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Guest Editorial

RESEARCH USING ANIMALS : AN ETHICAL DILEMMA

Animal experiments have played a vital role in advancing our knowledge of human and animal biology. They have been crucial to a host of medical advances and the development of treatments for human as well as animal diseases. The issue of animal welfare has always been of concern to both, scientists and the public. In the West there has been a strong tradition of caring for the welfare of animals used in laboratory experiments and stringent regulations that govern every aspect of animal research and testing. Common people are also concerned about the welfare of laboratory animals, and therefore it is generally expected that animal experiments are to be conducted humanely and only when necessary. I will argue that animal experiments are vital to the future well being of humans and, as long as they are conducted to high ethical standards, they are entirely justifiable, from a utilitarian viewpoint.

The history of animal experimentation

Animal experiments have been used in bio-medical sciences since its origins in ancient Greece. Around 500 B.C., Alcmaeon of Croton demonstrated the function of the optic nerve by cutting through it in living animals and showing that blindness resulted. Herophillus of Alexandria studied animals between 330 B.C. and 250 B.C. and showed the different functions of nerves and tendons (1).

The scientific and ethical reasons that animals were used for these rudimentary experiments of ancient times are essentially the same today. Firstly, it was apparent to the bio-medical scientists of those times that the lacunae in their understanding of the human body, especially to understand why it malfunctioned when diseased, could be addressed because there was sufficient biological similarity between humans and other animals, and therefore, a finding in one could be applied with confidence in the other. Secondly, though human suffering was commonplace and human life held cheap in those days, it was still considered far more important than the life of a non-human animal. The Greeks also valued the pursuit of knowledge for its own sake.

The Greek tradition of studying animals to help understand the human body continued into the Roman era and into the Arabic schools of medicine, but died away with the coming of the dark ages. It was not until the 16th century that it was revived in the medical schools of Italy, when it spread

throughout Europe as the usefulness of experiments on living animals to study the function of body organs became clear. Many of the most fundamental discoveries in physiology came from studying animals, including William Harvey's demonstration of blood circulation in 1628, Robert Hooke's discovery of the functions of the lungs in 1667 and Stephen Hale's measurement of blood pressure in 1733 (2).

As the study of animals advanced in medical schools across Europe and the experiments became more complex and invasive, doctors and scientists began to display a growing reluctance to cause animal suffering in the name of science. In 1863, an editorial about animal experiments in The Lancet, stated '....perhaps some two or three, or at most six, scientific men in London are known to be pursuing certain lines of investigation which require them occasionally during the course of a year to employ living animals for the purpose of their inquiries.' As a result, experimental physiology – the main type of medical research in those times – was quite underdeveloped in the UK as compared to the rest of Europe. It was not until the introduction of general anaesthesia in the late 1860s that things began to change and a new generation of young medical scientists began to conduct research on animals rendered unconscious with ether or chloroform. Government statistics show that the number of experiments in the UK increased form 250 in 1881, the first year when records were kept, to 95,000 in 1910.

The promise of animal research began to pay off during the 20th century when much greater investment in the biological and medical sciences produced a remarkable number of medical advances, essentially all of which depended, at one or more point in their development, on animal experiments. Before 1922, juvenile diabetes meant a slow, painful death as the body was starved of nutrition with no cure and no sufferer survived beyond the age of 20. The discovery of insulin, through research on dogs and rabbits, came as a virtual miracle. For the first time, a major fatal disease could be cured, simply by regular injections. It is estimated that, throughout the world, up to 30 million lives have been saved by this discovery. It came as no surprise to the world when, in 1923, Frederick Banting and John MacLeod were awarded the Nobel Prize for medicine for their work in this field. The story of the discovery of Penicillin by Alexander Fleming is well known. In 1928, Alexander Fleming was researching agents that could be used to combat bacterial infections at St. Mary's Hospital in London. One serious infection at that time was caused by staphylococci bacteria. Once, Fleming proceeded on vacation, leaving his culture plates unwashed. Upon his return, a few weeks later, he noticed that something had "grown" on one of the culture plates. It was mould, and staphylococci did not grow around it! Apparently, the mould secreted a substance which prevented the growth of these harmful bacteria. Fleming named the substance "Penicillin" after the mould, "*Penicillium notatum*," that was found on the culture plate. Fleming contributed his findings to the medical world in 1929, but few seemed interested. He even published a report on the benefits of penicillin in the British Journal of Experimental Pathology.

Although Fleming continued working with the mould for some time, a team of chemists and mould specialists eventually took over the work. Unfortunately, the interest in penicillin did not peak again until World War II. Howard Florey and Ernst Chain picked up the research again, found a way to purify it, and presented this powerful antibiotic to the world after having relied on their experiments on mice to establish its antibiotic activity. Dr. Fleming and his many years of research were not forgotten. He was knighted in 1944 and shared the 1945 Nobel Prize for physiology and medicine with British scientist Ernst Boris Chain and Sir Howard Walter Florey for the discovery of Penicillin and its curative effects in various infectious diseases which eventually had saved millions of lives at the end of the war itself.

