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Open access to maximize the value of animal research

Key position statement

The scientific research community, including the public and private sector, is committed to maximising the value of data generated from animal research in order to enhance the design of future studies. This can be achieved by archiving non-competitive data derived from animal experiments in publicly accessible repositories, and by sharing protocols and data on the characteristics and optimal use of each animal model as widely as possible. This could potentially lead to the refinement of experimental protocols and the reduction of the number of animals used in research. It could also inform strategic decision-making regarding future academic and commercial research. Animal usage may also be reduced through wider use of animal repositories. Data, protocols and results from well designed and conducted research using animals should also be readily available in a curated, searchable form. Sharing research outputs will help to maximise the knowledge base resulting from research, improve research outcomes and avoid unjustified duplication of work using animals.

The scope of this commitment should extend to individual researchers, research institutions, research funders, publishers, industry and government departments, which fund and undertake research using animals.

Publishing results of animal experimentation in scientific journals:

1) The approved guidelines for publication[1] of research using animals including ARRIVE, ILAR, ICLAS and GSPC should be widely supported.
2) Additional open access publications, or on line space in existing journals, for well-designed studies that do not support the initial hypothesis, and for 'verification'/'replication' studies should be provided.
3) Published papers should include a clear statement on how data and materials related to the paper can be accessed.
4) It should be made a condition of publication that where appropriate, raw data related to the publication are deposited in a recognised database to make this standard practice. E.g. sequence data.

[1] http://www.nc3rs.org.uk/downloaddoc.asp?id=1206&page=1357&skin=0

5) Funding bodies should require details of publication plans to be included in the proposals for work. There should be a requirement for all grants using animals to publish 'something' of journal quality, irrespective of whether the initial hypotheses have been supported or not.
6) The research sector should create incentives for the publication of all results so that publication becomes normal practice. This could include developing a system where the number of times certain publications are accessed via a repository system is counted.
7) Improve research identifiers (such as ORCID[2]) and develop citation incentives to acknowledge researchers who publish all of their findings.

Accessibility of resources for animal studies:

8) Resources and repositories such as INFRAFRONTIER/EMMA (www.infrafrontier.eu) or KOMP (https://www.komp.org) for mice, the Zebrafish International Resource Center ZIRC (http://zebrafish.org) the Rat Genome Database (http://rgd.mcw.edu) or FlyBase (http://flybase.org) have established successful models for sharing animal models, protocols and genetic information, as well as a wealth of cross-referenced data. Their use should be encouraged and their sustainability secured by increased EU, other public sector and charitable funding.
9) Systematic approaches like INFRAFRONTIER or the IMPC use high-end technology and common standards and protocols to minimize impact on animals and maximise scientific output with the minimum amount of animals. Researchers should be encouraged to use these services.
10) Repositories such as INFRAFRONTIER/EMMA act as 'clearing houses' which can connect researchers working on specific disease models or drug targets, with others in the field who have used similar animal models.

Accessibility of data on animal studies:

11) Encourage platforms for the publication and dissemination of all well designed and conducted research findings irrespective of whether they support the initial hypotheses or not.
12) Develop mechanisms to increase the sharing of research resources, protocols, and data through cross-linked, open-access repositories and databases.
13) A future vision could encompass a central portal through which interrogation of all animal studies, published or unpublished could be accomplished.
14) Improve awareness of the importance of, and training in, undertaking systematic reviews of available information in the literature and in dedicated bioinformatics resources as part of the study design[3] process, as well as training and method development on meta-analysis.
15) Encourage increased searching and use of data and existing protocols in databases such as CAMARADES[4], eTRIKS for translational research in the remits of the IMI, FigShare[5], Dryad[6].

[2] www.orcid.org
[3] Macleod, m. 'How to avoid bumping into the translational roadblock'
[4] http://www.camarades.info/index_files/Protocols.html
[5] http://figshare.com/
[6] http://datadryad.org/

Issue Background

Publication of research results

- Not all research results from studies using animals are published. A recent study conducted in the Netherlands estimated that ~50% of all studies using animals in academia and only ~10% of all for profit studies are published [7]. This has a number of implications, which include:
  - Possible unjustified duplication of studies involving animals;
  - Possible premature "first in man" studies[8];
  - Possible publication bias[9].
- Currently, there is little incentive and very few avenues to publish so-called 'negative' and 'null' results (see workshop 1).[10]
- Increased sharing of experimental design and methodologies will increase the quality of future studies and maximise the knowledge gained by systematic review of previous research.
- Therefore , the following challenges with respect to open access need to be addressed:
  - A flexible enough vocabulary and data dictionary to include all robust results from animal studies in a format, which can be easily interrogated must be developed. This format must be applicable to all the various areas relying on animal experimentation.
  - It needs to be decided if in addition to *in vivo* animal studies, the results of *in vitro* research using cellular systems should be part of these open access efforts as their scientific value will likely go beyond strict implementation of the 3Rs relevant to research with animals.
  - It is important that sharing of experimental designs and research results will in no manner compromise commercially sensitive information. Therefore, these different and in parts conflicting interests (open access versus property right concerns) must be seriously considered.

[7] ter Riet G, Korevaar DA, Leenaars M, Sterk PJ, Van Noorden CJF, et al. (2012) Publication Bias in Laboratory Animal Research: A Survey on Magnitude, Drivers, Consequences and Potential Solutions. PLoS ONE 7(9): e43404. doi:10.1371/journal.pone.0043404
[8] ibid p 1
[9] ibid p 4
[10] Gabriella Anderson, Haiko Sprott, and Bjorn R Olsen, 'The Scientist' January 15, 2013 http://www.the-scientist.com/?articles.view/articleNo/33968/title/Opinion--Publish-Negative-Results/