

THE SCIENCE BEHIND THE FUTURE OF RECREATIONAL DRUGS

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Prof David Nutt, one of the project's science advisers, spoke on the project's findings, particularly how the boundaries between the various classes of drugs are becoming increasingly blurred. He pointed out that although existing illicit recreational drugs are controlled by the Misuse of Drugs Act, and drugs for illness by medical regulations, there is as yet no regime for the control of cognition enhancers, for which either route might be adopted. Three drugs also fall outside this system: coffee, tobacco and alcohol.

HOW NEUROSCIENTIFIC ADVANCES WILL IMPROVE OUR UNDERSTANDING OF HABITS AND ADDICTION

He said that within 20 years, we will understand the general rules of the mental processes underlying memory and learning. This might make it possible to produce methods to unlearn an addiction. In addition, we may have a genome profile of every newborn baby which would show up all the drug-related polymorphisms in an individual's genome and allow their susceptibility to drugs to be assessed. Those with susceptibility to particular drugs could theoretically be offered a vaccine against certain substances. There is also the potential to develop drugs to unlearn addictive behaviour but the pharma industry has expressed disinterest in their development, indicating a mismatch between scientific possibilities and actualities.

Advances in neuroimaging would allow the brain circuitry associated with drug liking and drug dependence to be understood, possibly aiding the development of new treatments. We already appreciate that the abundance of dopamine receptors is associated with pleasant or unpleasant reactions to drugs. Since many recreational drugs release dopamine, this circuitry seems to underpin the cycle of use leading to addiction. Genetic polymorphisms in dopamine receptors are also found to affect individual susceptibility to drugs and drug liking and this is also often the target on which drugs may act, exacerbating the cycle of drug dependence. Other receptor systems have been implicated in individual variations of drug effects. In animals, we also appreciate that stress and deprivation while young can affect a system's sensitivity and add to drug susceptibility. Specific enzyme variants that are particular to certain individuals can have implications for drug use too, such as those with the val-val polymorphism who perform better on mental flexibility tests whilst on amphetamines than those without this enzyme variant, who actually perform worse on amphetamines.

DEVELOPING NEW DRUGS: POSSIBILITIES AND LIMITATIONS

In the future, new drugs are likely to be available that target known and novel receptors, such as the cannabinoid antagonist rimonabant, which opens up the possibility of a new treatment for cannabis dependency and possibly heroin. Other possibilities are drugs that target the chemical mediators of stress and new agents that work on receptors not

yet identified. But the pharmaceutical industry might decide not to develop them because of the risk of stigma as well as regulatory confusion and the uncertainty of reimbursement. Challenges also exist in making progress on studies of the brain mediators of addiction as regulatory confusion has led to a lack of investment. There also remains a lot of hostility towards seeing addiction as an illness as many people still want to see it as a form of abhorrent behaviour. This has implications for funding basic addiction research, which faces profound practical challenges. Nevertheless, advances have been made with vaccines, with phase two clinical trials already underway for nicotine and cocaine.

The same problems also affect the possibility of recreational drugs being developed by the pharmaceutical industry. It is likely that our ability to develop agents to affect specific receptors in the brain will not be taken up by pharmaceutical companies. Prof Nutt posed the question of why a safer version of Ecstasy could not be made, given the 700,000 people who use the drug each weekend in the UK, and the known and potential harms of the drug. But he suggested that the drug would not be made or sold, because it would probably become illegal to do so. Alternatively, the gene for those few at risk of harm from ecstasy use could be identified. He also raised the possibility of a drug that could switch off the memory impairing effects of alcohol, or another agent – a benzodiazepine partial agonist - that would mimic the pleasurable effects of alcohol without the associated toxicity. This would also raise the possibility of being able to reverse its actions. But because it's a drug it would have to be regulated and sold as a treatment for an illness, though this would not be the best use of it because those who use alcohol recreationally would not have access to it.

FUTURE DRUGS AND DRUG REGULATION

Prof Nutt said that future drug control could involve a more person-centred approach and a less paternalistic government approach. What, for example, if we deregulated any drug safer than alcohol? He suggested the way forward may lie with more emphasis on education and less on prohibition. But this raised issues related to attitudes towards drugs in general and also international conventions on drugs.

Prof Nutt's presentation generated a lively debate. One issue that was raised was the question of safer versions of nicotine than tobacco, especially since nicotine has been found to enhance attention in healthy people and those with Alzheimer's. Prof Nutt pointed out that a safer version, known as snus, was only available in Sweden due to a European court ruling. He suggested that such safer versions were not available due to economic interests of the tobacco trade but also lack of governmental interest.

Asked whether the rewards of drug use can be separated from its loss of control, Prof Nutt said that the theoretical answer is yes, but that this might be difficult to achieve in practice as any highly pleasurable drug might become associated with addiction.

Asked whether there might be an effective anti-anxiety drug, he replied that there have been a number of false dawns but that some level of anxiety in society is a good thing. These examples highlighted the point that a future aim could be to enhance an individual's control of their drug use, which in turn highlights the question of how much

control should society have over an individual? One respondent noted that the public find it unacceptable for their rights to be withdrawn, except if there is a serious health hazard, such as with passive smoking, or after a major trauma, such as 9/11.

KEY POINTS

Cognition enhancers may come to be regulated as medicines or as drugs.

Advances in genetics, neuroimaging and neurochemistry combined could provide new options for the self-management of drug use and drug addiction.

The pharmaceutical industry could develop new drugs for reducing use-related harm but the current regulatory system, and particularly regulatory confusion over whether such substances would be drugs or medicines, militates against this.