

## **Issues Regarding Animal Experimentation in India**

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### **The Use of Animals in Basic Research**

Animals are frequently used in curiosity-based studies, in the testing of drugs and commercial products and in academic exercises. Yet using animals in such experiments is unethical, unnecessary and poor science.

First, we must ask ourselves if it is right to imprison and harm other sentient beings. Animals in laboratories are routinely subjected to painful procedures. They are burned, shocked, poisoned, isolated, starved, forcibly restrained, addicted to drugs and brain-damaged – and they are usually killed afterwards. No procedure, no matter how painful, redundant or pointless, is prohibited by law. In addition to the physical pain animals endure, many studies have shown marked stress responses in animals undergoing common laboratory procedures. For example, routine handling, venipuncture and gavage elicit striking elevations in pulse, blood pressure and steroid hormone release that can persist for an hour or more after the event. Stress responses in animals are also seen during caging, isolation, handling and blood collection. This not only compromises research results but also graphically illustrates the trauma animals endure in laboratories.

In addition to the ethical issues, we must remember that profound differences in anatomy, physiology and biochemistry between humans and animals make animals poor models for humans. Results from experiments on animals cannot be accurately extrapolated to humans. In case after case, animals have proved to be poor predictors for how humans will respond to drugs, treatments or diseases. Yet many people still believe that animal experiments help humans because experimenters, universities and lobbying groups routinely exaggerate the potential of animal experiments to lead to new cures and the role they have played in past medical advances. Animal experiments don't persist because they are the best science; they persist because of experimenters' personal biases and archaic traditions.

### **Animal Experiments in Teaching and Skill Development**

Nearly 95 per cent of medical schools in North America – including Yale, Harvard and Stanford – do not use any animals to train medical students, and experience with animal dissection or experimentation on live animals is not required or expected of those applying to medical school. Medical students at these forward-thinking institutions are trained using a combination of methods, including sophisticated human-patient simulators, interactive computer programs, safe human-based learning methods and clinical experience.

In the United Kingdom, it's against the law for medical (and veterinary) students to practice surgery on animals. Both students and teachers favour replacing the use of animals in undergraduate medical training. Given the ethical issues surrounding the use of animals in medical training and the effective non-animal methods that are available, many medical educators have suggested that the current animal-based curricula persist only because of inertia, not because of any scientific or educational necessity.

Yet many medical colleges in India continue to use cruel animal experiments to teach their students. Bachelor of Medicine and Bachelor of Surgery (MBBS) programmes in India

frequently use live mice, rats, guinea pigs, rabbits and frogs in invasive, deadly and archaic classroom experiments in order to train medical students.

This use of animals occurs in spite of the progressive new directive from the Medical Council of India (MCI) stating that medical schools are no longer required to maintain an animal facility and now have the option to replace live animals in classroom experiments with sophisticated non-animal training methods such as computer-aided education. Furthermore, the use of animals in MBBS programmes appears to be a direct contravention of the Prevention of Cruelty to Animals Act, 1960, which mandates that available alternatives to animals used in teaching exercises must be used in place of animals. Chapter IV, article 17(2)(d) of the act states that experiments on animals should be “avoided wherever it is possible to do so; as for example; in medical schools, hospitals, colleges and the like, if other teaching devices such as books, models, films and the like, may equally suffice”.<sup>1</sup>

In the last decade, the trend has been away from animal use in all areas of scientific education. In 2003, the Pharmacy Council of India (PCI) issued a directive to all pharmacy schools in India to use CAL software in place of classroom animal experiments.<sup>2</sup> Also in 2003, MCI's Executive Committee concluded: “As an alternative to these tests involving animals, JIPMER, Pondicherry has developed EX-PHARM Blank CD. This CD has been specially prepared as a 100% replacement to animals used in undergraduate courses in Medicine, Pharmacology, and Veterinary Science”.<sup>3</sup> In 2008, PCI wrote to PETA India: “The council is not asking the institutions to do the mandatory practicals under Education Regulations 1991 by using animals. Instead the Council has issued instructions to institutions to use alternative measures to complete the syllabus”.<sup>4</sup>

More recently in 2011, the University Grants Commission issued guidelines to phase out dissection of and experimentation on live animals in zoology and life science courses.<sup>5</sup>

