- Love



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DID YOU KNOW? The phrase 'butterflies in the stomach' first appeared in the 1908 book *The House of Prayer* by Florence Converse

The concept of love has tormented the minds of philosophers, artists and musicians for millennia, but this cheek-flushing feeling can be boiled down to simple chemical reactions. Behind the romantic gestures, the human body is paddling through a whole host of chemicals that make us feel infatuated with another person. In the same way that melanin makes you sleepy or cortisol causes stress, this gravitation to another person is an emotion piloted by molecules in the body called hormones. They help ignite the initial spark of lust, fuel attraction and supply the cosy feeling of attachment. And it all starts in the brain.

Throughout the body are glandular cupids waiting to release love hormones straight into the body's bloodstream as soon as the brain gives them the order. When the moment presents itself and someone finds themselves face to face with a potential love interest, these glands flood our system with hormones that make us feel euphoric, such as dopamine, and activate the 'reward circuit' – a complex network in the brain that controls our sense of pleasure and decision-making. While science can determine how the body experiences love, what causes its spark is a little more difficult to pin down. What one person finds attractive in a partner can be completely off-putting to someone else. Psychologists have condensed why we find someone attractive into a few key factors,

"This cheek-flushing feeling can be boiled down to simple chemical reactions"

Did you know?

Dopamine was first described in 1910

CREATING CHEMISTRY

These hormones are the driving force behind the three phases of falling in love



1 LUST
The initial desire or lust to find a partner is driven by two hormones: testosterone and oestrogen. Regions of the brain called the hypothalamus and pituitary gland are responsible for triggering the production of these hormones in men and women.



2 ATTRACTION
While lust and attraction might seem the same, the two are driven by different hormones. While lust is specific to sexual desire, attraction is a broader feeling and is driven by different euphoria-inducing hormones called dopamine and norepinephrine.



3 ATTACHMENT
After lust and attraction, what follows is the release of the 'love hormone' oxytocin and vasopressin. The two supply feelings of happiness, calmness and security, encouraging pair-bonding. Oxytocin is also released following childbirth and while breastfeeding.



Unfortunately, love at first sight might be more fiction that fact

FALLING AT FIRST SIGHT

Is it possible to be struck with a sudden bolt of love when your eyes lock? If the silver screen is to be believed, there's no denying the power of falling in love at first sight. Studies have shown that as many as 60 per cent of people have experienced the phenomenon. In 2017, researchers in The Netherlands put the concept to the test by introducing 400 men to 400 women and observing whether or not they would form a romantic relationship with each other immediately after meeting, along with rating them on physical attractiveness. What the researchers found was that while many people – mostly men – had a strong initial attraction and reported experiencing love at first sight, the scientists concluded that the cornerstones of love, such as intimacy and commitment, are not experienced to the same degree in the first moments of meeting. However, it was found that those who claimed love at first sight were more open to these emotions than those who did not claim to have experienced love at first sight.

