Better Ways of Doing Research than Exploiting Greyhounds and Other Animals

by Dr Monika Merkes
President of Humane Research Australia

Australian researchers have used healthy greyhounds for heart surgery experiments, terminal blood donation, and to test dental implants and deep brain stimulation devices. According to the latest available statistics, a total of 8,870 dogs were used in 2016 in the five Australian states that provided data. Mostly, these dogs were beagles or greyhounds. Beagles are well-liked for their friendly and docile temperament, while greyhounds are easy to obtain from the racing industry.

The use of animals in science is outdated and unnecessary. It is not only costly, lengthy and not very effective, it may have held back the discovery of treatments and cures for humans because they did not work well in animals. For example, aspirin was patented in 1900. While it is safe for humans, it would not pass the current drug safety testing procedures because it causes birth defects in mice, rats, guinea pigs, rabbits, cats, dogs, sheep and monkeys.

Human-relevant methods that offer a more effective and ethical approach to science are available. Broadly, these include: in-vitro methods (performed with microorganisms, tissues, whole cells or parts of cells in test tubes, petri dishes etc.), in-silico (computer-based) methods, studies with human volunteers, and simulators.

NEW APPROACHES

An example of innovative in-vitro approaches are organs-on-chips. They are bio-engineered devices that mimic key aspects of the physiology and function of human organs. Scientists have used microchip manufacturing methods to engineer culture devices that contain tiny chambers lined with living human cells, connected by tunnels through which fluids flow in a controlled manner. They are equipped with mechanical forces that can mimic the physical environment of organs, such as breathing motions (lung-on-a-chip) or

movements similar to muscle contractions (intestine-on-a-chip). When nutrients, air, blood or drugs are added, the cells replicate some of the key functions of the organ they imitate.

Organs-on-chips enable the study of biological processes, the modelling of diseases and investigation of the effects of drugs. They can also be used in personalised medicine, where, for example, tissue samples of a patient can be grown on a chip and tested with different drugs to determine which drug is most likely to be most effective as a treatment for that patient.

Novel computer-based approaches can be used to predict the harmfulness (toxicity) of chemicals from their basic properties. One of these approaches is the read-across method which is used in the safety assessment of industrial chemicals. It uses data from a chemical substance for which safety information is available, to make predictions for a similar substance about which not much is known. The software builds a map on which similar chemicals are placed close to each other. New chemicals are placed on the map, based on their structural similarity with chemicals already on the map. From this information, the computer can predict the potentially harmful health and environmental effects for the new chemicals.

A group of researchers in the US combined several large data bases with information about thousands of chemicals and used the read-across method to test its accuracy. They found that the new method was accurate 80-95% of the time, compared to 50-70% for animal tests.

It is important to have fast and inexpensive safety testing methods available, because over 100,000 chemicals available on the market have never been tested. In addition, around 1,000 new chemicals are created every year. Traditional methods, which usually involve animal testing, are expensive and lengthy. Safety testing with traditional methods reportedly costs US$10–20 million per product and takes several years.

AUSTRALIA LAGS BEHIND

In the European Union and the US, governments are now collaborating with industry, the scientific community and other interested parties to develop more humane research and testing methods and to promote the uptake of already existing animal-free methods. Sadly, Australia is lagging behind. Australian governments do not provide dedicated funding for the development of research methods that do not use animals (although some individual researchers have contributed to progress in this area).

HOW YOU CAN HELP

Let's urge federal and state governments to fund and support further development and uptake of non-animal methods and to work with all stakeholders to advance new approaches, so that better treatments and cures for human diseases can be developed. This will also end the suffering of millions of animals.

Please write to the Federal Minister for Health and ask that Australia invests in the development and validation of non-animal methods - Email: greg.hunt.mp@aph.gov.au. Write to Prof. Anne Kelso CEO, National Health & Medical Research Council asking that funding be redirected from animal-based research to human-specific research that will replace animal experiments - Email: nhmrc@nhmrc.gov.au. Or contact your local member of the state or federal government.

Dr Monika Merkes is the President of Humane Research Australia and the author of "Better ways to do research: An overview of methods and technologies that can replace animals in biomedical research and testing". The 74-page plain language document outlines various new and not so new humane methods and technologies, provides examples for their use, and suggests in what areas of research, testing and education they can replace animals. The document is available online. For a free hard copy, contact: admin@humaneresearch.org.au

Email: mm@monikamerkes.com.au

Twitter: https://twitter.com/monikamerkes