This trend is supported by recent research. The medical-education literature indicates that simulation methods for such procedures as endotracheal intubation training are equivalent or superior to traditional teaching tools (including animals and clinical practice in humans) when measured objectively by lab or clinical competence or subjectively by student and instructor preference. This is further illustrated by the fact that the American Academy of Pediatrics' Neonatal Resuscitation Program, the American Heart Association's Pediatric Advanced Life Support and Advanced Cardiac Life Support courses and the Emergency Nurses Association's Emergency Nursing Pediatric Course all endorse the exclusive use of non-animal methods for resuscitation training (including intubation) in neonates, children and adults.

Historically, live animals, including dogs, pigs and goats, have been used to provide Advanced Trauma Life Support (ATLS) training, in which skills such as chest tube insertion, pericardiocentesis, peritoneal lavage and tracheotomy are taught. However, since 2001, the

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<sup>1</sup>Ministry of Environment and Forests, Government of India, “The Prevention of Cruelty to Animals Act, 1960”.

<sup>2</sup>Pharmacy Council of India, letter to PETA India, 2008.

<sup>3</sup>Medical Council of India Executive Committee, meeting minutes, 13 Mar 2003.

<<http://www.mciindia.org/meetings/EC/2003/ECMN%2013.3.03.pdf>>.

<sup>4</sup>Pharmacy Council of India.

<sup>5</sup>B Mohanty, “UGC Calls for Stop to Dissection of Animals,” *The Telegraph* 25 Aug 2011  
<[http://www.telegraphindia.com/1110825/jsp/nation/story\\_14422084.jsp](http://www.telegraphindia.com/1110825/jsp/nation/story_14422084.jsp)>.

American College of Surgeons has approved the use of the Simulab's TraumaMan simulator as well as cadavers and other simulators such as SynBone's Synman for this training.<sup>6</sup>

Non-animal teaching methods are not only more humane but also more cost-effective. Using animals in classroom exercises requires purchasing, caring for and disposing of them on an ongoing basis. Purchasing a set of CD-ROMs or a human simulator is a one-time expense, and the product can be used repeatedly for many years. Schools can save tens of thousands of rupees each year by implementing reusable replacements for animal "specimens".

Studies show that students prefer non-animal training methods. A survey done by the Department of Pharmacology, Government Medical College, Amritsar, Punjab, showed that the majority of medical students are against using animals in medical education.<sup>7</sup> Another study conducted by the Department of Pharmacology and Physiology, S N Institute of Pharmacy, Yavatmal, Maharashtra, found that an overwhelming majority of students feel that classroom animal experiments cause animals needless pain and suffering. These compassionate students would like to see the number of animals used in classrooms reduced with the switch to non-animal teaching methods.<sup>8</sup>

### **The Use of Animals for Drug Development**

No matter how many animal tests are conducted, human patients will still be needed to test the safety and efficacy of new drugs. Because animal tests are so unreliable, they make these human trials all the more risky. The US Food and Drug Administration (FDA) documented that 92 per cent of all drugs that are shown to be safe and effective in animal tests fail in human trials because they don't work or are dangerous. And of the small percentage that are approved for human use, half are relabelled because of side effects that were not identified in animal tests. Fortunately, there are modern *in vitro* and safe human-based methods available to accurately test the safety and effectiveness of a drug on the human body.

Taking a *healthy* being from a completely different species, artificially inducing a condition that he or she would never normally contract, keeping him or her in an unnatural and stressful environment and trying to apply the results to naturally occurring diseases in human beings is dubious at best. Testing drugs on these animals provides unreliable data. Physiological reactions to drugs vary enormously from species to species. Penicillin kills guinea pigs but is inactive in rabbits. Aspirin kills cats and causes birth defects in rats, mice, guinea pigs, dogs and monkeys. Morphine, a depressant in humans, stimulates goats, cats and horses. Animals in laboratories also typically display behaviour indicating extreme psychological distress, and experimenters acknowledge that the use of these stressed-out animals jeopardizes the validity of the data produced.

