PP+G REVIEW

Vol 2., No 2. Spring 2011

Ostry Prize

Public Policy & Governance Review

# Opening Up: Is Sunlight the Best Disinfectant?

## Second Runner-Up

**By Elisabeth Ormandy + Joanna Makowska**

Elisabeth and Joanna are PhD students in UBC's Animal Welfare Program. Elisabeth previously completed a BSc (Hons.) in Neuroscience, and an MSc in Applied Animal Behaviour and Welfare, both from the University of Edinburgh in Scotland.
Joanna obtained her B.Sc. with a major in Biology and a minor in Psychology from McGill University as well as an MSc in Animal Welfare from UBC before enrolling in the PhD program.

### Introduction

In this paper, the concept that 'sunlight is said to be the best of disinfectants' is taken by its intended meaning from a quote by U.S. Supreme Justice Louis Bandeis: that there are benefits to openness and transparency. In a similar vein, key figure in animal welfare science Temple Grandin recently stated that "slaughterhouses should have glass walls"—meaning that slaughterhouse activities should be transparent to the public. This concept will be applied to another animal-related topic—the practice of animal-based science, and in particular: 1) the tension between provision of information to the public and respect for researcher privacy, and 2) the need for greater transparency within the scientific community itself. Using these two issues for discussion, from the Canadian perspective, the case will be made that if animal research policy encourages greater transparency it will help educate and engage the public on important animal research issues, and it will help the scientific community improve implementation of the accepted ethic of humane scientific practice – the Three Rs of Reduction, Refinement and Replacement.

### A Call for Transparency and Openness Regarding Animal Research

On November 29th 2010 a group of 80 biomedical scientists from Sweden, Germany, Switzerland, France, and Great Britain met to discuss issues related to animal research. The outcome of the meeting was the Basel Declaration (2010), which is available for the scientific community to sign and commit to a responsible approach to the handling of animals in research by acknowledging and implementing the Three Rs principles (Russell and Burch, 1959; Fenwick et al. 2009). The Three Rs are the tenets of humane animal-based research, and as originally outlined by Russell and Burch (1959), involve: reducing

the number of research animals, refining animal research to minimize harm and enhance animal welfare, and replacing animals with viable non-animal alternatives wherever possible. For many years now, the scientific community has adopted these Three Rs concepts in the policies that oversee animal research, and as ethical standards that not only improve the lives of animals in research, but also promote better scientific practice.

The Basel Declaration (2010, p. 2) also made a call for transparency and openness with the public: via the 9th fundamental principle, signatories commit to "promote the dialogue concerning animal welfare in research by transparent and fact-based communications to the public." There has long been tension between scientists who conduct research on animals behind closed doors, and the public who demands full disclosure, often including pictures and videos. Many research facilities actively encourage researchers to keep their study information confidential because of fear of misinterpretation from a public that is perceived to be lacking in scientific knowledge. Furthermore, it is implied that if more radical members of the public are provided with any information at all, truth will be twisted and used to attack researchers (NCUA/AIS, 2011). However, most animal-based research is funded by public tax dollars, and members of the public are often the beneficiaries of the results through progressive health care. This, disclosure advocates claim, gives the tax paying public the right to be informed about the specifics of the research as well as to be involved in a dialogue with scientists (O'Sullivan, 2006).

Stephan Treue, director of the German Primate Centre and co-chair of the Basel meeting, agrees that the public lacks scientific knowledge, but unlike most scientists, argues that the solution is not to withhold information from the public but rather to disclose it. According to Treue, "[t]he public tends to have false perceptions about animal research, such as thinking that they can always be replaced by alternative methods like cell culture," and that openness and dialogue between the public and scientists "will be helpful to both sides" (Abbott, 2010, p. 742).

