

Are Amnesia Drugs on the Way?

In the film *Eternal Sunshine of the Spotless Mind*, Jim Carrey and Kate Winslet use a specialist medical service to obliterate their memories of their relationship. Science fiction? Only for the time being, it seems. The Dutch authors of a recent study in *Nature Neuroscience* think that they are on track to developing a drug to blunt bad memories.

The practical applications are immense. A spotless mind pill could bring relief to millions who suffer from post-traumatic stress disorder.

Here's what the researchers found. When 60 student volunteers saw pictures of spiders they received a mild electric shock, enough to develop a fear response. Then half of them received the beta-blocker propranolol, a drug used to steady the heartbeat; the control group only received a placebo.

The students who received propranolol were able to look at the spiders without fear. In other words, their emotional memory had been erased, but not the declarative memory of the spider images themselves.

This is consistent with previous research suggesting that emotional memory is controlled by the amygdala in the brain while declarative memory is controlled by the hippocampus. Perhaps propranolol disrupts protein synthesis in the amygdala, the researchers hypothesised.

How significant is this particular study? Not very, in all likelihood, despite the lurid tabloid headlines. "All they've shown so far is that the increased ability to startle someone if they are feeling a bit anxious is reduced," says Prof Neil Burgess of the Institute of Cognitive Neuroscience in the UK.

However, it is a harbinger of the future with far-reaching bioethical implications. The US President's Council for Bioethics devoted a whole chapter to an ethical analysis of memory-blunting in a recent

white paper on biotechnology. "Although the pharmacology of memory alteration is a science still in its infancy, the significance of this potential new power... should not be underestimated," it said.

There is enormous medical and commercial potential for a successful drug. A recent Pentagon study has estimated that 11% of Iraq veterans and 20% of Afghanistan veterans suffer from post-traumatic stress disorder – perhaps 300,000 people. Currently the problems of PTSD sufferers in the military range from simple readjustment to suicide and murder. A drug would allow soldiers to retain declarative memories of injury and death without their incapacitating emotional intensity.

But even using memory-erasing drugs in combat is ethically ambiguous. We are only at the threshold of understanding how memory is integrated into our personal identity. Blunting the memory of trauma might bring short-term benefits but long-term anxiety.

And what about legitimate feelings of guilt and shame? These drugs could be used to numb the consciences of soldiers so that they would kill without remorse.

"One of the horrible things I discovered after the [first] Gulf War was that, because of the coeducation of wars, as it were, male soldiers were given extensive desensitisation training to make them able to hear women being raped and tortured in the next room without breaking," the former chairman of the US Bioethics Council, Dr Leon Kass, has said. "It's a deformation of the soul of the first order. I cannot speak about it without outrage."

If they fell into the wrong hands, memory-blunting drugs could be used by abusers to soothe victims by removing their resentment and anger. Sharon Begley of *Newsweek* saw flashing lights ahead after the release of the Dutch study: "Let's face it, given the slippery slope of



An amnesia drug could help you forget about the horrors of war – and relationships.

drug use, it will be a short step from erasing the memory of a brutal rape or a roadside bomb in Iraq to erasing the memory of a bad date".

Furthermore, as a community we feel that some painful memories should never be forgotten. Should survivors of the Rwandan genocide have been given propranolol or should they demand justice for the crimes they suffered? Part of being human is learning from the painful memories of catastrophe.

While memory-blunting drugs have enormous potential for treating patients with emotional disorders, their use will have to be carefully controlled. They could have unpredictable effects.

After all, the treatment given to Carrey and Winslet worked so well that they fell in love all over again. Those who ignore their memories are destined to repeat them.

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