Why being caught by Tom is no sweat for Jerry

Mice found to produce a chemical that works like catnip on cats and gives them a chance to escape

By **Phoebe Southworth**

IT IS a famous animal rivalry which inspired the cartoon series *Tom and Jerry*. However, there may be more than just a battle of wills at play when mice try to get away from cats, researchers have suggested.

An intricate process evolved over many years may be helping the rodents escape when they are caught, according to animal behaviour experts. Mice produce a sweat chemical which confuses cats, giving them enough time to plot their route to freedom, Prof Benjamin Hart, from the University of California's School of Veterinary Medicine, said.

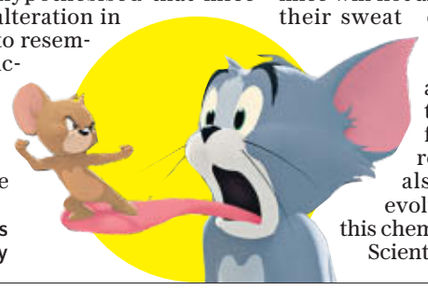
They secrete molecules, called lactones, which have a mesmerising effect on their feline captor similar to the effect of catnip, which contains a molecule called nepetalactone.

When cats smell catnip on the plant Nepeta cataria, a herbaceous member of the mint family native to Europe and Asia, this triggers the release of beta-endorphins, natural opioid chemicals produced in the body. They feel compelled to sniff, lick and chew the flowers and leaves – and even roll around, shake their heads and drool. This may explain why cats enjoy batting mice around and playing with them before eating them, as they are overcome by the catnip-like chemical in the mouse's sweat.

The excitement usually lasts for around 15 minutes, and can then return again after an hour. During the 15-minute window, in which the cat's usual predatory faculties are compromised, the mouse may be able to scurry away with relative ease.

Scientists suggest mice may have developed the ability to generate this sweat chemical due to evolutionary forces. The physiological process may have developed over many years as a way of helping them survive when they find themselves in the clutches of a ferocious cat.

Prof Hart told *The Sunday Telegraph*: "Mice produce lactones in the skin, which are excreted when mice are stressed. I hypothesised that mice evolved an alteration in the lactone to resemble nepetalactone and evoke catnip reactions in cats. Because the catnip, nepetalactone, induces playful behaviour, this gives mice a chance to escape".



Arch-enemies Tom and Jerry

Not all domestic cats succumb to the effects of catnip, with around three in 10 not responding to it. This means mice will not always be able to rely on their sweat chemical to stage an escape. However, big cats such as lions do appear to be susceptible to catnip – suggesting future studies may reveal their prey could also have developed an evolutionary generation of this chemical.

Scientists from the University of California previously found that the physiology of mice may play a role in not only how they respond to attacks from cats, but also how afraid they are of them.

Mice were able to permanently lose their innate fear of cats after they had been infected with the microscopic parasite Toxoplasma gondii, according to their study in the journal *PLOS One*. This is because the infection causes irreversible brain changes, the research found.

Cats often mark their territory with urine. When mice smell it, they take it as a warning that predators might be lurking. However, mice who were infected with the parasite no longer reacted fearfully when they smelled cat urine.

Health apps 'not fit for purpose and can do harm'

By **Rosie Taylor**

MOST health apps fail to meet basic quality standards and may harm patients, an NHS-backed review of thousands of apps found.

Only around 20 per cent of smartphone health and medical apps met clinical standards, kept patient data secure, were safe from hackers and easy to use, according to analysis by an independent NHS assessor.

But the vast majority of apps which promised to help people monitor, support or treat conditions like cancer, obesity or mental health problems fell far below basic standards.

"These statistics are deeply concerning, given how easy it is for vulnerable patients and carers to search app stores and stumble across apps which may give poor or outdated advice or blatantly misuse their private data," said Liz Ashall-Payne, chief executive of the Organisation for the Review of Care and Health Apps (Orcha), which carried out tests on around 5,000 apps.