Several countries provide information about animal research to the public via annual statistics on animal use provided by national oversight bodies. However, the information given is often selective. For example, the UK reports the number of animals used

per species but not per 'severity classification', even though studies on public attitudes indicate that the level of pain and distress the animals experience is of primary concern (Knight et al 2004, 2009). In Canada, animal numbers are reported per 'Category of Invasiveness', but the numbers given are not necessarily representative of what animals actually experience. As a key example, experiments using newly created genetically-engineered animals are automatically assigned to Category D, which represents studies that cause 'moderate to severe distress or discomfort.' (CCAC, 1991). In reality, many genetically-engineered animals do not suffer moderately, but are assigned to this category because they have the potential to, due to their unanticipated phenotype. Additionally, studies rather than animals are assigned to Categories of Invasiveness. Therefore, a Category D study using several procedures and 500 animals may in fact contain only one Category D procedure that is performed on 100 of these animals. However, all 500 animals are reported as Category D. As a result, the numbers of animals listed as being in Category D are inflated. Clearly, the accuracy of information provided about animal experimentation, in Canada and elsewhere, could be improved.

**What Are the Benefits of Transparency With the Public?**

The benefits of openness and transparency between the scientific community and the public are two-fold: first, transparency will improve public accountability, and second, those who oppose animal-based research may hold less radical views once they are faced with facts as opposed to speculative beliefs.

Being accountable to the public ensures that only science that is of either scientific or societal importance is carried out. Disclosing information would encourage researchers to clearly formulate and justify the use of animals and the choice of methods—clearly contributing the Three Rs principles.

Recent opinion polls in the US and the UK show that approximately one-third of the population opposes research on animals (Ipsos-MORI Poll, 2010; Gallup Poll, 2010). The case is often made that the public does not have enough background knowledge to be involved in discussions about animal research—the so-called deficit model. It has been argued that those who oppose animal research may do so because of lack of sufficient

knowledge about actual laboratory procedures, and a lack of information about the costs and benefits of animal research. However, without openness and transparency the public will remain lacking in the right information, and unable to engage fully in open discourse with the scientific community about what is and what is not ethically permissible. Indeed, Abbott (2010) writes that, “dialogue with the public is key to reducing opposition over the use of lab animals.” Broida et al. (1993) found that the strongest predictor of opposition towards animal research was lack of faith in institutional science. Full disclosure of experimental methods may help inform the public about the workings of science, which may in turn increase support for research. Furthermore, individuals who are more familiar with science (for example, science students versus non-science students) are more likely to point out the need for improvement of animal research procedures (Knight et al., 2003), further contributing to the Three Rs concept of refinement.

**How Might Policymakers and the Scientific Community Improve Transparency to the Public?**

Perhaps the best way to gain better transparency is by also encouraging public engagement on animal research issues. The current oversight system for animal research in Canada involves reliance on institutional Animal Care Committees (ACCs). These committees review proposals for experiments that plan to use animals, and it is their task to decide whether the proposed research should be able to proceed. It is a requirement of the national oversight body (the Canadian Council on Animal Care) that at least one ‘community representative’ sits on each ACC in order to represent public opinion. However, it is a challenge for one person to represent the public as a whole.

One way of supporting a movement towards better transparency might be to provide free public access (at the institutional level) to animal research proposals for a specified time before the ACC meets to decide whether the research should proceed. The proposal could appear online, and members of the public (along with other stakeholders, e.g. other researchers, veterinarians, members of animal welfare organisations) could be allowed to comment on the proposal. The intention would be for these comments to be taken into account when the ACC meet to discuss research approval. Importantly, during this process, researcher identity could be kept confidential to avoid any potential conflict

with animal rights activists. Ultimately, this process of involving many more stakeholders would aim to ensure that the Three Rs are implemented fully, and that all animal-based research is in line with societal values.

Another approach might be to host citizen juries or public forums to promote dialogue between scientists and the public, which may include facility tours wherever possible. However, this is a more costly option, and maintaining the confidentiality of researcher identities would be more challenging.

