12th June 2020

South Australian Productivity Commission
Inquiry into Health and Medical Research
30 Wakefield Street
ADELAIDE SA 5000

sapc@sa.gov.au

Dear Commissioner,

Re: Submission - Health & Medical Research in South Australia

Thank you for the opportunity to provide a submission to the above Inquiry. I am writing on behalf of Humane Research Australia, a not for profit organisation that challenges the use of animals in research and promotes the use of more humane and scientifically valid methodologies.

Introduction

In making this Submission, Humane Research Australia notes that for the purpose of the inquiry, the Commission will use the recently developed NHMRC definition of research impact which includes "the verifiable outcomes that research makes to knowledge, health, the economy and/or society, and not the prospective or anticipated effects of the research" (Issues Paper p 121), recognising four specific types of impact: knowledge, health, economic and social.

This submission is predicated on the assertion that there is an over-reliance on animal–based research in Health and Medical Research in Australia which does not typically produce reliable, verifiable outcomes.

Indeed, it is shown that there is a 95% failure rate of clinical trials following 'successful' animal trials[1].

It should be noted that HRA's call for increased transparency in animal research and investment in funding for 'alternatives' research has been supported by a Motion in the Senate and as such tangible action is required to ensure this call is met in practice.

4.1 Measurement and Data

Australia maintains no national collation of animal use statistics/data, unlike many other countries. Even at state/territory level, there are 5-year delays in reporting, extremely inconsistent collection and reporting methods between jurisdictions and institutions.

South Australia does not publish statistics of animal use in research and teaching which is contrary to the publication of data in the states of Victoria, New South Wales, Tasmania, Queensland and Western Australia. Consequently, statistics for the use of animals in research for Australia as a whole are incomplete without the published statistics of South Australia (and the territories). Humane Research

Australia is the only body in Australia which collates the animal use for research and this lack of shared data does not allow for a true reflection of the use of animals in medical research in Australia, nor in South Australia itself. As South Australian research institutes would be submitting data on the number of animals used and the purpose of this use, the data exists and should be collated and made public.

The lack of statistics collation at a national level, and at state/territory level, means that the 3Rs principles (Refining, Reducing, and Replacing animal use in research), or any other national policies that aim to limit and monitor the use of animals in research and teaching, are very difficult to implement, given that there is no accurate way of measuring change.

Australia has been cited as the fourth highest user of animals in research globally despite a proportionally low population [2] yet there is growing evidence to that research on animals is not sufficiently predictive of human outcomes and so does not translate well to clinical practice and commercial application. We therefore suggest that the classification 'animal use statistics' also be included for measurement of impacts in HMR.

5.1 Workforce

There are very few incentives, or financial resources, available to researchers to pursue alternatives research. By 'alternatives', HRA is referring to the many in-vitro, in-silico methods available, as detailed in the attached report 'Better Ways to Do Research'. Many of these technologies require expertise in in areas such as bioengineering or computational systems and may fall outside the skills set of biomedical researchers; therefore investment is required to develop this specialist workforce.

It is therefore apparent that an urgent need exists to provide these incentives to researchers in South Australia to ensure that Australia will be at the forefront in this escalating and promising area of research.

Incentives could include scholarships, grants, sponsorships to attend relevant conferences and mentoring.

5.2 Access to data

As summarised in point 4.1, the current regulatory environment at the national level and at the state level is not conducive to data generation and sharing. No national records are required of animal use data in research and teaching though the states of Victoria, New South Wales, Tasmania, Queensland and Western Australia publish data on animal use. South Australia does not. Therefore, statistics for the use of animals in research for Australia as a whole are incomplete without the published statistics of South Australia (and the territories).

Such published animal use statistics would ensure South Australia keeps up-to-date with other states in the country and would enable a measurement of inputs, outputs in the health and medical research sector.

Humane Research Australia proposes that research data, which includes animal- based research data, should be shared in a timely manner to prevent unnecessary duplication in research and duplication of

resources. This is particularly crucial for animal-based research to prevent unnecessary repetition of research and to adhere to the 3Rs, which are incorporated into State legislation.

We present that research funding within South Australia should be broken down into animal research/non animal research to enable measurement of productivity and impact of animal-based research on the health in the wider community.

We also submit that, to enable measurement of productivity and impacts in HMR, there needs to be more openness, better communication, greater accountability, and public access to information.

5.3 Infrastructure

It is widely accepted that animal research incurs the high ongoing costs of purchasing, caring for and disposing of animals. Alternatives are more cost efficient, as well as more effective. As with any transitioning industry, there are costs associated with training staff in new methods, and any potential investment in infrastructure or technology, dependent on the alternative method that it to be used. However, any initial costs outlaid can be returned over the long term. For example, tissue culture requires a high infrastructure and high level of training yet automated processes can test thousands of substances in parallel. (O'Neil (2017)[3]

5.4 Collaboration

To ensure secure research funding and also to achieve HMR outcomes, collaboration between researchers, institutions, industry both nationally and globally is extremely important to deliver urgent treatments to more people more quickly**.** South Australian government, the SA scientific community, industry and other stakeholders need to make efforts to pool knowledge and resources to replace animal based medical research with human-relevant (and often subsequently cheaper and faster) methods.

Research and biotech organisations around the world are developing technologies such as organs-on-chips and it is extremely important that South Australia HMR collaborates on the validation of new methods and technologies. Incentives and funding to researchers to attend conferences solely for alternatives collaboration should be awarded.