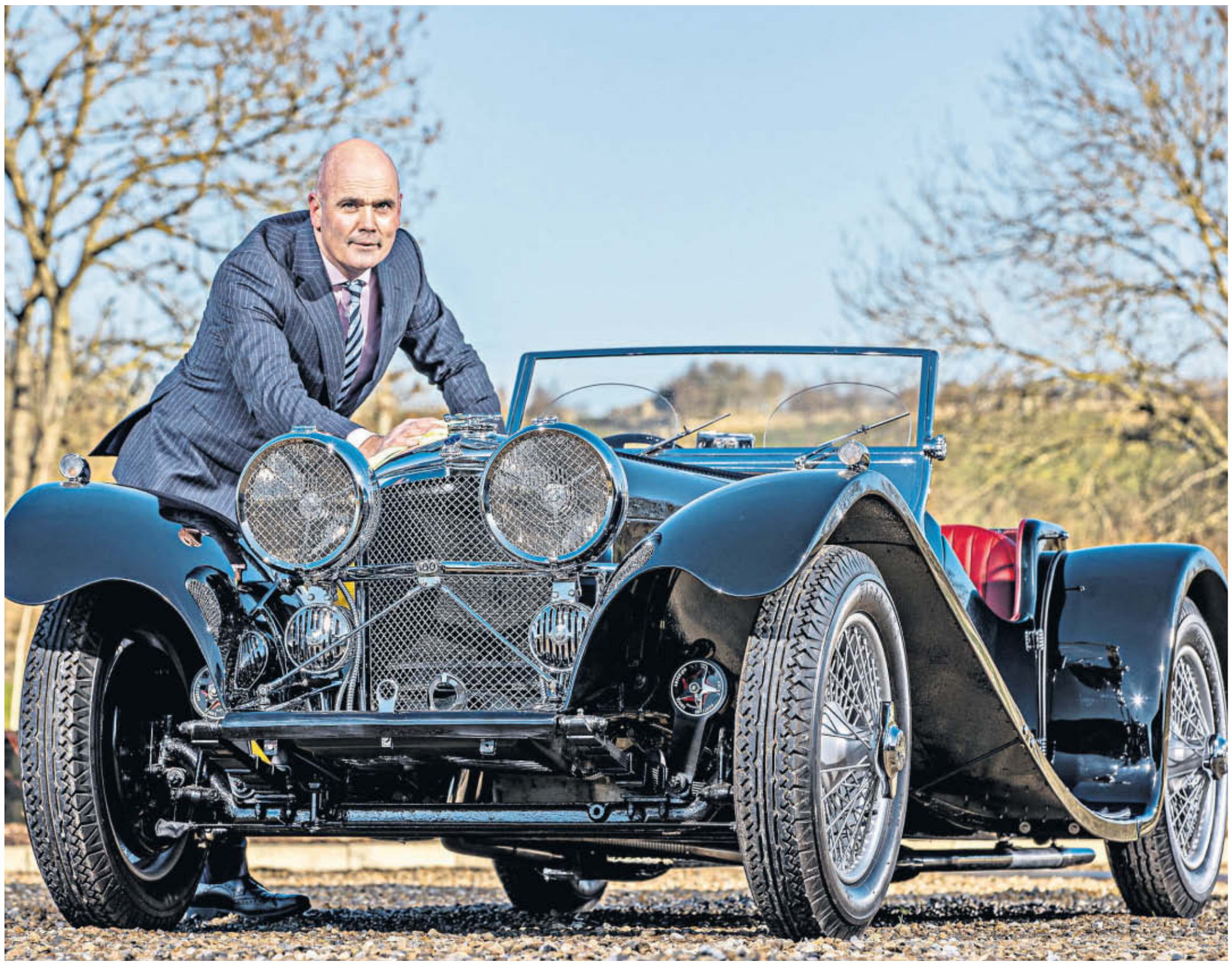
The figures come as it was revealed health app use has boomed by around 25 per cent since the start of the pandemic – equivalent to an extra 5 million downloads every day.

Downloads of mental health apps soared by nearly 200 per cent between mid-2019 and mid-2020, Orcha said. Diabetes management app downloads rose by 482 per cent and diet and weight loss apps by 1,294 per cent.

Researchers tested apps against more than 350 different quality criteria. Apps had to score 65 per cent or more to be considered good enough for NHS staff to recommend them to patients.

A review found three-quarters of 3,600 apps claiming to support cancer patients had not been updated in the past 18 months. Similar tests on 379 diet and weight management health apps found just 80 were up to standard.

There was also wide variation in the quality of the 676 mental health apps tested, with only a third meeting minimum standards. Ms Ashall-Payne added: 'There's a real problem with patients randomly selecting low-quality apps from publicly accessible app stores such as Apple and Google Play.'