Occasionally, cases of non-compliance with Canadian guidelines do occur, though these are typically met with corrective actions within a relatively short time frame. As well as promoting dialogue between scientists and the public, the ACC could keep records on compliance at their institution, and produce periodic, publicly available reports, which provide the number of instances of non-compliance and the corrective actions taken. The addition of public accountability (via increased transparency) in this case should act to reduce and perhaps eliminate any cases of non-compliance. Taking records of compliance at the institutional level will also identify areas where the Canadian Council on Animal Care (CCAC) might be able to provide support for constituents so that they are able to fully implement the national guidelines. The CCAC has already initiated a proactive impact analysis consultation process, where members of the scientific community are asked to evaluate the costs and benefits that new (or revised) guidelines may have on their day-to-day practice. The aim of the impact analysis is to identify what types of support constituents need, either in the form of implementation tools or training efforts provided by CCAC. This initiative is in place to ensure that all guidelines are feasible to implement, and recording instances of non-compliance would add a retroactive element to the process.

**Transparency and Openness Within the Scientific Community**

Openness and transparency within the scientific community itself is equally important as transparency with the public. In order to track Three Rs implementation and to identify areas for improvement, scientific practice needs to be transparent. However, recent studies have indicated that transparency is currently lacking in key areas of animal research:

scientific reporting, and data and/or animal sharing.

A study by Kilkenny et al. (2009) unearthed several key problems with the scientific reporting of animal research. In a strategic review of 271 different articles describing animal use data (with 48 of these articles examined in greater detail), Kilkenny et al. (2009) identified many articles that omitted basic details about the strain, sex, age and weight of the animals used. As the authors point out (p. 5), "This information is generally readily available to researchers and can be succinctly described, so it is unclear why omitting these essential details is so prevalent." There may be an argument that publication space is limited, but the authors reason that "the availability of [online supplementary materials] negates the argument that the lack of detail in published papers is primarily due to a lack of space." (p. 5) Kilkenny et al. (2009) also found that in 6% of the articles studied the number of animals used in the main experiment could not be determined. Reporting animal numbers is essential so that the biological and statistical significance of the experimental results can be assessed or the data re-analyzed, and is also necessary if the experimental methods are to be repeatable. Crucially, none of the studies that were assessed in more detail (i.e. 48 articles) discussed how the sample size was chosen. Overall, the findings of this study highlight the need for more stringent scientific reporting, and the authors make a call for reporting standards and better editorial policies to be established, specifically for the publication of animal research.

The results of the Kilkenny et al. (2009) paper correlate with a study conducted by Osborne et al. (2009), which focused on editorial policies relating to the use of animals. Before conducting a systematic review of journals, Osborne et al. (2009) identified 12 key criteria that they felt should be required by journals in order to a) get animal research published (i.e. the editorial policy relating to the use of animals), and b) advance the Three Rs (see Table 1 for a list of the 12 editorial policy criteria). Importantly, Osborne et al. (2009) also recorded information about whether the editorial policy required adherence to the policy as a condition for publication. Once the 12 criteria were set, information about the editorial policies of a randomized sample of 236 journals that published animal research was collected. Only 53% of the journals sampled were found to have an edi-

torial policy specifically relating to the use of animals. Of the remaining journals (n=153), 42 scored only one point based on the 12 point scoring criteria. The maximum possible score using the criteria was 12, but the highest score achieved was 9 (achieved by only one journal). The average score, taking all 236 journals into account, was 1.51.

**Table 1.** Scoring criteria from Osborne et al (2010). The editorial policies of all journals sampled in the study were evaluated using this scoring scheme.

| **Criteria** | **Score** |
|---|---|
| Mentioning the use of animals in research and testing | 1 |
| Referring the author(s) to national or international guidelines, codes of conduct or legislation relating to research involving animals | 1 |
| Making adherence to the policy a condition of publication | 1 |
| A specific statement in the research the journal is prepared/not prepare to publish, or other 'significant' animal welfare statement | 1 |
| The journal policy should include statements requiring that: | |
| The 3R's are implemented: humane alternatives used wherever possible, animal numbers and suffering reduced, and welfare improved | 1 |
| Animal housing and care follows good practice (and improves on minimum standards se tout in relevant legislation) | 1 |
| Discomfort, distress and pain is minimized using appropriate anesthesia and analgesia | 1 |
| Humane endpoints are defined and implemented | 1 |
| Protocols involving animal use undergo ethical review | 1 |
| Investigators and all personnel who handle and use animals are appropriately trained and qualified | 1 |
| Euthanasia is carried out according to good practice | 1 |
| Information that is suitable for publication such as species, animal numbers and other pertinent details including refinements in husbandry and procedure, is included in each manuscript. | 1 |
| **Maximum Score** | **12** |

