

MAD SCIENCE



Each year, Animal Aid presents 'Mad Science' awards to researchers who have carried out particularly pointless, egregious or cruel experiments on animals. Former themes have included 'safety' tests, equine research, experiments on non-human primates and tests using rats. Award recipients include teams and individuals working at British universities, teaching hospitals and commercial drug companies.



This year, there is only one award – and it goes to the Home Office (HO). This is the government department charged with approving and overseeing all of the animal research and testing that is conducted in this country, and which claims that it strictly regulates all such 'procedures'. The evidence demonstrates that the HO's record is far from impressive.

A recent judicial review brought by the British Union for the Abolition of Vivisection (BUAV) against the HO proved that it acted unlawfully by underplaying the suffering experienced by marmosets subjected to brain research at Cambridge University. The experiments included the removal of the top of marmosets' heads to induce strokes. After the surgery, the animals suffered bleeding head wounds, fits, vomiting, severe bruising, whole body tremors and mental and physical disabilities. Before the damage was deliberately inflicted, they were made to learn tedious and repetitive tasks. Afterwards came more 'tests'. These included being shut in tiny boxes, being administered potent stimulant drugs, and the withholding of food and water in order to coerce them into 'better' test performances. Despite such suffering, the HO classified the experiments as being of 'moderate' rather than 'substantial' severity.

The HO's shameless conduct over the Cambridge monkey affair is indicative of a deeper malaise within the department. It is routinely claimed that welfare standards in British laboratories are superior to those found anywhere else in the world. Yet in June of this year, the Dr Hadwen Trust revealed that conditions for animals in Britain's research labs do not meet new revised European guidelines in many aspects. Home Office advice on minimum pen sizes for some primates falls way short of recognised best practice, being up to eight times smaller than the new recommendations.

Guinea pigs, gerbils and rabbits should all be provided with more than double the space currently recommended, and enclosures for pairs of cats should be almost seven times wider and four times higher. The Home Office has not made compliance with the new guidelines mandatory for



UK laboratories and there is, consequently, no penalty for non-compliance. There are other important examples of the HO failing to enforce guidelines and thereby ensuring that animals endure suffering beyond that which is formally approved. In 1999, it authorised a Vietnamese company called Nafovanny to export primates to British laboratories from the largest captive-breeding non-human primate facility in the world. The establishment is able to hold 30,000 monkeys, many in tiny, rusting cages. As recently as 2005, The British Animals (Scientific Procedures) Inspectorate identified 'shortcomings in animal accommodation and care' at the facility. Nafovanny was subsequently the subject of a BUAV-led undercover investigation that exposed horrific 'factory-farming' conditions in contravention of international guidelines, and it also produced evidence of monkeys being taken from the wild to keep breeding levels high, and of being passed-off as captive bred when they were exported.

The Home Office claims it has a rigorous protocol for licensing animal experiments in the UK, and that 'cost-benefit' analyses are performed to ensure that all animal experiments stand a good chance of benefiting humanity. With this in mind, we have summarised below a number of animal research projects that have been approved by the Home Office. It is for readers to draw their own conclusions.

Oxford: Brain damage in monkeys increases their fear of toy snakes

A team of researchers in the Department of Experimental Psychology at Oxford University investigated the effects of brain damage on the social behaviour of nine macaque monkeys. The monkeys were divided into three groups – each having different parts of their brains surgically damaged. Once the animals had regained consciousness, they were studied to

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see how they responded to various threatening situations. This included being exposed to rubber snakes and the stares of unfamiliar human faces. Similar experiments conducted previously by the same researchers had shown that the greater the brain damage, the less sociable the monkeys became with one another. The team did not reveal the fate of the monkeys after the experiment. In conclusion, the researchers made a tacit admission about the lack of relevance of their own research. They stated that the equivalent tests given to human subjects (for which non-invasive scanning equipment was used) were considerably more complex than those possible in monkeys.

A role for the macaque anterior cingulate gyrus in social valuation. Science 2006; 313:1310-1312. Rudebeck M, Buckley MJ, Walton ME, Rushworth MFS.

Oxford: Rabbits bled to death to demonstrate health benefits of green tea

Green-tea extract containing chemicals called catechins have been shown to lower plasma (blood) cholesterol in hamsters, mice and rats. The purpose of these experiments was to see if it did the same in rabbits. Researchers at the Wellcome Trust Centre of Human Genetics, University of Oxford fed 24 rabbits on a high cholesterol diet, before administering different amounts of green-tea extract to them. After a month, the rabbits were sedated and bled to death, and their blood, aortas and livers analysed to determine the effect of the extract on their blood cholesterol levels and the amount of cholesterol receptor molecules (protein 'hooks' on cells that pull cholesterol into them from the bloodstream)

present in their livers.

