Scientific Bites, we talked about the gut microbiome and its role in our immune system. Today, we're exploring the effect of the microbiome on exercise.

Last year, *nature medicine* published an elegant paper on this particular topic. Researchers collected fecal samples from athletes every day five days before they ran the Boston marathon and five days after they'd run the marathon. These samples revealed one specific bacteria that was significantly more present after the marathon than before, called *Veillonelle*. The researchers were keen to know more about *Veillonelle* and thus they isolated them from the runners stool. While this might sound like dirty business, it turned out to be brilliant move.



#### Propionate, a runners faith

The runner's *Veillonelle* isolate was administered to mice. Five hours later, these mice ran until exhaustion. Just like the researcher were hoping, mice with *Veillonelle* in their gut were able to run for a longer period of time compared to mice that were not administered with *Veillonelle*. Moreover, the mice that ran longer had also less circulating inflammatory cytokines.

What's so special about *Veillonelle*? The researcher found that these bacteria can degrade lactate into propionate. Many other microbes are theoretically capable of utilising lactate, but do not possess the full pathway to convert lactate into propionate.

Then again, what's so special about propionate? Well, propionate increases the maximum rate of oxygen consumption, affects blood pressure and raises lipid oxidation, which is beneficial during exercise.

Thus, the microbiome is a critical component of physical performance. Systemic lactate produced during exercise crosses the gut lumen and is metabolised by *Veillonelle* into propionate in the colon, which in turn serves to promote performance. Very well done *Veillonelle*! Nutrition that fosters propionate production is very attractive for exercise performance. As it happens, Bioactor has been working on ways to augment beneficial short chain fatty acids such as propionate and butyrate through the use of flavobiotics.