Together, Kilkenny et al. (2009) and Osborne et al. (2009) make a strong case for improving the reporting of animal-based research in scientific journals, and for improving the editorial policies of journals as they relate to animal use. These are both key steps in being able to conduct systematic reviews of animal-based research.

Systematic review is "the identification and synthesis of all the available research litera-

ture addressing a specific research question, using a systematic approach" (NC3Rs UK, p. 1). It typically involves, "analysis of the experimental methods of all the included studies to assess the quality of the study design and conduct. Any methodological limitations (e.g. inappropriate study design, very small treatment groups, etc.) are usually noted to aid interpretation of the results and to give an indication of the confidence in the numerical results (NC3Rs UK, p 2.). Systematic review of animal research is also important to advance the Three Rs (NC3Rs UK p. 3), however, as identified by Kilkenny et al. (2009) and Osborne et al. (2009) there need to be significant improvements in the reporting of animal studies if systematic reviews can be carried out in a meaningful way.

In addition to scientific reporting, data sharing between researchers is also a key area for improvement to gain better transparency within the scientific community. Researchers are often in competition for grants, or for publication in high impact journals. As a result, a culture of confidentiality surrounds certain research practices. This is especially evident with the creation of new genetically-engineered animals, where researchers may have a desire to patent their ideas, techniques, and even the animals they have created. The use of genetically-engineered animals has already been identified as challenging the principle of reduction, since the use of genetically-engineered animals has been shown to contribute to a reversal of the downward trend in overall reported animal research (Ormandy et al., 2009). It has been argued that if data and animals are not shared freely within the scientific community, there is a risk of unnecessary repetition of experiments, and unnecessary use of animals (Ormandy et al., submitted), and this does not fit with the accepted Three Rs principles of humane science.

**How Might Transparency Be Improved Within the Scientific Community?**

As highlighted by Osborne et al. (2009), editorial policies for all journals that publish animal research should require certain information. Publication in journals is key currency for researchers, so if editorial policies require certain information to be reported as part of the article, then journals might be used as the leverage needed to improve scientific reporting, and thereby improve transparency and Three Rs implementation.

There may also be grounds for policy makers to implement the reporting of non-signifi-

cant results, or at least the creation of a database listing various projects that were carried out but not published. This would avoid needless repetition of experiments, with the aim being to reduce the numbers of animals being used. In addition to increasing transparency, better scientific reporting (with the addition of reporting non-significant results) would allow for systematic review to be carried out on animal research articles, similar to human clinical trial literature.

Confidentiality that comes from competition between researchers for grants and publication can be a roadblock to implementing the Three Rs, especially where genetically-engineered animals are involved. However, some current initiatives are trying to overcome this by providing repositories of information/animals to which there is free access: the North American Conditional Mouse Mutagenesis (NorCOMM) project, for example, which is part of a data sharing initiative to archive and share genetically-engineered mice. Policies and guidelines that encourage such data sharing will aid Three Rs implementation by reducing the number of animals used in unnecessarily repeated experiments or the repeated creation of genetically-engineered animals. Data sharing will also allow for better record keeping so that Three Rs implementation can be tracked over time.

**Conclusions**

Is sunlight the best of disinfectants? We have provided evidence that in the case of animal-based research, increasing transparency between the scientific community and the public, and within the scientific community itself, can be of benefit; not only for the purposes of accountability and ethical reflection on what is and is not permissible, but also for better tracking and implementation of the Three Rs. Ultimately, better transparency regarding animal research will not only benefit the scientific practice, but also animal welfare. Following up on the sentiments of Temple Grandin that were highlighted at the beginning of this paper, perhaps animal research laboratories too “should have glass walls.”

