

# Hardwired for love

Heartbreak can literally stop your heart, but the good news is a little self-love will lengthen your life, reports *Jody Scott*.

The heart has long been a symbol of romantic love. Every culture on Earth celebrates love or commiserates heartbreak in songs, poems, art and stories. Now science is proving your heart is more than a mere metaphor – or just a dumb pump.

As it beats approximately 100,000 times a day, your heart is in constant conversation with your brain. And when you fall in love, your heart and brain engage in a complex neurochemical “chain reaction”, to paraphrase Diana Ross.

Bryan Ferry was right, too. Love is the drug. And it activates the same reward pathways in your brain as cocaine. When you fall in love, your brain produces large amounts of a highly addictive hormone called phenylethylamine (PEA), triggering feelings of ecstasy, euphoria and intense energy. Next, your pre-frontal cortex releases an equally addictive feelgood neurotransmitter called dopamine. The desire for more dopamine motivates you to try harder to win that handsome stranger. And as your dopamine levels rise, your production of another hormone called serotonin (associated with feelings of contentment) declines, so you want them even more.

Low levels of serotonin may also make you act impulsively. You may experience mood swings. And rising dopamine triggers the production of testosterone to fuel your sex drive. Meanwhile, your brain tells your adrenals to produce adrenaline and noradrenaline to further fuel your excitement (hello, sweaty palms and racing heart). And if that weren't enough to make you crazy, your frontal lobe activity decreases, which means you may temporarily lose some cognitive capacity (love is blind).

Finally, the love hormone oxytocin and an immune-boosting neuropeptide called vasopressin arrive, encouraging you to form a lasting bond with the aforementioned stranger. Oxytocin also reduces your stress response and even helps you pay attention (mostly by calming you down so you can focus).

When you break up, an equivalent tidal wave of hormones floods your system, activating your parasympathetic nervous system and causing physical pain in your body. Love hurts. Your airways narrow, making it hard to breathe. Your heart slows down and it may even feel like it is quite literally breaking.

The region of your brain that regulates emotion – the anterior cingulate cortex – overstimulates the vagus nerve,

which connects your brain to your neck, chest and abdomen. This makes the muscles in your digestive system contract, so you feel like you have a knot in your stomach. Your appetite wanes and nausea sets in.

The disappearance of dopamine can feel like hard-drug withdrawal. The French call this heartbreaking pain of wanting someone you can't have *la douleur exquise*. Australians call it getting dumped. Either way, sudden involuntary separation can also increase your oxytocin levels in the short term, strengthening your attachment to the person you can no longer have. Which may explain why absence makes the heart grow fonder.

Clinical psychologist and mindfulness consultant Dr Richard Chambers says the end of a relationship often results in self-exploration, wondering: “Why did this happen?” or: “What did I do wrong?”, and this activates our fight-or-flight circuits, releasing the stress hormones adrenaline and cortisol. “Many scientists believe that this may be an adaptive response to the loss,” Dr Chambers says. “It might serve us to pause and wonder what went wrong, so we can avoid it recurring in the future.”

Scientists are only just beginning to understand the complicated connection between our heart, brain and gut. Dr Chambers says the discovery that the gut and heart also have neurons has created a growing recognition that perhaps these parts of the body have a type of intelligence. “These are not ‘brain cells’ and the intelligence is not a rational, cognitive one,” he says. “But it is an intelligence nonetheless.”

“The ‘gut feeling’ we get and our heart ‘guiding us’ are surely going to turn out to be more than just metaphors,” he adds. “My clinical experience certainly tells me that when people tune into what their heart and gut says about things, they often get in touch with a knowing that is deeper and more intelligent than what their brain is telling them ... I commonly ask my private clients: ‘What does your heart say about (the problem they have come with)?’ and they usually immediately know what to do when they tune into this.”

Professor Christopher Semsarian, a cardiologist and scientist who studies genetic heart disease at Sydney's Royal Prince Alfred Hospital, also firmly believes the heart and brain are intimately connected. “We know things like anxiety, depression, anger and fright can all adversely affect the function of the heart,” Professor Semsarian says. ▶

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We also know heartbreak is a real disease. And it can be fatal even in otherwise healthy people, especially women. Broken-heart syndrome, or stress-induced cardiomyopathy, mimics the symptoms of a real heart attack, including crushing chest pain, shortness of breath, an irregular heart rhythm, increased blood pressure and a change in blood chemistry.

Extreme stress caused by events such as a break-up, divorce, the death of a loved one and even natural disasters such as earthquakes floods our bloodstream with adrenaline, norepinephrine and cortisol. This chemical cascade of stress hormones stimulates our cardiovascular system and puts us in fight-or-flight mode. It can also cause the heart to enlarge into a shape resembling the *takotsubo* Japanese pots used to trap octopuses, which is why broken-heart syndrome is also called takotsubo cardiomyopathy.

