

# Extreme exercise linked to blood poisoning

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Credit: Peter Griffin/Public Domain

Researchers have discovered that extreme exercise can cause intestinal bacteria to leak into the bloodstream, leading to blood poisoning.

Experts at Monash University monitored people participating in a range of extreme endurance events, including 24-hour ultra-marathons and multi-stage ultra-marathons, run on consecutive days.

"Blood samples taken before and after the events, compared with a control group, proved that exercise over a prolonged period of time causes the gut wall to change, allowing the naturally present bacteria, known as endotoxins, in the gut to leak into the bloodstream. This then triggers a systemic inflammatory response from the body's immune cells, similar to a serious infection episode.

Significantly the study found that individuals who are fit, healthy and follow a steady training program to build up to extreme endurance events, develop immune mechanisms to counteract this, without any side effects.

However individuals who take part in extreme

endurance events, especially in the heat and with little training, put their bodies under enormous strain above the body's protective capacity. With elevated levels of endotoxins in the blood, the immune system's response can be far greater than the body's protective counter-action. In extreme cases, it leads to sepsis induced systemic inflammatory response syndrome, which can be fatal if it is not diagnosed and treated promptly.

The study, led by Dr Ricardo Costa, from the Department of Nutrition and Dietetics, is the first to identify a link between extreme endurance exercise and the stress it may place on gut integrity.

"Nearly all of the participants in our study had blood markers identical to patients admitted to hospital with sepsis. That's because the bacterial endotoxins that leach into the blood as a result of extreme exercise, triggers the body's immune cells into action."

The 24-hour ultra-marathon study, published in the *International Journal of Sports Medicine* and the multi-stage ultra-marathon study, published in *Exercise Immunology Reviews*, both by Dr Costa's team, reinforces current guidelines for people wanting to take part in extreme endurance events. These include getting a health check first and developing a training program that builds fitness and endurance progressively to meet the stresses and strains of the event.

Dr Costa said anything over four hours of exercise and repetitive days of [endurance exercise](#) is considered extreme.

"Exercising in this way is no longer unusual - waiting lists for marathons, Ironman triathlon events and ultra-marathons are the norm and they're growing in popularity," he said.

"It's crucial that anyone who signs up to an event, gets a health check first and builds a slow and steady [training program](#), rather than jumping straight into a marathon, for example, with only a

month's training," he said.

The research team found that people who were fitter and trained over a longer period of time leading into the ultra-marathon event had higher levels of Interleukin 10 – an anti-inflammatory agent, which allowed them to dampen down the negative health impacting immune response.

"The body has the ability to adapt and put a brake on negative immune responses triggered by extreme endurance events. But if you haven't done the training and you're unfit – these are the people who can get into trouble," Dr Costa said.

The next phase will see Dr Costa's team conduct further research into fully understanding the degree to which exercise, with and without heat, impacts gut integrity and function. They will also investigate and develop strategies for individuals to prevent and manage gut damage and symptoms caused by [exercise](#) and heat stress.

Provided by Monash University

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