Caffeine

A user's guide to the world's most popular drug DORY CERNY

When freelance illustrator Patricia Storms faces a new day, it's always with a giant cup of coffee in her hand. "I've got a really big mug," says the 45-year-old Torontonian, who estimates her morning cuppa is equivalent to two medium coffees. "First thing in the morning, it's out of need. It's a necessity." Sound familiar? Many of us will admit that we need that morning pick-me-up to keep us on our toes. In fact, coffee and tea consumption accounts for 90% of Canadians' daily caffeine intake, with chocolate, cola and medications making up the other 10%.

But what is this magical substance that so many of us need to put a bit of bounce in our steps? Caffeine occurs naturally in more than 60 plants, but humans most commonly consume it in coffee, tea, cocoa, cola nut, guarana and yerba maté. It makes us feel good because it acts on a chemical in the central nervous system called adenosine. When adenosine binds to receptors in the brain, it triggers various physical responses — including drowsiness. "Caffeine is very similar in structure to adenosine, so it blocks adenosine receptors," explains Dr. Terry Graham, a professor in chair of the College of Biological Sciences at Ontario's University of Guelph.

By blocking these receptors, caffeine reverses the physical effects of adenosine. "It inhibits some of the normal down-regulating sides of the brain and stimulates all of the sympathetic fight-or-flight kind of responses," says Graham. In other words, caffeine gives you an adrenalin rush. How much caffeine you're used to determines how it will affect you, as prolonged exposure builds tolerance. That acquired tolerance is why some people can indulge in an after-dinner coffee and be sound asleep a few hours later, while others must abstain as soon as they've finished their morning brew.

CAFFEINE BY THE CLOCK

It takes about 24 hours for caffeine to clear the system, so by late afternoon, when adenosine levels are starting to rise and we're getting a bit drowsy, adding another dose will keep us going, but it will also raise the overall caffeine level in the body by about half. That means that by bedtime, levels will still be pretty high, which could cause some tossing

THE USUAL SUSPECTS

Pick out the perps in your caffeine day. A daily intake of up to 400 milligrams is considered a prudent maximum

PHOTOS: BERNARD CLARK

and turning — unless you're used to the dose. Those who aren't should stick to decaf or tea.

While caffeine provides the benefit of making us more alert and happy, we can have too much of a good thing. Moderate amounts of up to 400 milligrams a day (about three eight-ounce cups of drip coffee) will do little more than perk us up, but overdosing can cause unpleasant side effects such as nausea, jitteriness, sweating, headaches and gastrointestinal distress. An excess of caffeine can accelerate calcium excretion and may promote bone loss. Serious effects impairing fertility and fetal development and promoting miscarriage have been suggested for women of child-bearing age, so the prudent recommendation is that they consume no more than 300 milligrams a day. Graham, however, notes that there is little scientific evidence that higher amounts will have these adverse reproductive effects.

CAFFEINE AND DISEASE

The good news is that research has linked caffeine consumption to lower risks for both Alzheimer's and Parkinson's diseases, dementia and multiple sclerosis. Because caffeine is a vasoconstrictor that narrows the blood vessels, it can also help to battle headaches by relieving pressure in the brain. And though caffeine does cause a sudden but slight and short-lived increase in blood pressure, scientific research has not produced evidence that this transient rise poses a risk for most people. "The blood pressure effects are minimal, if any at all, in regular coffee drinkers," says Dr. Martin Myers, a cardiologist and blood pressure specialist at Sunnybrook Health Sciences Centre in Toronto. The same is true for cardiac arrhythmia, which also appears not to be triggered by caffeine, despite the ongoing perception that there's a link. "People say they can feel their hearts racing after caffeine, but this has been looked at carefully and does not seem to be the case," says Myers.

Research by Graham, however, indicates that our favourite feel-good substance causes our bodies to require the production of more insulin, the hormone that regulates blood sugar. In healthy individuals, the demand is easily dealt with. "But if you're an obese person who is insulin-resistant, if you have type 2 diabetes and are very insulin-resistant, you've got a problem," he says, noting that diabetics won't be able to produce enough insulin to make up for the shortfall. Those on the cusp of the disease force their pancreatic cells to work harder to produce the hormone, actually putting themselves in a diabetes-like state of high blood sugar levels. On the flip side, heavy coffee drinkers (more than four or five cups a day) are actually less likely to develop diabetes. The mechanism for this is unclear, but Graham posits that it's likely antioxidants and other elements found in coffee — even decaf.

So, for most people, the benefits of drinking coffee or nibbling on dark chocolate appear to offset caffeine-related risks. But even if they didn't, that wouldn't sway Patricia, who refills her giant mug two or three times a day. "I don't know what I'd be without it," she says, laughing. "I think I'd be comatose."

I'VE BEEN FRAMED!

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