

Animals in Research in New Zealand

By Hannah Wilson, Rudolf Steiner School

In 2018 alone, New Zealand used almost a third of a million animals in research, testing and teaching (RTT), with animals used most commonly for research within agriculture, medicine, veterinary science and conservation (Ministry for Primary Industries, 2020; SAFE, n.d.). Animal welfare is an essential aspect of this issue; however, it is also important to bear in mind the scientific and economic implications of the use of animals in research in New Zealand. Overall, I believe that the use of animals in research, while sometimes necessary, should be reduced drastically, and the ethical guidelines surrounding this issue revised for clarity. Furthermore, balance, with a focus on carefully weighing harm against research benefits, is key to achieving the best possible outcomes for both humans and animals.

In New Zealand, anyone wishing to use animals in research must hold a current and approved Code of Ethical Conduct (CEC), as well as set up an Animal Ethics Committee (AEC) to set the required conditions for approved projects and monitor the research to ensure its accordance with the CEC (Animal Protection Index, n.d.; MPI, 2019). Each must include three external members, including a representative from the Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA). When considering and monitoring research proposals, AECs are required to refer to a set of ethical guidelines known as the Three Rs. The Three Rs aim to 'replace' animals with in vitro or less sentient alternatives, 'reduce' the total number of animals used, and 'refine' projects to lower their overall impacts on and reduce the distress of the animals involved (MPI, 2020). When putting the Three Rs into practice, a balance must be found between the optimization of the animal welfare and the research validity. For example, if more animals are used than is necessary, the surplus animals are wasted. Conversely, if not enough animals are used, then the data accuracy is compromised, once again resulting in animals being used to no avail. Furthermore, there is a degree of flexibility in how the Three Rs can be interpreted since there are no specifics on what exactly the guidelines should look like in practice. This is likely in part because the use of animals in research varies across projects, so it is difficult to set a nationwide bar.

There is a definite conflict of opinion surrounding the Three Rs. The New Zealand Anti-Vivisection Society (NZAVS), for example, neither promotes nor agrees with them (T. Jackson, personal communication, 25 August, 2020), while the Ministry for Primary Industries (MPI) actively promotes the Three Rs and encourages their use (MPI, 2020). NZAVS also claims that 'they [the Three Rs] act more as a lip service rather than actionable guidelines' (T. Jackson, personal communication, 25 August, 2020) and that the Three Rs are deeply flawed as they only consider the ethical implications of the use of animals in research, while ignoring the invalidity of the use of animals to model the human response (NZAVS, 2018). While this is a fair statement, it is necessary to remember that although animals are used to predict the human response, this is only relevant for a fraction of the animal research conducted in New Zealand.

Agriculture related research is responsible for approximately half of New Zealand's animal research (MPI, 2020). AgResearch is one of the leading agricultural research companies, using a range of physiology, nutrition and genomics-based research tools to both benefit the economy and improve animal welfare (AgResearch, n.d.). However, some of their projects do raise ethical questions, such as research into the gene editing of Auckland Island pigs to better suit their use in human organ transplants (AgResearch, 2019). While this project does address the huge demand for organ donors in New Zealand

(Waikato District Health Board, n.d.), it could be argued that humans have no right to take these live organs for their own benefit, while also remembering the huge impact a transplant procedure would undoubtedly have on the pigs, which we now know are highly sentient and intelligent animals (Bekoff, 2015).

AgResearch also conduct non- invasive research which does stand to benefit animals directly. An example of this is the use of thermal imaging to detect changes in the eye temperature of ewes to better understand the amount of stress that animal is experiencing. Temperature can be used as a measure of stress since it signals the activation of the autonomic nervous system (ANS). The ANS, part of the peripheral nervous system (PNS), controls involuntary responses (BBC, n.d.), and is further divided into separate systems including the sympathetic nervous system (SNS). The SNS is best known for mediating neuronal and hormonal responses to stress, specifically the sympatho-adrenal response (fight-or-flight response). Preganglionic fibers running from the central nervous system (CNS) to the adrenal medulla in the adrenal glands secrete acetylcholine which in turn activates the secretion of adrenaline (epinephrine). Adrenalin activates typical stress responses such as increasing heart rate, while also increasing blood flow which results in a measurable change in body temperature (Lumen learning, n.d.; The Human Memory, 2020).

The most invasive part of this project involves injecting a portion of the ewes with adrenalin in order to compare their responses with the others. The knowledge gained can theoretically be used in the future to improve farming by improving animal wellbeing (AgResearch, 2020). Clearly, this increased welfare stands to benefit the animals themselves, yet there is also an economic motivation for companies, since many New Zealand consumers prefer to buy meat and animal products if they know it has been ethically sourced. This marketing strategy could be portrayed as a greedy ploy to increase profits, however it is also important to remember the economic importance of New Zealand agriculture. 'Our economy relies on livestock and animal production' says Kate Littin, Manager of Animal Welfare at MPI (personal communication, 02 September 2020). Animal research conducted by AgResearch has the potential to benefit New Zealand's economy, especially in light of Covid-19.