The development of vaccines against polio had depended heavily upon animal experiments. Although the disease was known since ancient times, it was not until 1909 that we began to understand how it was caused, when researchers studying the disease in monkeys (the only group of animals affected by it) showed that it was transmitted by a virus – a tiny particle smaller than bacteria. It was subsequently known that polio was caused by three strains of stable viruses that were a part of the *Enterovirus* family. To be effective, a vaccine has to confer immunity against all three strains. Dr. Jonas Salk was the first to develop a successful vaccine - Inactivated Polio Vaccine - using a mixture of the three strains of polio viruses, grown in monkey kidney cultures. The Oral Polio Vaccine (OPV) was developed in 1958 by Dr. Albert Sabin who attenuated the wild type poliovirus by passaging the virus in monkey kidney epithelial cells.

The list of medical advances that have depended on animal research is a matter of history. It includes essentially every medical advance of the 20th century. The total saving of human life and amount of suffering prevented is impossible to calculate.

The necessity of animal research

The transplant pioneer at the University of Pittsburgh, Dr. Thomas Starlz, was once asked why he used dogs in his work. He explained that his first series of kidney transplant operations left the majority of his subjects dead. He figured out what enabled the minority to survive and commenced a second series of operations; the majority of these subjects lived. A third group of subjects received liver transplants and only one or two died. In his fourth group all subjects survived. He remarked that it is important to realize that his first three groups of subjects were dogs, while the fourth group was human babies (3). Was he supposed to experiment and refine his technique on humans or was he expected to abandon a promising line of research that saved innumerable lives? The attempt to draw comparison between humans and animals is however fundamentally problematic. Human beings have agency and an appreciation of their circumstances that places them outside of the natural dictates that order and regulate the lives of animals. The animal world is a constituent part of nature while ours is not. These facts are important because they render the proposed extension of rights to animals nonsensical.

Animals are not beings of a kind that can exercise or respond to a claim against them. As Carl Cohen, Professor of Philosophy at the University of Michigan, has argued, animals and humans occupy separate moral spheres that cannot be forced into compliance (4).

Advocating animal rights involves a certain exaggeration of animal capacity but also relies upon a denigration of human ability that is much more dangerous. Our ability to understand nature and bend it towards our needs takes on an organized form through the project of science. Science occupies a very special realm within the gamut of human action and therefore advances the cause of human freedom. When science is upbraided for intruding upon nature it is not only science but humanity that is being attacked. The impression is that research animals are a 'necessary evil', when, in fact they are necessary, period. The example of Starlz's research dramatically illustrates the importance of animal research in developing medicine. There are many more breakthroughs that can be attributed, wholly or in part, to the use of animal experimentation (5, 6).

A fair assessment of history of animal research is that animal work has provided considerable breakthroughs in knowledge and understanding while at the same time, and consistent with all scientific endeavours, there have been hopeless experimental failures and the occasional calamity. The benefit to humankind has been impossible gauge in terms of human lives saved which would be well over a billion, a rough underestimate.

Equating the inequitable

Those who argue against the continued use of animals in research rarely do so by suggesting that humanity has not gained from the use of animals, which is a difficult argument to make. Instead it is proposed that animals retain capacities that make our use of them, as a means to an end, immoral. The proponents of this claim argue that if animals have a capacity for suffering, feeling and thinking as humans do then it should logically be the case that they have a claim to rights similar to ours. Anything else would be 'speciest' (7). Such 'abolishionist' views are of those who wish to prevent all forms of use of animals for human ends. 'Abolishionists' argue from the point of principle, which is that animals have cognitions and awareness comparable to our own and should, therefore, be treated as having 'inherent value'. The success or failure of animal research is beside the point; the value of animal life is sufficient that we should not use them as a means to an ends. We do not use people, even mentally disabled people, no matter how extreme their disability, as a means to an end and so, intuitively, if animals have equal abilities to persons of varying mental capacity, according to some, there is equal reason to defend the value of the animal as much as people. Ryder flags the mental abilities of animals, especially the capacity for experiencing pain, as a driving force of animal rights advocacy. He coined the term 'painience' to describe the capacity to suffer pain or distress of any sort and makes it the basis of rights qualification (8). Cohen agrees that animals experience pain but he does not view this as guaranteeing animals access to rights but rather as enforcing the

duty of humans not to be cruel (9). In my personal opinion they are all guilty of exaggerating the capacities of animals. They draw false equivalence between the capacities and abilities of humans and animals based on superficial contrast leading to the moral blunder of equating the inequitable.

