

Natural High

Did you know that you have an intimate drugs cabinet hidden within you and that exercise unlocks the doors? Sarah Stirling investigates how you can maximise the natural highs you get from running, cycling and swimming.

THE BODY'S MORPHINE

"I suddenly felt fully in balance and powerful, like I was entering a dream-state. I could feel it in my face, the creases - I was smiling. It was elation out of nowhere." Trail runner Carlton Rowlands is telling me about experiencing a runner's-high, on a technical ridge at sunset, 100km into the 120km TDS® race in the Alps. There are some clues in there. So what causes it?

The feeling isn't reserved for those pounding on foot: "runner's high" is more generally known as "flow state". It's when you're so engaged in the present that you feel really alive - to the point of euphoria sometimes. Intuition increases. Eureka moments happen. Time does funny things: flying by effortlessly, or slowing to help you think. Whatever you are doing, you do it better in flow state.

You can achieve flow in all kinds of activities, but my aim here is to focus on what happens in the body chemically, strand by strand, when you access the state of mind through sports. We'll start with the famous endorphins, but these are only one ingredient in a powerful flow-inducing cocktail that your body releases when you exercise.

Humans have long known that taking drugs works - fossilised poppy seeds suggest that Neanderthals took opiates - but it's only in recent decades that we've discovered how drugs work, and this is key. They mimic, block or enhance chemicals produced naturally, by your brain.

Think about that for a second. It's enormous. You and I - anyone reading this magazine - we're all addicted to natural highs, supplied in the form of neurotransmitters: "messenger molecules" sent by your brain to encourage you to do more or less of whatever you're doing. Gradually, scientists have discovered more and more of them. Endorphins, for example, were isolated by American scientists in 1973. The name is a blend of "endogenous" (in the body) and "morphine".

Endorphins reduce perceptions of pain and stress, and make you feel happier and more relaxed, much as opiates like morphine and heroin do. Near the end of a long race, Carlton had been pushing extra-hard and for an extra-long time, and was receiving a good dose of these to help him continue despite fatigue.

The depth of Carlton's workout is the first clue to getting enough natural highs to access flow state. Lance Dalleck, Associate Professor of Exercise and Sport Science at Colorado University, told me the body produces similar neurotransmitters whether you are swimming, running or cycling, for example, and that how high you get is "typically related to intensity of activity." It's how you're doing whatever you're



engaged in, not what you're doing that's key.

Does that mean you have to push yourself really hard to access flow? Sort of, but my research suggests that "intensity" is more ambiguous than it might seem.

For example, not long after the TDS race, everything changed for Carlton Rowlands. He turned pro, and entered his most demanding race yet: the infamous Ultra Trail du Mont Blanc. Lining up with the other elites, he stared down the start line barrel surrounded by huge crowds. He'd made the big time. He'd trained for this. He had to do well, for his sponsors, Vibram.

The thought added pressure. As he stood there, waiting, his body began flooding him with more and more stress hormones. The 29-year-old raised his wrist to look at his heart-rate. His watch was measuring 146 beats per minute. Before he'd even taken a step, he'd gone above his fat-burning zone and was burning sugar.

Within ten miles he felt like he'd run 100. The setback made him turn inwards, worrying about getting a poor result. He was pushing his body as hard as he could. But he just couldn't immerse himself in the race. It started me thinking: the intensity required to access flow is mental rather than physical. How deeply you can immerse your mind is more important than how far you can push your body.

Musing on the subject, I tell competitive cyclist Harry Wickham that I can't get into the flow on a bike, it's too boring. He replies "Yes, I know a lot of runners who have picked up a bike and gone at it with a runner's attitude, then written it off."

Runner's attitude? Excuse me? Intrigued, I quiz him, and Harry explains that he loves the saddle for two reasons. Firstly, "An hour running equals two on the bike; maybe more. Cycling doesn't shock the muscle fibres, which allows for longer sessions."

What's good about that? Sounds like an inefficient recipe for a sore bottom to me. But, "From the moment our subconscious is breached by the morning alarm, it's hounded,"

he argues. "Cycling's time to effort exchange rate is king!"

Instead of pounding his body as hard as it will go, Harry softens the impact so he can spend more time exercising, and this means he gets more time in the flow. But I still don't get it. "Four hours on a bike is dull, though," I argue. "How can you immerse yourself in that in the first place?" Harry wags his finger at me. He has a trick up his sleeve.

CANNABIS-LIKE

The other interesting thing about cycling, Harry tells me, is that in no other sport is the sharing of effort so tangible, and real: "A solo rider is a weird thing, like a lone sardine or a solo swift." He paints a picture of whipping along chatting, sharing food, stopping for a coffee and looking out for each other. Immersing yourself in the social aspect of feeling part of something. "Humans want to work together and road cycling fires this primal human part of our brain," he concludes.

Then my reading turns up something really interesting: apparently, as well as helping you push on, endorphins encourage feelings of attachment to other people. So does dopamine, which we'll get to shortly. And there's another neurotransmitter in the flow cocktail which has a sociable side effect, too.

In the 1990s, a team at the Hebrew University of Jerusalem isolated anandamide, also known as the bliss molecule ("ananda" is Sanskrit for "bliss"). As well as making you feel happy, as any pot smoker will attest, cannabinoids make you more open and empathetic.

