

# THIS WEEK

## EDITORIALS

**AMAZON** Optical illusion sheds wrong light on jungle colour **p.6**

**WORLD VIEW** China's arable land is in need of greater protection **p.7**



**MONARCH** Fewer butterflies flutter by on annual migration **p.10**

## Animal farm

*Europe's policy-makers must not buy animal-rights activists' arguments that addiction is a social, rather than a medical, problem.*

**D**rug addiction is a disease. Images of the brains of addicts show alterations in regions crucial to learning and memory, judgement and decision-making, and behavioural control. Drugs imitate natural neurotransmitters, resulting in false or abnormal messages being sent around neural circuits. The brain's central reward system is overstimulated and flooded with dopamine. The brain adapts to this flood by turning down its ability to respond to dopamine — so addicts take more and more of the drug to push dopamine levels higher.

Changes in other reward-system neurotransmitters such as glutamate can impair cognitive function. And the triggering of subconscious memory systems leads to conditioning, so environmental cues such as particular people or places set off uncontrollable cravings.

None of that is particularly controversial, at least among scientists. So why do a growing number of politicians in Europe want to curtail research into addiction? Why would they deny their constituents the hope that they or their loved ones might one day be helped with the terrible burden of this disease?

The answer is a troubling new front in the long battle over the use of animals in research (see page 24). Campaigners opposed to animal research have targeted addiction as the soft underbelly of political support for such work. Addiction is a social problem, they argue, not a medical one. And social problems are not solved by science, or by research on animals.

That is a seductive message for politicians. Care and compassion for drug addicts is rarely a vote-winner. Care and compassion for animals is a sure thing. Many voters believe that funds are best focused on crushing drug barons and locking up dealers. Many also believe that addicts are at best weak-minded, at worst evil, and have only themselves to blame if their drug habits kill them. If the science of addiction can be questioned, then why bother pursuing medical cures based on scientific research?

(For a taste of the muddled thinking on offer here, search the Internet for a recent 'debate' on addiction featuring the journalist Peter Hitchens and the actor Matthew Perry, broadcast by the BBC's current-affairs programme *Newsnight*.)

### DANGEROUS DECREE

Flawed, unscientific thinking on addiction has already produced a decree in Italy, expected to become law next month, which bans the use of all animals in addiction research — despite vociferous objections from the scientific community. The dozen or so Italian groups working in this area will have three years to phase out their research, and other scientists hoping to develop a drug for any brain-related disorder, from anxiety to migraines, will no longer be able to generate safety data required by regulatory agencies on their addictive potential in animals. In Belgium, the government is rushing through legislation that would ban addiction research using monkeys — again in the face of objections from scientists.

Let's be clear: research using animals has been central to our understanding that drug addiction is a chronic, relapsing disease that

changes the structure and function of the brain; that an individual's genetic make-up accounts for around half of the vulnerability to addiction; and that environmental factors are crucial in precipitating addictive behaviours in the vulnerable. Environmental factors include stress at critical developmental stages, from the womb, through early childhood, to adolescence. Without animal research — including work on primates, whose brains are most like our own — it will not be possible to go further and discover exactly how the neural circuitry in an individual brain is shaped by interacting genetic and environmental forces. It is an extremely tough nut to crack — but it must be cracked.

**"Winning the war against the misuse of drugs requires us to address demand as well as supply."**

Research using animals is, rightly, a perennially sensitive issue. But to claim that animals may not be used specifically for addiction research is to define those affected by the disorder as less worthy of care and concern than those with other disorders. Politicians cannot choose to ignore scientific evidence and then claim that they do not know that addiction is a disease. Animal-rights campaigners have unleashed a dangerous argument. It must be stopped in its tracks — and quickly.

Winning the war against the distress and damage caused by misuse of drugs requires diverse approaches that address demand as well as supply. It may not seem intuitive to those witnessing the misery and violence around the drug world — in the United States alone, illicit drug use costs more than US\$190 billion a year in crime, increased health-care costs and lost productivity — but it is likely that demand can be reduced by developing treatments for the self-destructive cravings that drive drug addiction. Given the technical tools now available for looking deep inside the brain, there is realistic hope that such treatments will emerge from research in the coming decades.

The work must continue. Europe should look to the United States and to inspirational figures such as Nora Volkow, head of the US National Institute on Drug Abuse in Bethesda, Maryland, who regularly testifies on the science of addiction to the US Congress to justify the institute's research budget.

Volkow — a neuroscientist born in Mexico, a country blighted by drug wars — has the scientific clarity of vision, and the relentless patience, to be able to argue for the promise of research effectively year in, year out. Such wisdom also exists in Europe, but politicians too frequently ignore it.

Volkow is the great-granddaughter of Leon Trotsky, the Russian revolutionary who was famously assassinated in 1940 — in the family home in Mexico in which Volkow herself grew up. She fights for a different cause: rational drug politics. Her European counterparts are fighting too. All governments must pay attention.

Diseases can be cured. People affected can be helped by science and research — and yes, by the use of animals. Addiction is no different. ■