Pain & suffering

The famous dictum of the philosopher Jeremy Bentham, ‘The question is not, Can they *reason*? Nor, Can they *talk*? But, Can they *suffer*?’ is routinely wielded in defence of animal interests with the assumed positive answer to the latter question. This assumption is hasty. There is good evidence that the extent to which animal suffers and feels pain is minimal, especially when compared to humans. The suggested experience of pain in animals is an interpretation based on our own experience that we project on to the animal world. The projection is understandable but wrong, as an examination of the term ‘pain’ reveals (10, 11). To avoid the tautological use of the term pain, some sort of definition of what pain is, is needed. In the absence of a definition, pain is ascribed when there are 'pain behaviours' or 'pain stimuli' or, more simply pain is present when there is pain. The circularity arises because the description of behaviours that follow noxious insult and the psychological description of pain experience are at two different levels: the link between them is at the heart of the problem of understanding animal suffering or other types of animal experience (12). That link, however, is rarely explored or even recognized and is instead simply assumed.

To escape the inherent tautology of describing pain as the result of painful stimuli, pain is generally defined as a sort of amalgam of cognition, sensation and affective processes commonly described under the rubric of 'biopsychosocial' model of pain (13, 14). Pain is no longer regarded as merely a physical sensation of noxious stimulus and disease, but is seen as a conscious experience that includes mental, emotional and sensory mechanisms. Pain has been described as a multidimensional phenomenon for sometime and this understanding is reflected in the current International Association for the Study of Pain (IASP) definition of pain as ‘An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage’ (15). Although clearly not without its flaws, the IASP definition captures the basic essence of pain subjectivity and I defend it wholeheartedly. The view of pain as a low-level phenomenon directly contingent upon injury is, by this definition, a mistaken one. Pain is actually a high-level process that makes no sense in the absence of sentience; pain accompanies injuries in minds that are capable of subjectivity and this criterion is a reach for animals. There are good reasons for believing that animals lack the ability for reflection (and therefore lack an inner world) and the capacity for reasoning or suffering.

Thus, the two grounds on which using animals as research subjects is widely condemned are: first, because it wrongly violates the rights of animals (16), and second, because it wrongly imposes on sentient creatures much avoidable *suffering*

(17). Both these arguments are unsound. The first relies on a mistaken understanding of rights; the second relies on a mistaken calculation of consequences. Both deserve definitive dismissal.

Rights & obligations

A right, properly understood, is a claim or potential claim that one party may exercise against another. To comprehend any genuine right fully, therefore, we must know *who* holds the right, *against whom* it is held, and *what* it is a right. Rights arise, and can be intelligibly defended, only among beings who actually do, or can, make moral claims against one another. Whatever else rights may be, they are necessarily human; their possessors are persons, human beings. Humans confront choices that are purely moral; humans – but certainly not dogs or mice – lay down moral laws, for others and for themselves. Human beings are self-legislative, morally *autonomous*. Animals do not have such moral capacities. They are not morally self-legislative, cannot possibly be members of a truly moral community, and therefore cannot possess rights. In conducting research on animals therefore we do not violate their rights, because they have none to violate. It however does not follow that we are morally free to do anything we please to animals. In our dealings with animals, like in our dealings with other human beings, we have obligations that do not arise from claims against us based on rights. Rights entail obligations, but many of the things one ought to do are in no way tied to another's entitlement. Rights and obligations are not reciprocals of one another, and it is a mistake to suppose that they are. Obligations may arise from certain acts or circumstances: one may be obliged to another for a special kindness done, or obliged to put an animal out of its misery in view of its condition – although neither the human benefactor nor the dying animal may have had a claim of right. In our dealings with animals, few will deny that we are at least obliged to act humanely – that is, to treat them with decency and concern that we owe, as sensitive human beings, to other sentient creatures. To treat animals humanely is not to treat them as humans or as the holders of rights.

A common objection is about infants, brain damaged humans and the comatose who are incapable of making moral claims and therefore must be without rights. This objection fails as it mistakenly treats an essential feature of humanity as though it were a screen for sorting humans. The capacity for moral judgement that distinguishes humans from animals is not a test to be administered to human beings one by one. Persons who are unable because of some disability, to perform the full moral functions natural to human beings are certainly not for that reason ejected from the moral community. The issue is one of kind. Humans are of such a kind that they may be the subject of experiments only with their voluntary consent. The choices they make freely must be respected. Animals are of such a kind that it is impossible for them, in principle, to give or withhold voluntary consent or to make a moral choice. What humans retain when disabled, animals have never had.

In conclusion

Those who claim to base their objection to the use of animals in biomedical research on their reckoning of the net pleasures and pains produced make an equally grave mistake. An argument that is explicitly framed in terms of interest and benefit for all in the long run must attend also to the disadvantageous consequences of not using animals in research, and to all the achievements attained and attainable only through their use. The sum of the benefits of their use is utterly beyond quantification. The elimination of horrible disease, the increase in longevity, the avoidance of great pain, the saving of lives, and the improvement of lives (for humans and for animals) achieved through research using animals is so incalculably great that the argument of critics, systematically pursued, establishes not their conclusion but its reverse: to refrain from using animals in biomedical research is, on utilitarian grounds, morally wrong.

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