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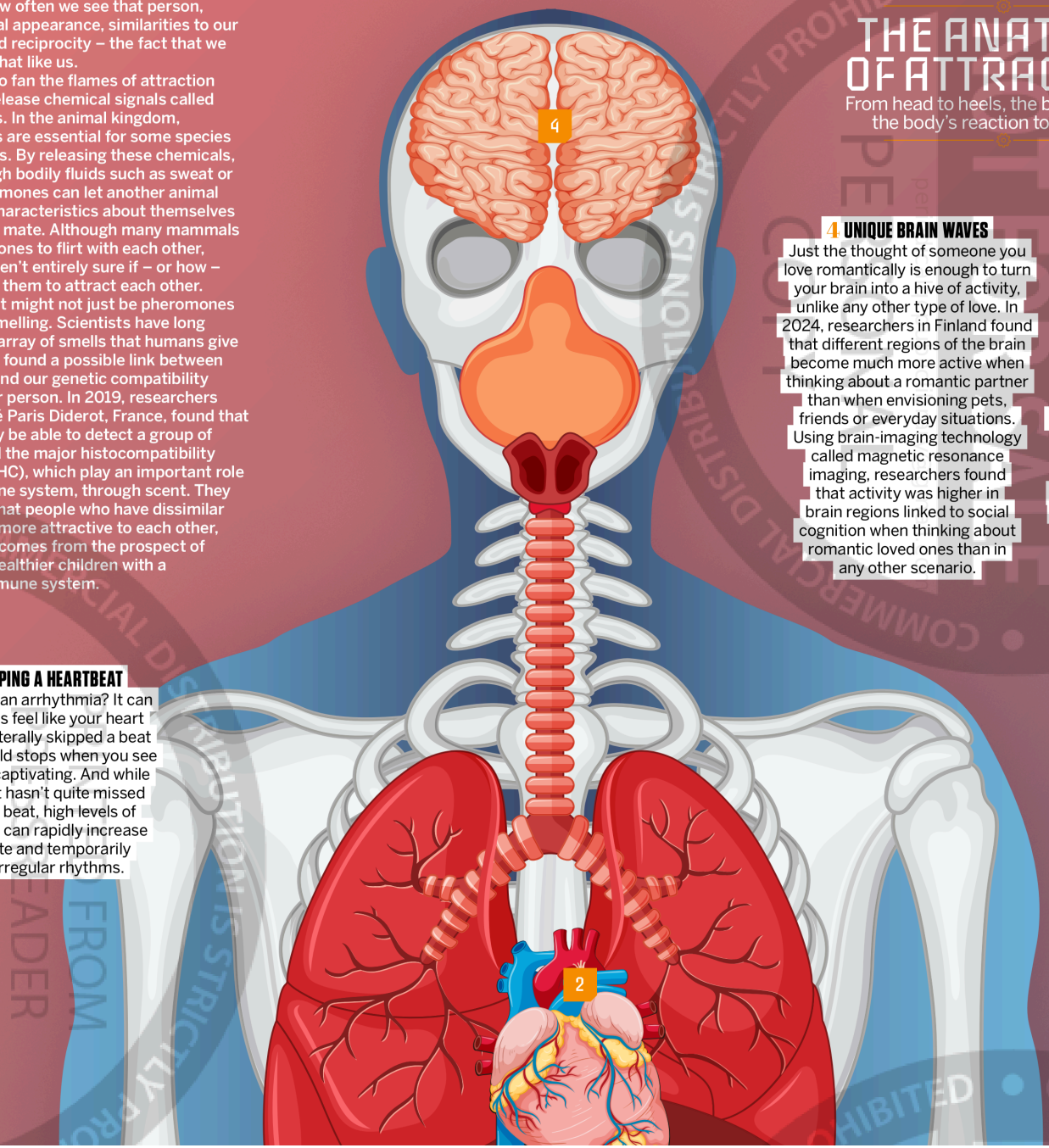
including how often we see that person, their physical appearance, similarities to our interests and reciprocity – the fact that we like people that like us.

One way to fan the flames of attraction may be to release chemical signals called pheromones. In the animal kingdom, pheromones are essential for some species to find mates. By releasing these chemicals, often through bodily fluids such as sweat or urine, pheromones can let another animal know vital characteristics about themselves and entice a mate. Although many mammals use pheromones to flirt with each other, scientists aren't entirely sure if – or how – humans use them to attract each other.

However, it might not just be pheromones that we're smelling. Scientists have long studied the array of smells that humans give off and have found a possible link between our scents and our genetic compatibility with another person. In 2019, researchers at Université Paris Diderot, France, found that humans may be able to detect a group of genes called the major histocompatibility complex (MHC), which play an important role in the immune system, through scent. They also found that people who have dissimilar MHCs were more attractive to each other, which likely comes from the prospect of producing healthier children with a stronger immune system.

THE ANATOMY OF ATTRACTION

From head to heels, the biology behind the body's reaction to attraction



4 UNIQUE BRAIN WAVES

Just the thought of someone you love romantically is enough to turn your brain into a hive of activity, unlike any other type of love. In 2024, researchers in Finland found that different regions of the brain become much more active when thinking about a romantic partner than when envisioning pets, friends or everyday situations. Using brain-imaging technology called magnetic resonance imaging, researchers found that activity was higher in brain regions linked to social cognition when thinking about romantic loved ones than in any other scenario.

3 BATTLING BUTTERFLIES

Feeling the flutter of stomach-trapped butterflies is a common occurrence in the early stages of falling in love. This is a side effect of the rush of adrenaline coursing through the bloodstream, causing blood to be diverted away from the gut to other vital organs such as the liver. This makes the gut wall contract and creates the oh-so-familiar feeling of butterflies. With reduced levels of blood and oxygen, the gut is effectively telling you to calm down.

2 SKIPPING A HEARTBEAT

Is it love or an arrhythmia? It can sometimes feel like your heart has quite literally skipped a beat and the world stops when you see someone captivating. And while your heart hasn't quite missed an entire beat, high levels of adrenaline can rapidly increase heart rate and temporarily cause irregular rhythms.