And it is actually not as rare as we might think. “Up to five per cent of women who present with a ‘heart attack’ can have stress-induced cardiomyopathy,” Professor Semsarian says.

A recent study published in the journal *Circulation: Cardiovascular Quality and Outcomes* found women who divorced were 24 per cent more likely to experience a heart attack compared with women who remained married. And women who divorced two or more times had a 77 per cent greater risk of heart attack. Even women who remarried still had a higher chance of heart attack than women who never divorced. However, the study found a man’s chance of a heart attack only went up dramatically if they divorced two or more times.

While stress-induced cardiomyopathy is more common in post-menopausal women over 55 years of age (whose hearts may already have suffered some damage), Professor Semsarian says it does occur in younger women, too. “Most people are unaware that the number-one killer of women in Australia is heart disease, not breast cancer,” he says. “So women need to be aware of symptoms such as chest pain, shortness of breath or blackouts.”

While deaths from cardiovascular disease have declined steadily since the 1970s, according to the National Heart Foundation of Australia cardiovascular disease killed 22,493 Australian women in 2013, compared to the 2,862 who died of breast cancer.

National Heart Foundation CEO and Chief Medical Adviser Professor Garry Jennings says that, sadly, many of these deaths are preventable. Forty per cent of heart attacks in women are fatal. But women are more likely to delay calling an ambulance and to present to hospital at a later stage of illness – often when it’s too late.

“Only 20 per cent of Australian women know heart disease continues to be the leading cause of death for Australian women and has been so since 1950,” says Professor Jennings. He says women don’t perceive themselves to be at risk of heart disease and this can lead to delays in diagnosis and treatment.

Heart Foundation research shows only 60 per cent of women who have a heart attack experienced chest pain. Symptoms less commonly associated with having a heart attack, such as breathlessness, nausea and arm or jaw pain, were more likely to be present.

Professor Jennings says the good news is that love can mend (or at least help prevent) a broken heart. Indulging in a little self-love via regular moderate exercise (at least 150 minutes a week), sticking to a healthy diet, not smoking and avoiding weight gain can also help prevent heart disease and improve blood pressure.

“There is growing evidence mindfulness practices such as yoga can benefit many aspects of health, including the heart – less rhythm problems of the heart, and less depression and anxiety, which can trigger heart problems,” adds Professor Semsarian.

Professor Jennings recommends women have their blood pressure, cholesterol, blood sugar and blood fats tested annually, especially after 40, when our metabolism starts to slow down.

And we can protect our daughters’ hearts by keeping them active. A survey by the Heart Foundation showed almost 60 per cent of girls aged 15 to 17 years reported undertaking little to no exercise or physical activity, compared to one third of boys in the same age group. Exercise also has also been shown to stimulate the dopaminergic reward pathways of the brain, so you are teaching them how to feel good, too.

To heal a broken heart, try cultivating mindfulness and self-compassion. “There is growing evidence that these practices further reduce the stress response (fight/flight) and adrenaline/cortisol levels, and in fact activate what is called the mammalian ‘tend and befriend’ circuits in the brain, resulting in the release of oxytocin,” says Dr Chambers, who recently launched the Recharge mindfulness program in Melbourne ([www.rechargemeditation.com.au](http://www.rechargemeditation.com.au)) and has created mindfulness programs for all students at Monash University.

“Mindfulness activates the prefrontal cortex and deactivates the amygdala, reducing the fight/flight response,” he says. “Over time we see neuroplastic growth (more grey matter density) in the prefrontal cortex, and decreased grey matter density in the amygdala. Meditation activates the parasympathetic nervous system, which counteracts the arousal of the sympathetic. So even when we are stressed (parasympathetically aroused) we can remain present and relatively calm.”

Mindfulness also helps us deal with sadness and grief. “Being able to feel emotions directly without resisting them or getting caught in them means that they come and go naturally, allowing us to go through the grieving process in a healthy way ... self-compassion (being unconditionally kind to ourselves when we are experiencing difficulties) is like the loving parent who comes and holds the upset child and says: ‘It’s okay that you are feeling that way, it’s normal, let yourself feel it. You are going to be okay’... when we practise this, both through meditation and also in everyday life, it gets hardwired into us.”

Dr Chambers says one of the most powerful ways you can do this is simply to put your hand on your heart and tune in to the warmth and feeling of physical presence. “It is literally like giving ourselves a hug,” he says. “When people do this for 10 seconds or more they commonly report a feeling of wellbeing as oxytocin is released.”

Studies have shown oxytocin can help promote sleep, boost mental clarity and immunity, lower blood pressure and stress, relax muscles and soothe your parasympathetic nervous system. And while it is commonly associated with childbirth, breastfeeding, labour, orgasm and falling in love, Dr Chambers says it is also produced during any pleasant social behaviour, such as being with friends, touch, massage, dance, good food and laughter. “Next time you are feeling heartbreak, reach out to a good friend, see a comedy, go dancing, have a nice meal and ask them for a hug.”

Happy Valentine’s Day, lovers. ■

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