

# Engineering love

With break-up and divorce a major part of modern life, it looks like we may be outliving our inborn capacity to love. But there could be a way to outwit evolution and make love last, say

**Julian Savulescu** and **Anders Sandberg**

IT'S easy to forget that we humans are animals too. After all, our relatively large cortices have enabled us to create advanced technology, megacities, nuclear weapons, art, philosophy – in short, a radically different environment to the African savannah we inhabited for most of our history. To top that, we have developed an extraordinarily complex medical system capable of doubling the human lifespan.

Yet in many ways we are stuck with the psychology and drives of our hunter-gatherer ancestors. We are not made for the world and institutions we have created for ourselves, including that of life-long marriage.

Throughout most of our history, people survived for a maximum of 35 years. Staying alive was a full-time job, and most pair-bonds ended with one partner dying. Given this lifespan, at least 50 per cent of mating alliances would have ended within 15 years. This figure is surprisingly close to the current global median duration of marriage, 11 years. It seems unlikely that natural selection equipped us to keep relationships lasting much more than a decade.

The fact is that in the US divorce has surpassed death as the major cause of marital break-up. This has significant consequences, especially for children. As law professor

Katherine Spaht of Louisiana State University in Baton Rouge wrote in the *Notre Dame Law Review*: “In comparison with children of intact first marriages, children of divorce suffer in virtually every measure of... well-being.”

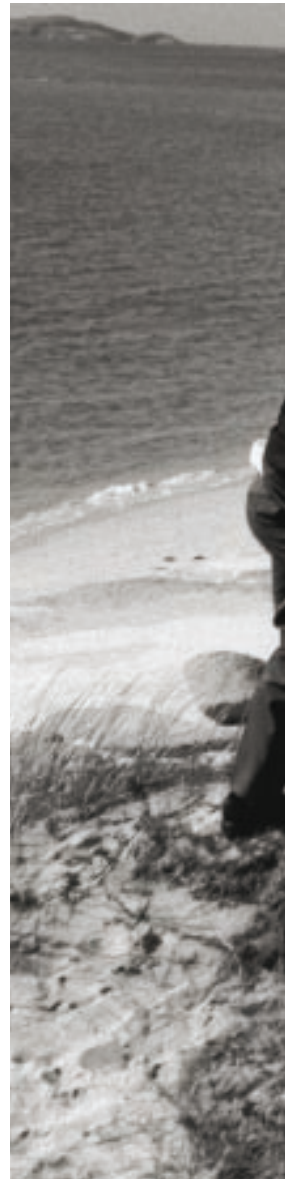
On the other side of the coin, stable, loving relationships are good for us, improving both parent and child welfare through the social support they provide. Most research confirms that successful marriages boost physical and emotional health, self-reported happiness and even longevity. So how can we make up the gap between the health-giving ideal of “till death do us part” and the heartbreaking reality and harms of widespread divorce? And do parents have a special responsibility to do so, given those harms?

One promising route is to consider the advances in neurobiology and see how we might use science. Some of the latest research suggests we could tweak the chemical systems involved to create a longer-lasting love.

Helen Fisher, an evolutionary psychologist at Rutgers University in New Brunswick, New Jersey, argues that human love is constructed on top of a set of basic brain systems for lust, romantic attraction and attachment that evolved in all mammals. Lust promotes mating with any appropriate partner, attraction makes us choose and prefer a particular partner, while attachment allows pairs to cooperate and stay together until parental duties are complete.

Human love, of course, is complex. While there is no single “love centre” in the brain, neuroimaging studies of people experiencing romantic love have shown patterns of activation in areas linked to the hormones oxytocin and vasopressin, as well as the brain’s reward centres. These findings fit with research into the mating habits of monogamous prairie voles

Behind the scenes, evolution may be working against the longevity of marriage



(*Microtus ochrogaster*) and their cousins the polygamous montane voles (*Microtus montanus*).

The receptors for these hormones are distributed differently in monogamous and polygamous voles. Infusing oxytocin into the brains of female prairie voles and vasopressin into the brains of males encouraged pair-bonding activity such as spending time together exclusively and driving away sexual competitors, even in the absence of mating, while the hormones did not affect the non-monogamous montane voles.

In one striking experiment, researchers introduced a vasopressin receptor gene from the faithful prairie vole into the brain of its

## PROFILE

This essay draws on the article “Natural selection, child rearing, and the ethics of marriage (and divorce): Building a case for the neuroenhancement of human relationships” by Brian Earp, Anders Sandberg and Julian Savulescu, which will appear in the journal *Philosophy and Technology*. Earp and Savulescu are working on a book on “love drugs”. They are based at the University of Oxford’s Uehiro Centre for Practical Ethics; Sandberg is at the University of Oxford’s Future of Humanity Institute



hormone report an increase in sexual thoughts, activity and satisfaction – though not in romantic passion or attachment. But since levels of sexual interest in men and women diverge as a relationship continues, and since this disparity strongly affects its stability, synchronising levels of desire by altering levels of testosterone might help.

It also looks likely that the strong dopamine and oxytocin signals elicited during the early romantic phase of a relationship and during sex help to imprint details of the partner and create positive emotional associations to the relationship. So it may be possible to trigger this imprinting by giving the right drugs while someone is close to their partner.

The stick rather than the carrot in the maintenance of a pair bond is that love is linked to fear and the sadness of separation. This may be due to corticotropin releasing hormone. Carefully boosting it or, rather, the processes behind the “stick” effect, might be useful as a deterrent from straying.

So what of the future? We already modify sexual behaviour, for example, by offering paedophiles chemical castration to squash their sex drive. And given the growing knowledge of the cognitive neuroscience of love and its chemical underpinning, we should expect far more precise interventions to become available soon.

Whether we should do any of this is another matter. Love and relationships are among the most potent contributors to our collective well-being so there are strong moral reasons to make relationships better. But the use of neuroenhancements leads to many questions. Will they render relationships inauthentic, the product of pharmaceutical design? Could we become addicted to love? And could such drugs and chemicals be used to imprison people in bad relationships? So should we change our institutions or stick with modifying our behaviour using counselling and therapy instead?

On balance, no. We argue we need all the help we can get to liberate ourselves from evolution. It has not created us to be happy, but offers enough transient happiness to keep us alive and reproducing. Yet from our human perspective, happiness and flourishing are primary goals. In a conflict between human values and evolution we might well ignore what evolution promotes. “Love drugs” are not a silver bullet, but in a regulated, professional environment and with an informed public, they could help overcome some of biology’s obstacles. Why not use all the strategies we can to give us the best chance of the best life? n

## “We need all the help we can get to liberate ourselves from evolution”

promiscuous cousin. The modified voles became monogamous (*Neuroscience*, vol 125, p 35). This gene controls a part of the brain’s reward centre. In humans, differences in this gene have been associated with changes in the stability of relationships and in partner satisfaction. If human and vole brains share similar wiring, as research suggests, we might be able to modify our mating behaviour biologically as well.

Tapping into the power of oxytocin could

prove useful in other ways. Oxytocin is released during physical contact such as touching, massage or sex, and is involved in nursing behaviour, trust and “mind-reading” – our attempts to work out what our partners think and feel – as well as in counteracting stress and fear. Taking oxytocin in the form of a nasal spray would promote unstressed, trusting behaviours that might reduce the negative feedback in some relationships and help strengthen the positive sides. It could also be used alongside marital therapy to open up communication and encourage bonding.

What of testosterone, the hormone that helps to control sexual desire in men and women? People who have been given the

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