The authors concluded that green-tea extract rich in catechins can lower plasma cholesterol in rabbits when mixed with their food. This conflicted with results from another experiment that showed that, when mixed with drinking water, green-tea extract had no effect on rabbits' cholesterol levels. Furthermore, human epidemiological studies demonstrated the cholesterol-lowering effects of green tea in humans in the 1990s.

A green tea extract lowers plasma cholesterol by inhibiting cholesterol synthesis and upregulating the LDL receptor in the cholesterol-fed rabbit. Atherosclerosis 193 (2007) 86-93. Christina A. Bursill et al.

Cambridge: Rat heroin addicts' drug-seeking behaviour is affected when gene-altering chemicals are injected into their brains

At the Department of Experimental Psychology, University of Cambridge, rats had cannulae implanted into a region of their brains known as the 'basolateral amygdala' (BLA), which is responsible for the formation of emotional memories. They were then trained to seek heroin by means of pressing a lever, and made to become dependent on the drug via continually active heroin-filled pumps located under their skin. The rats were then subjected to heroin withdrawal, and were trained to associate this with intermittent noises, flashing lights and strong odours. The authors showed that, in the subsequent presence of these stimuli, the rats no longer sought heroin via the lever. This suppression of heroin-seeking was, however, obliterated when the rats' BLAs had been infused with an agent that blocked the activity of a particular gene within it, prior to them associating the above stimuli with heroin withdrawal. Following the experiments, the rats were suffocated using carbon dioxide. The authors concluded that drug withdrawal memories undergo reconsolidation in the BLA region of rats' brains, which involves the activity of a particular gene. Drug dependency is a complex phenomenon, in which issues such as personal circumstances, genetic predisposition, local culture and self-esteem all play a part. People and not rats are





the only relevant 'model' for understanding why and how people become addicted and how their condition might be remedied.

Disrupting Reconsolidation of Conditioned Withdrawal Memories in the Basolateral Amygdala Reduces Suppression of Heroin Seeking in Rats. The Journal of Neuroscience (2006) 26(49); 12694 –12699. Kim G. C. Hellemans et al.

Cambridge: Pregnant horses deliberately under-fed

Researchers at the Equine Fertility Unit, Cambridge conducted an experiment on 20 out-of-training Thoroughbred pregnant mares at the Equine Fertility Unit at Cambridge. The declared aim was to assess the effects of a reduced diet on the development of the unborn foal.

A major setback occurred when all of the mares unexpectedly contracted a disease part-way through the study. The disease – known as 'strangles' – is usually associated with poor management, especially poor sanitation, crowded conditions and stress.

Prior to being mated, all of the animals were given access to pasture during the day and housed at night. When housed, they were fed individually adjusted amounts of feed aimed at maintaining a 'body condition score' of 'moderately thin' or 'moderate'. Once mated, there mares were divided

into two groups. Nine animals were given a 'moderate food intake' – including poor quality grazing – while the other 11 received a 'high food intake'. At the end of the first trimester of pregnancy, all of the pregnant mares unexpectedly became infected with strangles.

The disease is characterised by high fever, significant nasal discharge and severe inflammation of the neck and its lymph nodes, some of which may rupture, releasing large amounts of thick, creamy pus. The animals were said to have gradually recovered from the disease over a period of one to four weeks without treatment. All of the mares gave birth at the end of their pregnancy to underweight foals.

In their conclusion, the authors state that their experiment failed to show any difference between the two groups. The fact that the pregnant mares became ill during the study is described by the authors as 'an unexpected and fascinating insight into the effects of disease-mediated weight loss' on pregnancy in the mare.

This study was sponsored by the Horseracing Betting Levy Board.

Effects of a Streptococcus equi infection- mediated nutritional insult during mid-gestation in primiparous Thoroughbred fillies. Part 1: placental and fetal development. Equine Veterinary Journal 2006; 38(6):549-557. Wilsher S, Allen WR.

London: Rats with a penchant for junk food give birth to similarly affected offspring

In a study funded by the Wellcome Trust, researchers at the Royal Veterinary College fed pregnant rats on a diet of biscuits, marshmallows, cheese, jam doughnuts, chocolate chip muffins, butter flapjacks, potato crisps and caramel/ chocolate bars, which continued through breastfeeding until weaning. They found that pups born from those mothers ate much more 'junk food' than pups from mothers given only a 'normal' diet of rat chow – concluding that the offspring of mothers indulging in junk food are somehow pre-programmed to be partial to junk food when they're born, and that human mothers-to-be ought to be abstinent in this regard to prevent human babies from being similarly affected.