CHARLOTTE GRAHAM FOR THE TELEGRAPH

Ready to roar An SS Jaguar 100 Recreation is the top lot in an auction of vintage cars belonging to the late Lancashire businessman Gordon Briggs. The car, which Tennants Auctioneers expects to sell for up to £150,000, was manufactured by SS Cars, which changed its name to Jaguar in 1945.

Skin implant can cure debilitating effects of jet lag, say scientists

By **Margi Murphy**

BUSINESS travellers may one day be able to eliminate jet lag by simply tapping on a smartphone app which is connected to an under-skin implant that can manipulate their sleep pattern.

Researchers at Northwestern University, Illinois have been handed $33 million (£23 million) from the US Defence Department's Defence Advanced Research Projects Agency (Darpa) to make the technology a reality. They plan to build a bioelectronic device the size of a pinky finger that can alter the wearer's circadian rhythm.

Using an app, wearers can adjust the system so it can recalibrate their circadian rhythm accordingly. This could mean adjustments if they are travelling to a different time zone, or if there is an eight hour shift in their working hours.

The implant will cue the body's cells to release peptides, the hormones believed to regulate sleep, to make the shift, replacing our inner sleep clocks.

Prof Jonathan Rivnay, who is leading the project, said: "In order for various cues or pharmaceuticals [drugs] to affect your circadian rhythm you have to deliver them at the right time in your circadian phase.

"So you would tell your smartphone how many hours you want to shift and it would sense your current phase. Then it would figure out a schedule of when to deliver the cues to have the greatest effect in shifting the rhythm."

'You would tell your phone how many hours you want to shift ... then it would figure out a schedule'

Dubbed a "living pharmacy", the implant will be packed with live cells and will sit permanently under the wearer's arm, without any need for additional medication or replacement.

Darpa expects that human testing for the implants could begin in four years, in the hope they can be used by servicemen to eliminate sluggishness often felt during frequent travel while on tour.

But whether everyday consumers will be open to implanting the bio-implant into their arms is up for debate.

Prof Rivnay said: "I think it will depend on the severity of the condition being treated. A business traveller that flies halfway across the world once a week might not want to implant it, but somebody who suffers from very debilitating sleep disorders may volunteer.

"We are already seeing a lot of examples of implanted bioelectronic devices that are saving lives and improving quality of life like neural stimulators and pacemakers.

"So I imagine there is an interested population out there."

Tell-tale tampon changes colour if woman has thrush

By **Joe Pinkstone**

SANITARY towels and tampons that turn pink if a woman has thrush are being developed by scientists in India.

Three in four women will at some point in their life suffer from the vaginal yeast infection, which occurs when there is an overgrowth of the naturally-occurring fungus Candida albicans.

It can be easily diagnosed in doctors' surgeries and clinics, but in many disadvantaged parts of the world the condition often goes unrecognised due to a lack of healthcare facilities.

Dr Narsh Mani, an associate professor in biotechnology at the Manipal Institute of Technology, led the project to create a cheap, simple and effective diagnostic tool to tackle the issue.

His colour-changing invention costs less than 20 pence per item and gives results in 10 minutes.

"The driving ideology of our lab has always been engineering frugal technology which can be put into the hands of people who need it the most," he told *The Sunday Telegraph*. "Therefore, manufacturing this product sustainably is our ultimate goal."

The products are in the early stages of development and are not ready to go on sale, but could be available to the public in three years, Dr Mani says.

Researchers made the pads by purchasing cotton threads from a local craft store and treating them with chemicals to strip it back to untreated material.

This was then coated in a molecule called L-proline beta-naphthylamide, which binds to an enzyme made by the fungus, the treated fibres were embedded in the inner layers of sanitary products. Work is now ongoing to perfect the technology and the manufacturing process.