Did you know?

90 per cent of serotonin production is in the gut

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DID YOU KNOW? The world record for longest marriage is 86 years and 290 days

1 SWEATY PALMS
Along with a rush of happiness, love can also flood the brain with cortisol, a stress hormone, in those initial anxiety-inducing moments of attraction. It's associated with the body's 'fight-or-flight' response and helps convert proteins into sugar for energy. This has several side effects, including increased blood pressure and infamously sweaty palms. Although sweaty palms might not be the desired reaction, it's believed to be a leftover mechanism from our prehistoric cave-dwelling days when in the moment of fight or flight, sweaty palms gave a person extra grip to escape a threat.

2 IMMUNITY BOOST
Along with getting a boost of endorphins, some studies have found that our immune systems also get invigorated by love. In 2019, researchers from Tulane University and the University of California, Los Angeles, showcased that women who fell in love during their study had increased activity in 'antiviral defence' than those who did not fall in love. The researchers suggested this may be due to preparing the body for physical touch and the potential for contracting a virus.

Our love hormones are predominantly produced in a region of the brain called the hypothalamus

"What one person finds attractive in a partner can be completely off-putting to someone else"

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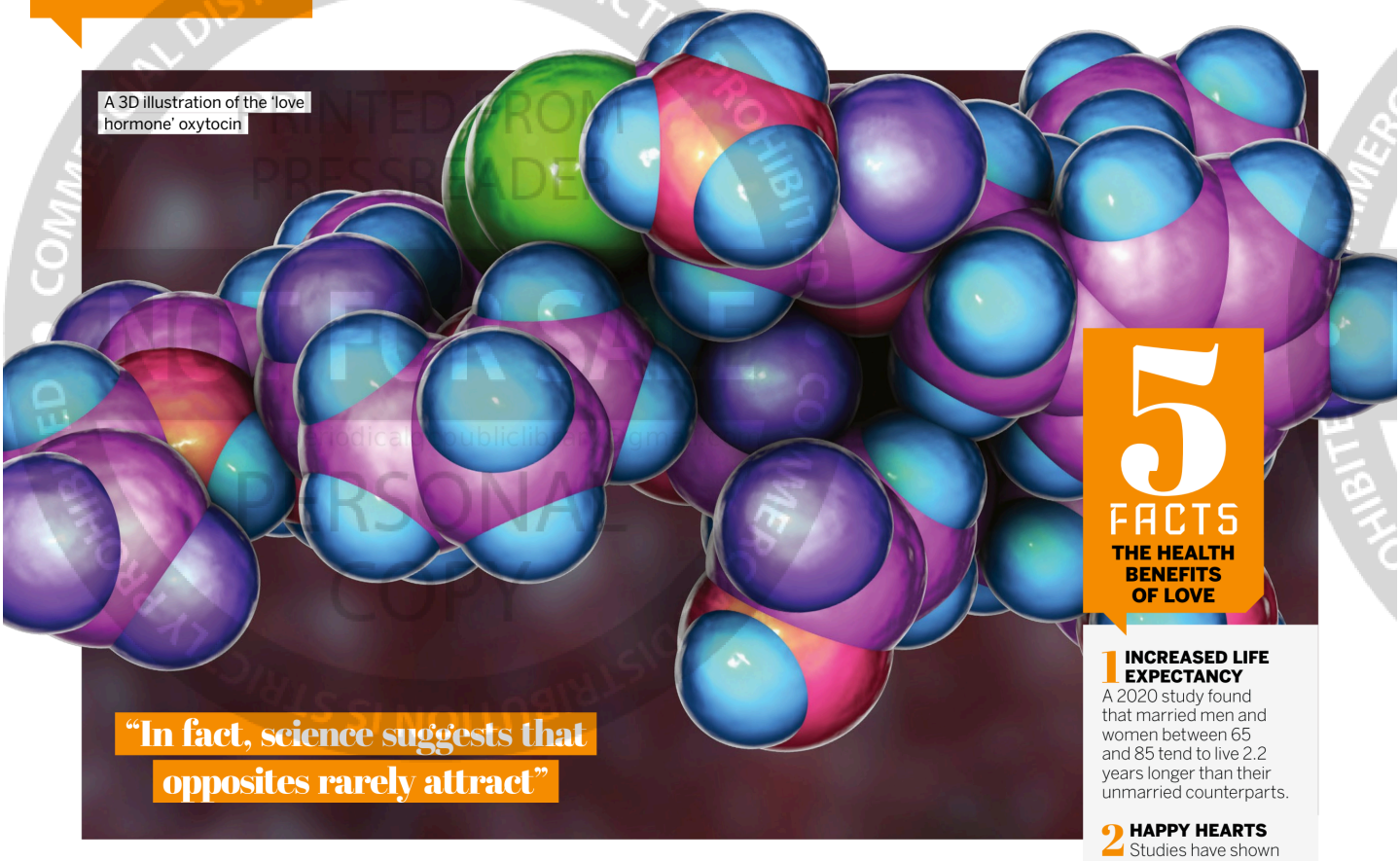