A review of 76 drug tests on animals found that despite all the animal studies showing that the drugs in question worked safely, only 55 per cent were repeated in human trials. Of these, one-third were found to produce results that conflicted with what had been reported in the animal studies (ie, the treatments were not actually effective). The authors concluded that

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<sup>6</sup>American College of Surgeons, statement on alternative models for the ATLS Surgical Skills Practicum.

<sup>7</sup>Mandeep Singh Dhingra et al, "Animal Experiments and Pharmacology Teaching at Medical Schools in India: A Student's Eye View", AATEX 11(3), 2006: 185-191 <[www.asas.or.jp/jsaee/aatex/11-3-6.pdf](http://www.asas.or.jp/jsaee/aatex/11-3-6.pdf)>.

<sup>8</sup>SV Tembhurne and DM Sakarkar, "Alternative to Use of Live Animal in Teaching Pharmacology and Physiology in Pharmacy Undergraduate Curriculum: An Assessment of 120 Students' Views", *International Journal of Medical and Pharmaceutical Sciences* 1(1), 2011 <[www.ijmps.com/files/documents/4.10.pdf](http://www.ijmps.com/files/documents/4.10.pdf)>.

“patients and physicians should remain cautious about extrapolating the findings of prominent animal research to the care of human disease”<sup>9</sup>.

The FDA has also noted that the chances of a drug being suitable for human patients, even after it has passed all the animal and other laboratory studies, is only 8 per cent.<sup>10</sup> The US National Institutes of Health have reported that more than 80 HIV/AIDS vaccines that have passed animal testing have failed in human clinical trials.<sup>11</sup>

### **Cosmetics and Household Product Testing**

As per a European Union (EU) directive, there will be a complete ban on the testing of cosmetics on animals within the EU beginning in 2013, including a ban on the marketing of cosmetics products tested on animals. This will prevent the sales of cosmetics that have been tested on animals outside the EU by European or non-European companies.

The testing ban on finished cosmetics products has been in effect since 11 September 2004; the testing ban on ingredients or combinations of ingredients has existed since 11 March 2009. The marketing ban has been in effect since 11 March 2009 for all human health effects, with few exceptions. There is a maximum cut-off date of 10 years from the time that the directive came into force, i.e., 11 March 2013, irrespective of the availability of alternative non-animal tests.<sup>12</sup>

Historically, rabbits have been used in unimaginably cruel tests of corrosivity and eye irritancy, and guinea pigs have been used in phototoxicity tests. In some laboratories, animals are still used, even though the Organisation for Economic Co-operation and Development (OECD), in its published test guidelines (TG) for the testing of chemicals, has approved Corrositex® (OECD TG 435), EpiDerm™ and EPISKIN™ (OECD TG 431) for testing skin and eye irritation and corrosivity. OECD TG 432 gave approval to the *in vitro* 3T3 NRU phototoxicity test, and OECD TG 428 gave approval to *in vitro* dermal absorption methods. All these tests have been validated by the European Centre for the Validation of Alternative Methods (ECVAM). In November 2008, the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) published recommendations on pyrogenicity testing, noting that while none of the five *in vitro* pyrogen test methods evaluated “can be considered as a complete replacement for the rabbit pyrogen test (RPT) for all testing situations .... However, ... they can be considered for use on a case-by-case basis ....”<sup>13</sup>

And just recently, the UK government, which had already mandated the end of cosmetics tests on animals, announced its intention to end testing of household products such as cleaners on animals as well. If the UK can do this, so can we.

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<sup>9</sup>“Translation of Research Evidence From Animals to Humans, *Journal of the American Medical Association* 296 (2006): 1731-2.

<sup>10</sup>“Innovation or Stagnation: Challenge and Opportunity on the Critical Path to New Medicinal Products,” US Department of Health and Human Services, Food and Drug Administration, March 2004.

<sup>11</sup>National Institute of Allergy and Infectious Diseases, “Clinical Trials of HIV Vaccines,” National Institutes of Health, 19 Sept. 2008.

<sup>12</sup>Commission of the European Communities, “Timetables for the Phasing Out of Animal Testing in the Framework of the Seventh Amendment to the Cosmetics Directive (Council Directive 76/768/EEC)”, 2004 <[http://ec.europa.eu/consumers/sectors/cosmetics/files/doc/antest/sec\\_2004\\_1210\\_en.pdf](http://ec.europa.eu/consumers/sectors/cosmetics/files/doc/antest/sec_2004_1210_en.pdf)>.