In general, when animals must be used in research, non-invasive methods should be given high priority and other techniques employed. Ideally, agricultural research in New Zealand would be focused on improving the welfare of animals involved in an already cruel industry, with less of a focus on economic gain. The fact remains that agriculture is a significant contributor to New Zealand's economy. As much as it would be nice to get rid of the greed and replace it with kindness, this is not a viable long-term solution. Arguably, greed, while not a morally desired trait, remains a part of human nature, particularly in the business and economic world.

Unlike agricultural research, the forced swim test (FST), also known as the Porsolt swim test, uses animals to model the human response. While not widely used in New Zealand, the FST has recently been conducted at both Victoria University of Wellington and the University of Otago (NZAVS, 2020). The FST was originally designed to model the effectiveness of different antidepressants, and involves the placement of a rat or mouse in a cylinder filled with enough water so that its hind paws cannot touch the bottom. The time the animal spends struggling versus the time spent floating is supposedly representative of how depressed that animal is. Typically, mice endure one session lasting six minutes, while rats endure two sessions 24 hours apart, with the first lasting 15 minutes and the second 5 minutes. (R. Yankelevitch-Yahav et al., 2015; NZAVS, n.d.). Classifying the struggling behaviours as either swimming or climbing allows researchers to differentiate between serotonergic and noradrenergic antidepressants since the latter have been seen to increase the climbing behavior (Carr & Lucki, 2010).

NZAVS describes the FST as ‘torturing and nearly drowning mice and rats’ (NZAVS, 2019), however, this statement seems unlikely when considering that, firstly, the rodents are placed in the water for a maximum of 15 minutes, and secondly, both rats and mice are natural swimmers; able to swim for up to 3 days at a time (Engelhaupt, 2015; Moxie Blog, 2017). This evidence would suggest that in this particular instance, NZAVS has embellished slightly, perhaps as a result of their natural bias in this area since they are committed animal advocates. Their commitment to animals can be seen in their organization name (New Zealand Anti-Vivisection Society) and their slogan ‘ending animal experimentation’, as well as the many campaigns publicised on their website, such as the ‘Stop The Otago Animal Lab’ campaign (NZAVS, n.d.).

However, besides ethical implications, there are other concerns that have been raised frequently regarding the FST, namely concerns of its scientific relevancy. The FST measures coping strategy to an acute inescapable stress (R. Yankelevitch-Yahav et al., 2015) which is not necessarily synonymous with depression. In times of stress, including depression, the hypothalamus–pituitary–adrenal (HPA) axis is activated in order to release cortisol into the bloodstream. However, stating that stress is the sole cause of depression is a case of oversimplifying a complex psychiatric disorder. Not only has the development of depression been linked to many other factors including childhood trauma, family history and drug use (Higuera, 2020), but also, an animal’s response to chronic environmental stress is in no way a reflection of its internal emotional state.

It could be concluded that while the FST is clearly not an effective model for measuring the effects of antidepressants, it does not technically pose a significant threat to the lives of the animals, and is therefore more ethically sound than the public would believe. It is likely that the public hold such strong views on the FST because of its one-sided portrayal in the media as cruel and unnecessary, and also due to a lack of information. This lack of information could be largely avoided if the organizations conducting research were more transparent about how they use animals. Kate Littin agrees that transparency surrounding this issue is an aspect that needs work, stating ‘I think it’s not helpful in New Zealand that we still do have organizations that aren’t open about what they do with animals to the level of detail that lots of people would be interested in’ (K. Littin, personal communication, 02 September, 2020). It is important to bear in mind that the FST was approved by the AECs at the New Zealand universities it was conducted at. Since the FST is arguably not scientifically relevant, this shows that the AEC approval and monitoring system is imperfect. Perhaps NZAVS are correct with their statement that the approval process and supporting Three Rs are indeed too focused on ethical implications as opposed to scientific relevance. This could certainly be the case for the FST, although it is unlikely that all instances of animal use in research to model the human response would follow an identical path.

NZAVS, in partnership with several other organizations for the advocacy of animals recently put forth a petition to the government for an official ban on the FST in New Zealand. This petition, however, was not approved. It was argued by the select committee evaluating the petition that overall, the FST has a low prevalence in New Zealand, and is likely to fade away from the scientific world unaided (New Zealand House of Representatives, 2020). While this argument is true, officially banning the FST would have made a strong, positive statement to the rest of the world about New Zealand’s views on animals in research. Other countries would likely have followed suit, resulting in a huge impact, particularly in countries where the FST is widely used.

In my opinion, maintaining balance is a key aspect to regulating the use of animals in research in New Zealand. This can be seen in both weighing the harm of the research against the possible benefits, and balancing opinions and biases on the AECs. While NZAVS do not support the Three Rs and instead aim to

fully abolish the use of animals in research, I find this position highly optimistic, especially when considering the economic implications of animal research. However, I do believe that the Three Rs should be revised for clarity in order to avoid poor decisions being made as a result of bias. Furthermore, it is highly important to seriously consider scientific validity alongside ethics. Researchers need to be more open about how they use animals as the public currently has limited access to this information. Lack of information leads to scandal which leads to the conclusion that if organizations are not open then they must be hiding something. If researchers were legally bound to share details about how they use animals, this would both expose any illicit activity and bring it to a stop under increased public scrutiny, overall resulting in a positive impact for both humans and animals.

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