**References**

Abbott A. Basel declaration defends animal research: Dialogue with the public is the key to reducing opposition over the use of lab animals. Nature 468 (2010): 742

Basel Declaration (2010). Available at: http://www.basel-declaration.org/doc/basle%20

declation_en.pdf. Accessed February 27, 2011

Broida J, Tingley L, Kimball R and Miele J Personality differences between pro- and anti-vivisectionists. Society and Animals 1 (1993): 129-144

CCAC. Survey of animal use (2009). Available at: http://www.ccac.ca/Documents/Publications/Statistics/Survey_2009.pdf. Accessed February 26 2011.

CCAC, Categories of Invasiveness (1991). Available at: http://www.ccac.ca/en/CCAC_Programs/Guidelines_Policies/POLICIES/CATEG.HTM. Accessed February 28, 2011

Fenwick N, Griffin G, Gauthier C. The welfare of animals used in science: How the "Three Rs" ethic guides improvements. Canadian Veterinary Journal 50 (2009):523-530

Gallup Poll (2010). Available at: http://www.gallup.com/poll/137357/Four-Moral-Issues-Sharply-Divide-Americans.aspx. Accessed March 1, 2011

Kilkenny C, Parsons N, Kadyszewski E, Festing MFW, Cuthill I, Fry D, Hutton J and Altman DG. Survey of the quality of experimental design, statistical analysis and reporting of research using animals. PLoS ONE, 4(11) (2009): 1-10

Knight, S., Vrij, A., Bard, K., Brandon, D. Science versus human welfare? Understanding attitudes toward animal use. Journal of Social Issues 65 (2009), 463-483.

Knight, S., Vrij, A., Cherryman, J., Nunkoosing, K. Attitudes towards animal use and belief in animal mind. Anthrozoös 17 (2004): 43-62.

Knight S, Nunkoosing K, Vrig A and Cherryman J. Using grounded theory to examine people's attitudes towards how animals are used. Society and Animals 11(4) (2003): 179-198

Ipsos-MORI Poll (2010). Available at: http://www.ipsos-mori.com/DownloadPublication/1343_sri-views-on-animal-experimentation-2010.pdf. Accessed March 1, 2011

National Centre for the Three Rs (NC3Rs, UK). Systematic reviews of animal research (no date). Available at:

http://www.nc3rs.org.uk/downloaddoc.asp?id=695. Accessed February 26, 2011

National Council of University Administrators and Atlantic Information Services, Ltd (NCUA/AIS). Animal researchers issue call for help, say protecting work is everyone's duty. Report on Research Compliance, 8 (1) (2011) Available at: http://grants.nih.gov/grants/olaw/seminar/docs/AWSR_RRC_0111.pdf. Accessed, February 25, 2011

Osborne NJ, Payne D. and Newman ML. Journal editorial policies, animal welfare and the 3Rs. American Journal of Bioethics 9(12) (2009): 55-59

O'Sullivan S. Transparency and animal research regulation: An Australian case study. Animal Liberation Philosophy and Policy, 4(1) (2006) Available at: http://www.abolitionist-online.com/article-issue05_transparency.animal.res.siobhan-osullivan.shtml. Accessed February 26, 2011

Ormandy EH, Schuppli CA and Weary DM. Worldwide trends in the use of animals in research: The contribution of genetically modified animal models. Alternatives to Laboratory Animals 37 (2009): 63-68

Ormandy EH, Dale J and Griffin G. The use of genetically-engineered animals in science: Perspectives of Canadian Animal Care Committee Members (submitted) Laboratory Animals. Preliminary report (2010) available at: http://www.genomebc.ca/portfolio/genomics-and-society/events/knowledge-translation-workshops/genetically-engineered-animals/. Accessed February 28, 2011

Russell WMS, Burch RL. *The Principles of Humane Experimental Technique*. London, UK: Meuthen (1959)