However, there is no significant evidence to suggest that the same effect is present in humans – and, of course, it is simple common sense for pregnant women to eat a healthy, balanced diet. A number of nutritionists and child-health specialists questioned the results of the study and its applicability to humans, and warned against extrapolating this data to people. All rats were killed after the experiment.

A maternal 'junk food' diet in pregnancy and lactation promotes an exacerbated taste for 'junk food' and a greater propensity for obesity in rat offspring. British Journal of Nutrition (2007, online) doi: 10.1017/S0007114507812037. Stéphanie A. Bayola et al.

Oxford, Cambridge and Newcastle: Brain-damaged monkeys forced to watch fish

Scientists from the Universities of Oxford, Cambridge, Newcastle and the University of Western Ontario (Canada) teamed up to conduct a long-term study of brain behaviour in two male macaque monkeys. Both monkeys underwent brain surgery to implant electrodes, which recorded brain activity. The implant was held in place by stainless steel screws, a head bolt and dental cement. The monkeys were seated in a soundproof room, in a purpose-built 'primate chair' – an apparatus that restricts body movement. During each



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experimental session, the restrained monkey was exposed to a stream of pictures. His task was to hold his stare until he saw a fish. All of the experimental brain and eye recordings were computer-controlled, as was the delivery of a juice reward. An incorrect stare or no response on the part of the monkeys resulted in no reward being given. In all, the monkeys underwent 67 experimental sessions. What happened to them after the sessions was unrecorded.

Selective representation of task-relevant objects and locations in the monkey prefrontal cortex. European Journal of Neuroscience 2006; 23:2197-2214. Everling S, Tinsley CJ, Gaffan D, Duncan J.

Edinburgh: 'Cooling' substances relieve pain in rats – as Socrates knew they did in people 2,500 years ago, and as human clinical research has revealed

Researchers at Edinburgh University investigated whether a chemical called 'Icilin' (related to menthol) that induces a feeling of 'coolness,'



could relieve chronic pain in rats. When administered via injection or topical application, it appeared to ameliorate the suffering of rats who had previously had pain inflicted upon them by a variety of methods, including tying ligatures around their thighs to constrict the sciatic nerve, injecting an irritant into a hind paw, and chemically damaging the sciatic nerve.

The researchers – at the Centre for Neuroscience Research, Division of Veterinary Biomedical Sciences – concluded that Icilin had analgesic properties, based on the observation that the rats took longer to withdraw their painful paws from applications of heat, cold, or a sharp point. They also implicated a gene called TRPM8 in the process, by removing tissue from the rats for various analyses, and by pumping an inhibitor of that gene into the spinal cords of the animals.

It has been known for around 2,500 years, since the time of Hippocrates, that cooling can produce pain relief. More recent human clinical research has shown the beneficial effects of cooling on chronic back pain, dental pain, post-operative pain, and muscle injuries, and menthol is used topically to relieve neuralgia in traditional Chinese and European medicine.

Analgesia mediated by the TRPM8 cold receptor in chronic neuropathic pain. Current Biology (2006) 16(16); 1591-605. Proudfoot CJ et al.

Cambridge: Pony mares abort following surgical manipulation

A team of researchers at Cambridge University's Department of Physiology used 23 pregnant pony mares to study sugar metabolism in the unborn

foal. All of the pregnant animals – some of whom were very near to giving birth – were starved for 18 hours before undergoing invasive surgery. Intravenous anaesthesia was used, rather than the considerably safer inhalation anaesthesia. All of the mares underwent abdominal surgery to expose the uterus, in which a series of cuts were made so that the researchers could reach the unborn foals. A leg of each foal was exposed and a catheter inserted in a vein and artery, and then threaded towards the heart. The surgical incisions were sutured with the catheters remaining inside the foals. These catheters were then connected – through a small opening in the abdominal wall of the mare – to a bag secured to the flank of the mare. A week later, the actual experiment began, whereby two test substances (glucose and arginine – both involved in sugar metabolism and pancreatic function) were injected directly into the foals through the catheters. Blood samples were taken at various intervals and the data recorded.

Of the original 23 pregnant pony mares, nine produced dead or dying foals. The authors could not explain some of these events. The foals' response to the injected test substances produced no surprises and the authors merely documented the physiological responses that would normally be expected from the kind of intervention to which the foals had been subjected. However, the authors did conclude that the development of foetal pancreatic cells could be affected by over-exposure to steroid drugs. The fact that pregnant animals should not be given such drugs has long been documented and is already well known in veterinary medicine.

This research received financial support from the Horserace Betting Levy Board.

Maturation of pancreatic B-cell function in the fetal horse during late gestation. Journal of Endocrinology 2005, 186:467-473. Fowden AL, Gardner DS, Ousey JC, Giussani DA, Forhead AJ.

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