A 3D illustration of the 'love hormone' oxytocin

"In fact, science suggests that opposites rarely attract"

This may be one of the few instances where opposites really do attract. The old Hollywood notion that two people with nothing in common or who have polar-opposite opinions can come to realise their differences in some way and fall in love is likely as fictional as the movies. In fact, science suggests that opposites rarely attract. For example, a 2017 study found that participants of the survey reported feeling more attracted to people who had similar attitudes when compared to made-up 'phantom' participants with different attributes to themselves.

Did you know?

There are 62 million married couples in the US

The evolutionary explanation as to why two people fall in love is to reproduce and pass on their genetic information to the next generation, for companionship and for survival – having close connections to members of the same species for protection and support. Of course, love isn't just romantic. Platonic love can come in the form of close friendships or the strong bond between parents and their children.



THE PHYSICAL PAIN OF HEARTBREAK

Despite all the joy and happiness that love can bring, it can quite literally break a person's heart. Known as takotsubo or 'broken heart syndrome', when a person experiences a stressful event, such as the loss of a loved one, the muscles of the heart can weaken. The rush of stress hormones such as adrenaline and noradrenaline can cause the narrowing of the small arteries, restricting blood flow to the heart, as well as interfering with the way heart cells function. The effects of broken heart syndrome are typically temporary and reversible, and the heart will usually make a full recovery within weeks. However, in some rare cases, the condition can lead to life-threatening complications, such as congestive heart failure and low blood pressure.

5 FACTS THE HEALTH BENEFITS OF LOVE

1 INCREASED LIFE EXPECTANCY
A 2020 study found that married men and women between 65 and 85 tend to live 2.2 years longer than their unmarried counterparts.

2 HAPPY HEARTS
Studies have shown that those in happy relationships are at a lower risk of developing cardiovascular diseases than those in a stressful relationship.

3 BETTER SLEEP
People in loving relationships are more likely to sleep well. Some studies have suggested that happily married couples are ten per cent more likely to have a restful night's sleep.

4 PROTECTION FROM PAIN
Researchers have shown that love can distract from pain. One study revealed that participants felt less pain from being poked when they were gazing at a picture of a loved one.

5 DECREASING ANXIETY
While stress levels can be high during initial attraction, MRI scans of those in long-term relationships have shown less activation in the regions of the brain associated with anxiety.

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DID YOU KNOW? A 2022 study found that, on average, it takes men 108 days and women 123 days to say "I love you"

ANIMAL ATTRACTION

Other species have their own ways of showing how they feel about each other











1 COURTSHIP

Like humans, animals have to feel the pull of attraction in order to find a mate, and there's no beasts better at showing off than birds. From the elaborate plumage of birds of paradise to the gift-giving antics of bowerbirds, they have evolved a myriad of ways to draw attention in the hope of sparking a connection.

2 TOUCH

Signs of affection are commonplace for many mammals. Lions, for example, are some of nature's best nuzzlers. As a way to form social bonds, male lions typically rub heads with other males, and females nuzzle with other males and females, especially their cubs. The physical connection keeps the pride in sync and maintains the hierarchy within.

3 GRIEF

Feeling the loss of a loved one isn't exclusive to humans. Some animals, such as elephants, have the ability to mourn as intensely as we do. Along with crying over the death of other elephants, these emotional animals have been witnessed holding 'funerals', kicking up dust over the fallen elephant, picking up their bones and burying their bodies in mud.

4 EMPATHY

Primates are known for having emotions similar to humans, including empathy. In a 2017 study of our closest evolutionary relative, the bonobo, researchers found that they're willing to share their food with strangers without getting anything in return. Some species, such as chimpanzees, also extend that empathy to other species than their own.

5 IMPRINTING

As a survival technique, imprinting is a fascinating behaviour where the offspring of an animal – typically birds – intensely bonds with the first animal they see. Although this is intended to be their parents, it means that they can form attachments to any animal they first catch sight of.

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