5.5 Funding

It is acknowledged that Australian funding bodies will accept applications for '3R's research', however their systems of application review mean that those applications do not stand a realistic chance of success, which is why we only see incidental progression of alternatives. Therefore, the only way such applications would succeed through the system would be for dedicated funds being set aside specifically for this area of research, as other countries have done. This specific purpose 'pot' would be in addition to funding for any proposals that are accepted through the current system as 'incidental 3Rs'.

It is acknowledged that the state of South Australia provides capital funding for stand-alone research institutions (e.g. the South Australian Health and Medical Research Institute) and it is extremely encouraging that the South Australian Government has provided funding, with the establishment of a research scholarship for the 3Rs (Replacement, Reduction, Refinement), but it is disappointing that funding is not allocated specifically for research into alternatives to non-animal based human-relevant transitional research.

Additional bespoke funding would facilitate innovative human-relevant research with translational value.

Internationally government-funded initiatives are acknowledging the need to further develop and validate non-animal methods of research, investing millions of dollars in alternatives and reflecting practical commitment to the replacement of animal research. This should be enshrined in legislation. It is noted that in South Korea new federal legislation has been proposed that would prioritise funding for human biology-based approaches in biomedical research; whilst the UK Animals in Scientific Procedures Act 2012 revision has enshrined the concept of the development of 'alternatives' as a legal requirement.

5.6 Translation of Research

Humans differ from animals anatomically, genetically and metabolically, and interspecies variations are a high cause of clinical trial failure of pharmaceutical products. Not only does this mean that results cannot be accurately extrapolated to humans, but it also means that some possibly successful treatments are being ruled out pre-clinically due to adverse reactions or responses in animals. Animal use in research and safety studies is therefore misleading and causes abandonment of effective therapeutics[4].

'*We are so ingrained in trying to cure mice that we forget we are trying to cure humans*'. - Dr. Ronald Davis, Genomics Professor, Stanford University, USA.[5] According to FDA (U.S. Food and Drug Administration), in spite of huge research effort and expense, development of new treatments has slowed, as preclinical success has not followed through into clinical trials[6] . Latest figures have revealed a 95% failure rate of clinical trials following 'successful' animal trials[7].

A presentation delivered by the NSW Office for Health and Medical Research[8] identified Australia as 'Poor at translating research innovation into economic benefit for Australia' with an Innovation Efficiency Index of 73 (of 128 OECD countries). Similarly, a 2018 KPMG report on the economic value of Australia's medical research concludes that with an increased focus on translation and commercialisation of medical research, return on investment will increase[9.]

Whilst these observations are not specific to South Australia, representing a national trend, Humane Research Australia submits that intensifying efforts to develop, validate and implement human-relevant research will result in increased translation and commercialisation of medical research in South Australia.

It is not only the benefits to human health that are identified as supporting drivers, but also the potential for economic growth. For example, a non-animal technologies roadmap for the UK concludes

that 'Non-animal technologies could replace the use of animals in testing the safety and efficacy of new products including pharmaceuticals, veterinary medicines, agrichemicals, chemicals and consumer products, and are one of a series of emerging technologies that could drive future UK economic growth' [10]. Indeed, the 3D Cell Culture market was estimated to be over US$ 718.8 M in 2018. It is anticipated to grow at a compound animal growth rate of 19.8% from 2019 to 2030[11]. While other nations forge ahead in the area of alternatives research, Australia is missing an opportunity to excel in clinical translation and technological innovation.

Further, The Dutch government recently announced its plan to phase out toxicology tests for chemicals, food ingredients, pesticides, veterinary medicines, and vaccines by 2025. Their Transition Program for Innovation[12] without the use of Animals sets out the means to achieve this through collaboration between the science, health care, government and business community.

We submit focus must be placed on research to advance the science of translation into interventions to improve human health, rather than to sustain publishing careers.

5.10 Clinical Trials

According to FDA (U.S. Food and Drug Administration), in spite of huge research effort and expense, development of new treatments has slowed, as preclinical success has not followed through into clinical trials. Latest figures have revealed a 95% failure rate of clinical trials following 'successful' animal trials (Arrowsmith, J. (2012)[1].

Whilst these figures relate to the US, the lack of predictive value of animal models is a global issue. We submit that funding must be redirected into human relevant research instead on continuing to fund animal models of research with extremely low validation rates at clinical trial. Additionally, the results of clinical trials should be made available to enable public scrutiny.

5.11 Collaboration and precincts

Listening to the public

According to Nexus Research in 2018, 67% of Australians support allocating a proportion of medical research grants to funding scientific alternatives to animal experiments[13]. Within the research community, HRA has received endorsement from researchers who have expressed interest in the provision of funding incentives to develop alternatives to animal experiments.
Public acceptance of the use of animals in biomedical research is conditional on it producing benefits for humans. Pandora Pound and Michael Bracken argue that "the benefits remain unproved and may divert funds from research that is more relevant to doctors and their patients".[14]

Rachel Smith

Campaigns and Communications Manager
Humane Research Australia
Rachelsmith@humaneresearch.org.au
0415 227 815

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Senate Motion moved and agreed to on 27/2/2020
https://www.aph.gov.au/Parliamentary_Business/Hansard/Hansard_Display?bid=chamber/hansards/7123b722-738a-4e51-9256-2815f1b3d2bd/&sid=0148