

# What effect has caffeine?

## Optimum caffeine dosage

In terms of research on optimum caffeine dose rates, a large number of studies have reported a wide range of results. These can be summarised as follows (all figures in milligrams of caffeine per kilo of bodyweight – mgs/kg):

- **Events from 30-60 minutes' duration** – in runners, doses of 3mgs/kg and 6mgs/kg enhanced performance, but 9mgs/kg had no effect<sup>1</sup>. In cyclists, doses of 5, 9 and 13mgs/kg all produced enhanced performance, and the magnitude of performance gain was the same for all doses<sup>2</sup>, while another cycling study produced performance gains with doses of 2.1, 3.2 and 4.5mgs/kg, the gains being greatest at 3.2 and 4.5mgs/kg<sup>3</sup>.
- **Events over an hour** – intakes of 1-2mgs/kg enhanced cycling performance at the end of 2 hours of cycling to the same degree as 6mgs/kg given at the beginning<sup>4</sup>. Some researchers have suggested that this is because individuals may become more sensitive to caffeine as fatigue accumulates.

In short, the recent balance of scientific opinion about the likely caffeine dose required to produce a performance effect can be summarised as follows:

- For events less than 30 minutes, 6mgs/kg
- For events of 30-60 minutes, 3-6mgs/kg
- For events over one hour, 3mgs/kg or less

There's also evidence that when it comes to caffeine dose, unless the event is very short, less may be more (and more

could be less)<sup>5</sup>. When trained cyclists took either 3mgs or 6mgs of caffeine per kilo, their performance was significantly improved compared to no caffeine; however, it improved more (4.2% reduction in time) when taking the 3mg/kg dose compared to the 6mg/kg dose (2.9% reduction). When the scientists number crunched the data, they found that the increase in performance when taking caffeine was essentially the same regardless of the dose taken – i.e. the extra 1.3% performance increase measured by researchers when the cyclists took 3mgs was not statistically meaningful. In a larger study with more subjects, it might have been possible to show that a 6mgs/kg dose produced significantly worse performance than a 3mgs/kg dose. Regardless of this, these results definitely showed that taking 6mgs/kg gave absolutely no additional performance over a 3mgs/kg dose.

## **How much caffeine should we be taking?**

If you're a regular caffeine user, how can you apply these findings to your own training? Here are some tips:

- For races/training over an hour, stick to a caffeine dose of 3mgs/kg. Higher doses won't give additional performance gains and may even be detrimental.
- Caffeine breaks down only slowly in the body; this means that there's no need to top up unless your event exceeds two hours and even then, just 1-2mgs/kg is likely to be ample.
- Bear in mind that not everyone responds uniformly to caffeine so use these figures as a good starting point for further experimentation rather than gospel.

*This article was supplied by Henk Janse van Vuuren, Vice Chair for VSHSAO*