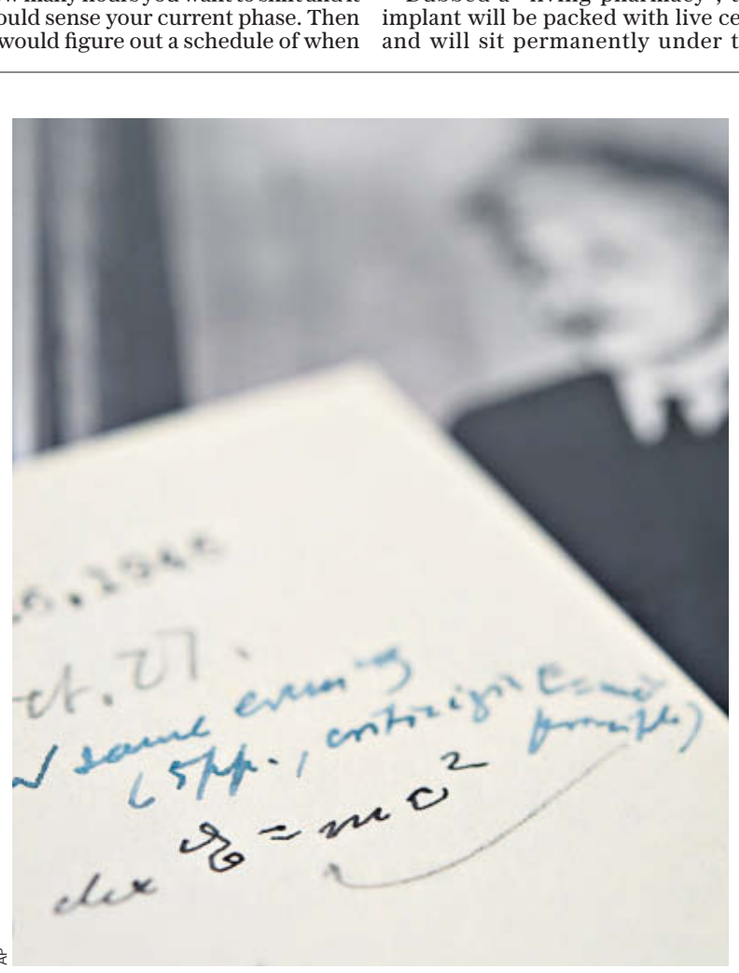
'Everyday personal products can be transformed into simple analytical devices rather economically'

"Through this technology, we have shown that everyday personal products such as sanitary pads and tampons can be transformed into simple yet effective analytical devices rather economically," Dr Mani said.

"Possible variations of the technology could see all manner of diseases being tested through these devices.

"Our own lab is working on integrating a multimodal testing system onto sanitary pads and tampons which could test ... for a myriad of urinary tract infections simultaneously."

One in 11 women experience three or more bouts of the infection every year.



AP

Stroke of genius This letter written by Albert Einstein, in which he penned his "E=mc2" equation, sold for more than $1.2 million (£850,000) at a Boston auction.

Satnav for hospital visitors cuts missed appointments

By **Phoebe Southworth**

HOSPITAL satnavs have been developed to ensure medical staff will no longer be delayed by having to give visitors directions.

The first technology of its kind for this setting has been successfully trialled at the Chelsea and Westminster Hospital in London to stop patients and their relatives getting lost in corridors.

They can install the application on their phones and it will guide them from outside the building to specific consulting rooms, a bed on a ward, or even a seat in a particular department. It can also tell them where to find the pharmacy and cafe.

Chelsea and Westminster Hospital NHS Foundation Trust teamed up with BuzzStreets, a navigation platform, to create the system after research found that many people were struggling to get around often complex labyrinths of hallways in hospitals.

Some 87 per cent of visitors need to be given directions and almost a third end up losing their way if it is their first visit, according to Deloitte Digital. It is estimated that the application will decrease the chance of getting lost by 90 per cent, as well as reduce missed appointments by up to 30 per cent.

Joe Fernandez, chief executive of BuzzStreets, said: "Chelsea and Westminster Hospital is a complex building with over 6,000 visitors every day – all with different needs. We've developed the app to tackle the common problems relating to visitors getting lost and staff spending time giving directions."

Sensors are fitted around the hospital which communicate with the application on the visitor's phone. They are able to pinpoint location to an accuracy of one to two metres. A route will be calculated and appear on a map.

Instructions for where to go are read out by the application as well as shown on the screen. People who find it hard to use stairs can also specify this in the application, so they will be directed to lifts instead.

Vanessa Sloane, deputy chief nurse at the hospital trust, said: "The app reduces frustration for staff and visitors. It helps reduce the anxiety of patients and visitors trying to find their way, which previously required contact with multiple different people."

90pc

Reduction in the chances of getting lost in hospital when app is used, as well as a 30 per cent fall in missed appointments