Caffeine may reduce stress – but it won't solve your problems

10 June 2015, by Peter Kinderman

That menu suddenly looks very affordable! Credit: David Hodgson/Flickr, CC BY-SA

Coffee addicts have been saying it for years – now an experiment on mice has found that caffeine does indeed help one stay cool in stressful situations – and has pinpointed the neurochemical pathways involved in the process. The researchers even suggest that the study may one day lead to medical therapies for stress-related illnesses in humans.

But while the research itself is important, we must not forget that stress is a normal human reaction to events rather than brain chemistry. The last thing we need is another psychiatric drug that ignores the root of the problem.

Previous research has shown a number of positive effects of caffeine, for instance on preventing depression. This study is the first to uncover the neurochemical pathways that enable caffeine to prevent some of the negative effects of stress on the brain.

Caffeine is known to inhibit receptors in the brain for the chemical adenosine. The researchers found that these receptors also control the negative effects of chronic stress and that stress-induced behaviour can be reversed by blocking the receptors.

The results are important, as we do indeed know that chronic stress affects people very badly. In mice, the (rather unpleasant) stressful situations in this experiment included as damp bedding, sharing living space with others, food and water deprivation, cold baths and cages tilted at 45°. And these poor mice unsurprisingly showed the behavioural and neurological consequences of this stress.

In humans, chronic stress can also have disastrous consequences. For example, my colleagues have shown that the economic crisis in the years between 2008 and 2010 can be blamed for as many as 1,000 people in the UK taking their own lives. We do, absolutely, need to understand how stress affects us. And we definitely need to find ways to help people (and mice) affected by stress.

Handle with care

But I do have a nagging concern. The paper suggests that a drug blocking this particular receptor could be used to treat illnesses stemming from chronic stress such as depression or anxiety.

It's this that I question. While I don't doubt that the study has revealed something fascinating about how the brain responds to chronic stress, it's a little less certain that the research tells us anything about "disorders". The mice seemed to respond normally to an abnormal – stressful – situation. It would be unfortunate to extrapolate that understanding to infer that such a response is a sign of abnormality, especially in humans.

Stressful events make us stressed, emotionally and

physically; they have negative cognitive, emotional, physical and behavioural consequences. Given that we process information in the brain using neurotransmitters, it's obvious that there will be a neurological route or pathway behind stress-induced behaviour. It's great to know more about that pathway – and maybe that will even help us become more resilient or recover faster from stressful life events.

Swerves and steering wheels

An analogy might help. If a driver swerves and crashes a car, we don't usually regard the steering wheel as the "cause" of the crash. The steering wheel was absolutely necessary (almost certainly the steering wheel was a necessary part of the causal chain), but it didn't "cause" the crash. OK, we can imagine a weird scenario where a fault in the steering wheel (grease on the grip, perhaps) might be to blame. But such scenarios are vanishingly rare. Essentially, the wheel is a part of a mechanism whereby the cause (the driver's swerve) translates into the crash.

It's fantastic that this research has been conducted. It's genuinely important – and potentially useful. As a scientist and I believe passionately that knowledge (and depth of knowledge) can help us understand the full implications of the embodied human experience. That includes understanding how the brain works and the neurochemical pathways of our response to stress. But it doesn't necessarily mean that these molecular pathways are the "cause" of psychological distress. It's probably better to think of them as enabling our normal human responses, not causing them.

This is important. The unfortunate tendency to label undesirable emotions as "symptoms" of "illness" may well cause us to treat people with less empathy than we should, to ignore the root causes of distress and to turn to inappropriate medical treatments. I'm all in favour of understanding how our brains work. I'm slightly less keen on mistaking mechanisms for causes.

Source: The Conversation