Why do these exercise-related neurotransmitters have this side effect? From an evolutionary perspective, trust and working together when hunting or travelling would have been very important for survival. When you socialise while exercising, you mimic this effect. Cyclists, it seems, can be a rolling tribe, intensely immersed in each other.

NATURAL SPEED

In a similarly tribal way, working against people can get you into the flow too. "The race I really remember, in terms of everything coming together and the buzz lasting for weeks, was last February," psychologist and runner Cat St Clair tells me. "It was snowing and I'm not very good at descents." However, Cat found herself flying down Box Hill like never before. The competitive urge took over, and she simply decided: "If I put myself in hospital, well I'm going to do it anyway."

It's why we compete, isn't it? Psychological brakes of any sort - not feeling in the mood, being scared to push it - manifest themselves as physical ones. Race pressure increases focus on



performance, and focussing on performance equals flow. Added to this, a good fight with the weather can have a similar effect to competing.

This brings us onto another neurotransmitter in the flow cocktail: norepinephrine, which speeds up heart rate, muscle tension, respiration and production of energy, making you feel more aroused and focussed. It's a natural version of speed, basically designed to help you get it right when you put your mind to something.

ANTI-DEPRESSANT ALTERNATIVE

If you're not into racing or socialising, or training long or hard, don't worry. It seems there are other ways to increase intensity. Like turning the temperature down. Way down.

"I'm nervous," says Sarah, shivering in her cossie on the edge of a dismal-looking British lake. I'm watching a BBC documentary, *The Doctor Who Gave Up Drugs*. Sarah, a dark-haired 24-year-old single mum who has been on anti-depressants since she was 16, is about to try wild swimming as an alternative. As she swims, something clicks "I'm on top of the world!" she yells.

What was going on? Well, your skin has far more cold receptors than warm ones, so exposure to chilled water sends an overwhelming flurry of electrical impulses from your nerve endings to your brain. All this stimulation, combined with the neurotransmitters produced anyway when you exercise, equals a potent anti-depressant.

When Sarah gets out she feels an even bigger rush, which points to another neurotransmitter in the flow cocktail - serotonin. Researchers have dubbed this molecule the body's Prozac. It helps people "cope with adversity" Oxford University's Philip Cowen told the *New York Times*, "To keep going and try to sort everything out."

You get serotonin at the end of a workout as a

reward for returning to homeostasis (equilibrium). It's what gives you that "afterglow" effect. You know how you get that lovely rosy feeling after exercising in the cold on land? After exercising in water it's much more intense. That's because heat loss in water occurs much faster - water conducts heat about 25 times better than air.

Next I invite Vivienne Rickman-Poole, an expert wild swimmer who is trying to tick off all the lakes in Snowdonia, round for a cuppa. I'm interested in how she gets into the flow. Here she is describing a dip in the dark (picture a sensitively-spoken blonde):

"I love the darkness for the heightened awareness it gives you. The wind on the surface and the blackness all around me was filling my head with overwhelming joy. I felt euphoric, blissfully happy and totally alive."

It sounds very similar to Carlton's flow experience, doesn't it? Yet Vivienne cares "little for distance, times, temperatures." She's an artist by trade and by nature. She's not interested in pushing hard. Instead, she's sought out other aspects of swimming that inspire her, and she focusses intensely on these.

For example, Vivienne enjoys feeling the seasons change, "It's almost as if it's inside, not just on the skin" - and seeking out isolation above deep water - "I'm always searching for that ultimate abyss of nothingness. It gives you a real clarity of thought." She also likes photographing the female form, her own body, underwater, "It doesn't matter what size or shape you are, there's some kind of graceful beauty in it and I find that really interesting."

It makes sense that the form intensity takes is personal. In order to intensely absorb yourself in something, it helps if you enjoy what you are doing. However, I notice that there's a key element running through Vivienne's

swimming. In fact, it's apparent in all my case studies, in one way or another...

COCAINE VS NATURAL HIGHS

Exploration. This theme brings us onto probably the most important neurotransmitter in the flow cocktail. The first of the five to be discovered, dopamine was isolated in a lab in Sweden in 1953. This neurotransmitter "rewards exploratory behaviour", explains journalist Stephen Kotler in his brilliant book, *The Rise of Superman: Decoding the Science of Ultimate Human Performance*.

Dopamine makes you feel engaged, excited, creative, keen to investigate and find meaning. It's the body's secret cocaine-esque stash, and the main reason "human beings are hard-wired for exploration," says Kotler.

So there you have it. Heroin, cocaine, prozac, speed and cannabis. I wonder: how does the high you get from natural drugs compare to that of the manmade versions? Lance Dalleck from Colorado University emails back, "Sometimes the high you get is the same."

However, if you've experienced flow state, you'll know that it can be elusive. That's because there's a final paradox. Because your body doesn't think perpetual bliss is good for you, natural highs are short-lived, compared to the highs you get from taking drugs.

Once they've done what they intended - make you do more or less of what you were doing - the pleasure-giving neurotransmitters break down. Added to this, your body plays another sneaky trick to keep you away from nirvana, and so maintain your equilibrium - there's a rule of diminishing returns, so you have to keep working harder for your kicks.

So whatever works for you - training hard, going long distance, cold water, exploring, well, you're just going to have to go back out there and do more of it, I'm afraid.