<sup>13</sup>National Institute of Environmental Health Sciences, National Institutes of Health, “Availability of the ICCVAM Test Method Evaluation Report and Final Background Review Document,” *Federal Register* 73(227), 2008: 71003-4 <<http://iccvam.niehs.nih.gov/SuppDocs/FedDocs/FR/FR-E8-27790.pdf>>.

Already in most countries the law simply states that cosmetics and toiletries must be safe for human use; tests on animals are not required – and indeed are ineffective for predicting human reactions to products. More than 1,000 manufacturers of cosmetics, toiletries and household products worldwide – including profitable and innovative industry leaders such as Revlon and Crabtree & Evelyn – do not conduct any animal tests. While some companies establish safety by using ingredients that are generally recognised as safe through years of use by humans, other companies use alternative testing methods to evaluate the safety of new ingredients.

In India, though, the majority of the cosmetics and household products available in the market undergo tests on animals, but the Indian government has yet to make a decision on it. After the tests, the animals die or are killed. There are alternative ways to test for skin corrosion, which is supposedly done to ensure that the items are safe for use by human beings. Moreover, the items that pass the tests on animals are not necessarily safe for use by human beings. As the world moves away from the use of animals in cruel and archaic tests for these products, India must not be left behind. Compliance with international norms and standards will improve trade avenues for the country.

### **Alternatives to Animal Experiments**

A study of 20 reviews of animal tests' accuracy found that only two concluded that the animal tests were consistent with the human findings or had contributed significantly to developing new treatments.<sup>14</sup> Add to this the appalling failure rate of drug tests, and it is clear that we are doing a disservice to science by maintaining the status quo. We must embrace non-animal methods of scientific training, basic research, and drug and product testing.

Unlike crude, archaic animal tests, non-animal methods usually take less time to complete, cost only a fraction of what the animal experiments cost and are not plagued with species differences that make extrapolation difficult or impossible. Effective, affordable and humane research methods include studies of human populations, volunteers and patients as well as sophisticated *in vitro*, genomic and computer-modelling techniques. The following are just a few examples:

Sophisticated human cell- and tissue-based research methods allow researchers to test the safety and effectiveness of new drugs, vaccines and chemical compounds. The Hurel biochip, for example, uses living human cells to detect the effects of a drug or chemical on multiple interacting organs. VaxDesign's Modular Immune In vitro Construct system uses human cells to create a working dime-size human immune system for testing vaccines. Harvard researchers have developed a human tissue-based “lung-on-a-chip” that can “breathe” and be used to estimate the effects of inhaled chemicals on the human respiratory system. Human tissue-based methods are also used to test the potential toxicity of chemicals and for research into burns, allergies, asthma and cancer. The US National Disease Research Interchange provides more than 130 kinds of human tissue to scientists investigating more than 50 medical conditions, including cancer, diabetes and glaucoma. Cell and tissue cultures are used to screen new therapies and to test for product safety.

Clinical research on humans also provides great insights into the effects of drugs and how the human body works. A research method called “microdosing” can provide information on the safety of an experimental drug and how it is metabolized in the body by administering an

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<sup>14</sup>“Systematic Reviews of Animal Experiments Demonstrate Poor Human Clinical and Toxicological Utility”, ATLA 35 (2007): 641–59.

extremely small one-time dose that is well below the threshold necessary for any potential pharmacologic effect to take place.<sup>15</sup>

Studies of human patients using sophisticated scanning technology, such as MRIs, fMRIs and PET and CT scans, have isolated abnormalities in the brains of patients with schizophrenia and other disorders.<sup>16</sup>

According to the World Health Organisation, cancer is largely preventable, yet most cancer-focused health organisations spend a pittance on prevention programmes, such as public education. Epidemiological and clinical studies have determined that most cancers are caused by smoking and eating high-fat foods, foods high in animal protein and foods containing artificial colours and other harmful additives. We can beat cancer and other diseases by attending to this human-derived, human-relevant data and implementing creative methods to encourage healthier lifestyle choices. More human lives could be saved and more suffering spared by educating people about the importance of avoiding fat and cholesterol, quitting smoking, reducing alcohol and other drug consumption, exercising regularly, and cleaning up the environment than by all the animal tests in the world.

