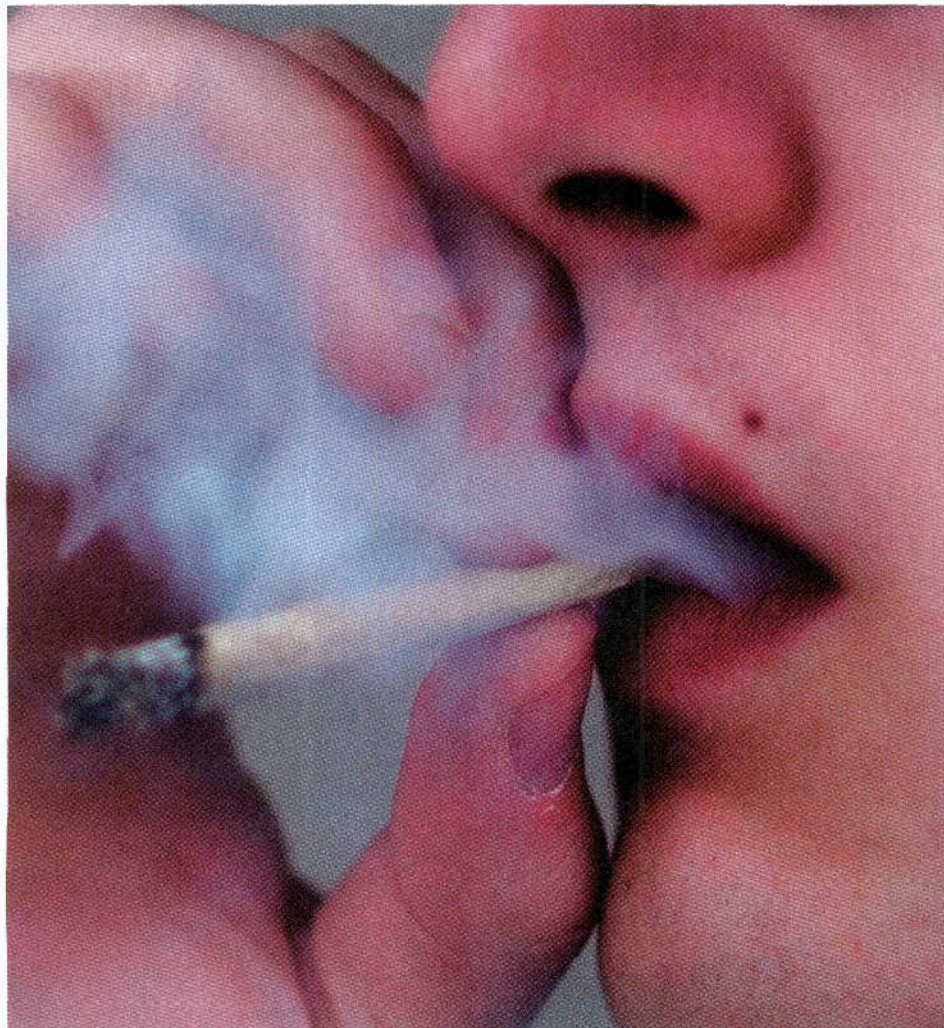


## Smoke signals

A smart new technique from Oxford University spin-out tests users' saliva to detect cannabis



**Drug testing: Oxford University has set up OxTox to commercialise its electrochemical technology**

THE DEVELOPMENT of a quick and simple electrochemical test that can detect whether someone has been smoking cannabis has led to the spin-out of a dedicated drug-testing technology company from Oxford University.

OxTox has been set up to commercialise the technology that was developed by researchers in the university's chemistry department. According to Terry Pollard, the spin-out's project manager, the technology's unique method of detection will make it quicker and cheaper than any existing drug-testing technologies.

Pollard works for Isis Innovation, the university's technology transfer programme, which is helping OxTox move towards commercialisation of the system. 'Many existing devices work like pregnancy tests, with a solution that flows through a material and then you have to wait for it to change colour,' said Pollard. 'With this, because you are looking for a reaction just on the very sur-

face of the electrode, all you need is some saliva and it will give you a result very quickly indeed.'

The system works by monitoring the voltage change when a chemical oxidises. A voltage is applied to two electrodes that are coated in two different stable chemicals. The electricity produces a chemical reaction between the two and a third, less stable product is produced. The key to the technology is that this third product — called dichloro benzoquinone monoamine — has been chosen so that it will only react with THC, which is the active ingredient in cannabis. As the chemicals react the voltage will dip, indicating that THC is present.

One big obstacle to the detection of cannabis compounds using oxidation is that the reaction produces 'fouling' of the electrodes, which can reduce the electrode's sensitivity. This method of indirectly monitoring the compound is a new idea and will neatly sidestep any

such problems, according to Pollard. When there is no more THC present the reaction ends and the device moves back to equilibrium. Because the reactive compound is only produced when a voltage is applied, it makes the system much more stable.

Pollard said existing testing devices that use saliva often need a large sample to be effective. 'Police in Australia are currently trialling immunoassay-based roadside cannabis tests,' he said. 'The problem is, not only do subjects have to chew on something for a long time to produce enough saliva but the testing equipment is also very susceptible to differences in temperature. The OxTox device won't be.'

He added that another — perhaps less obvious — problem is one of the peculiar after-effects of cannabis use: the inability to produce much saliva.

While the system is still lab-based, OxTox aims to convert this breakthrough into a handheld device, similar to a breathalyser in appearance. It is hoped that by licking a disposable strip the presence of any illegal compounds could be detected and displayed on a screen within a minute. 'It's extremely quick, which is important as you don't want people hanging around the side of the road, waiting,' said Pollard.

The device is one in a range of new technologies being developed to detect cannabis and other drugs. *The Engineer* reported on 13 February that researchers at Keele University are working with Staffordshire police on a project to develop an instant drug testing system.

OxTox is now in talks with police departments in Australia to find out which features they would require in the finished device and is looking into design and usability issues. At first it envisages its patented system will be used as a screening tool to give police an instant indication of whether someone is driving under the influence of drugs. If the system indicates the presence of cannabis compounds in the saliva, the subject would be taken back to the station for further tests.

While the chemistry in the current system is cannabis-specific, Pollard said OxTox's researchers are also looking into variations of the product that can be used to detect other drugs, particularly amphetamines. In Australia, many truck drivers use amphetamines to stay awake during long journeys across the country.

Although Australian police are likely to be the early adopters of sophisticated screening technology, Pollard believes that if the system proves successful it is likely to be taken up by UK police in the future.

**Niall Firth**

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