### **Ethical and Legal Issues**

Any system that involves inspections by people from within that system is flawed – it amounts to self-policing, and that doesn't work in any industry. It doesn't take a scientist to know when animal welfare laws are being violated or that an experiment that violates the law is flawed.

When we review the condition of laboratories in India, we can understand why a self-policing system doesn't work. For example, some years ago, the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) ordered the confiscation of 37 monkeys who had been horribly abused for years from the National Institute of Virology, Pune. There have been several cases across India in which animals have been confiscated from colleges – including All India Institute of Medical Sciences; Maulana Azad Medical College; College of Pharmacy, Delhi University; King Institute, Chennai; Bombay Veterinary College, Parel; and College of Veterinary Sciences, Marathwada University – as well as research centres such as Jai Research Foundation, Ahmedabad; Vaccine Institute, Vadodara; Bengal Chemicals, Kolkata; and several others. In each case, the institution violated various guidelines of the CPCSEA's Prevention of Cruelty to Animals Act, 1960, and animals were found to be living in substandard conditions without proper food and/or water. Many were unable to stand, some suffered from serious injuries (including missing fingers and anal bleeding) and others had gone mad inside their cages.

In addition to the physical pain of experiments, an honest view of the situation for animals in laboratories should take into account the totality of the suffering imposed on them, including the stress of capture, transportation and handling; the housing in confined and unnatural conditions; the deprivation that constitutes standard husbandry procedures; and the physical and psychological stress experienced by animals used for breeding, who suffer through cycles of impregnation only to have their young torn away from them, sometimes immediately at birth.

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<sup>15</sup>Center for Drug Evaluation and Research (CDER). *Guidance for Industry, Investigators, and Reviewers: Exploratory IND Studies*, Rockville, Md., 2006.

<sup>16</sup>Kelvin O Lim *et al*, "In Vivo Structural Brain Assessment," The American College of Neuropsychopharmacology, 2000.

Animals in laboratories endure lives of deprivation, isolation, stress, trauma and depression even before they are enrolled in any sort of protocol. This fact is especially apparent when one considers the specialised needs of each species. In nature, many primates, including rhesus macaques and baboons, stay for many years or for life with their families and troops. They spend hours together every day, grooming each other, foraging, playing and making nests for sleeping each night. But in laboratories, primates are often caged alone. Laboratories typically do not allow social interactions, provide family groups or companions or offer grooming possibilities, nests or surfaces softer than metal.

In many laboratories, animals are handled roughly – even for routine monitoring procedures that fall outside the realm of an experimental protocol – and this only heightens the animals' fear and stress. Video footage from inside laboratories shows that many animals cower in fear every time someone walks by the cages.

A 2004 article in *Nature* magazine indicated that mice housed in standard laboratory cages suffer from “impaired brain development, abnormal repetitive behaviours (stereotypies) and an anxious behavioural profile.” This appalling level of suffering results simply from standard housing conditions – *before* the animal undergoes any sort of procedure.

A November 2004 article in *Contemporary Topics in Laboratory Animal Science* examined 80 published papers and concluded that “*significant fear, stress, and possibly distress are predictable consequences of routine laboratory procedures*” [*emphasis added*] including seemingly benign practices such as blood collection and handling.

Experimenters claim a “right” to inflict pain on animals based on any number of arbitrary physical and cognitive characteristics, such as animals’ supposed lack of reason. But if lack of reason truly justified experimentation, experimenting on human beings with “inferior” mental capabilities, such as infants and the intellectually disabled, would also be acceptable.

The argument also ignores the reasoning ability of many animals, including pigs, who demonstrate measurably sophisticated approaches to solving problems, and some primates, who not only use tools but also teach their offspring how to use them. The belief that it is acceptable to harm animals because they are weaker or they look different or because their pain is considered to be less important than our own is cruel and unethical. It is time for those in animal laboratories to join the thousands of scientists, physicians, medical students, ethicists and ordinary people who believe that we need to extend compassion to all beings capable of suffering.