

Comment

Progress in Promoting the Three Rs in Korea: Efficiency and Consistency

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Summary — The Korea National Information Center for the 3Rs was established in August 2011, to enhance humane science and animal welfare in Korea. It is a national Three Rs platform, with the goal of exchanging knowledge and sharing examples of best practice, in order to help replace laboratory animal use in education and training. This paper briefly summarises the progress made and the challenges that have become apparent during the initial operation of the collaborative project. There is a need to recognise and manage the challenges resulting from policy changes, especially misinterpretation of the objectives by the decision makers at the participating academic institutions and the government. The collective power of this type of collaborative project can be used to leverage an ongoing commitment to essentials such as consistent funding for operational and support staff, as well as allocation of the required space.

Key words: CITI-KOREA, education, KNIC3Rs, research ethics, Three Rs platform.

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Introduction

Scientists planning research that involves the use of animals are required by law to examine the possibilities for the implementation of *Replacement*, *Reduction* and/or *Refinement* (the Three Rs; 1) in these experiments. A number of information centres have emerged globally, such as the Animal Welfare Information Center (AWIC), the Center for Alternatives to Animal Testing (CAAT), and the University of California Center for Animal Alternatives (UCCAA), to assist scientists and lay people in locating information on the Three Rs (2).

Since April 2008, we (the authors) have been acting as project coordinators and facilitators in the setting-up of the Institute for the 3Rs, at Konkuk University, Korea (3) and the Korea National Information Center for the 3Rs (4; hereafter referred to as KNIC3Rs). Our initial approach for this project was to develop a Three Rs platform website in Korea at the Konkuk University, to provide user-friendly ‘alternative’ teaching resources funded by the Alternatives Research & Development Foundation (ARDF), USA. This project was expanded to *nationwide*

advocacy, in collaboration with the Catholic University of Korea, the Institute for the 3Rs at Konkuk University, and the Animal, Plant and Fisheries Quarantine and Inspection Agency under the Ministry for Food, Agriculture, Forestry and Fisheries. This national Three Rs platform promotes the humane use of animals in education, training and research, as well as raising awareness of the moral and ethical issues that enhance animal welfare and sound science.

To facilitate the exchange of information resources on humane science and animal welfare at the *global* level, the KNIC3Rs had international link agreements with the Jeanne Marchig International Centre for Animal Welfare Education, at the Royal (Dick) School of Veterinary Studies, University of Edinburgh, UK; the Animal Welfare Information Center, United States Department of Agriculture, USA; the Center for Alternatives to Animal Testing, Bloomberg School of Public Health, Johns Hopkins University, USA; the Science Bank, Animalearn, USA; and the Royal Society for the Prevention of Cruelty to Animals (RSPCA) International, UK (jointly referred to as “the Participants”).

Further Progress in Promoting the Three Rs

Since the initiation of the project, a number of further activities toward promoting the Three Rs have been undertaken at the KNIC3Rs:

1. The KNIC3Rs developed a website (<http://3r.animal.go.kr>) to disseminate Three Rs information and resources, to encourage the use of methods which reduce or replace animal use, or which minimise pain and distress to those animals that are used in research, in testing or for teaching purposes.
2. The KNIC3Rs conducted a national survey (5) of institutional employees who are Institutional Animal Care and Use Committee (IACUC) members and researchers, to assess their current practices and opinions about searching for Three Rs information. These findings may influence the future direction of the Three Rs platform website, and have provided us with ideas on the plan of how to improve its educational mission (6). There were 325 Korean institutions registered as having IACUCs in 2011 (7). A total of 719 IACUC members and researchers from government and public (18%), academic (33%), medical (6%), industrial (43%), and other (2%) institutions, responded to the survey (paper in progress). This was an overall response rate of approximately 55.5%.
3. The KNIC3Rs arranged an international workshop, entitled *Train the Trainer: Good Science and Animal Welfare in Experimental Design*, on 20–21 September 2012, which was funded by the RSPCA International, UK. It is modified from FRAME's popular training schools in *Experimental Design and Statistical Analysis of Biomedical Experiments* (8), which aim to provide research scientists with the tools they need to minimise the number of animals they use and maximise the data they obtain through their work. Dr Derek J. Fry (University of Manchester, UK) and Dr David Lovell (St George's, University of London, UK) conducted a two-day workshop in Korea. The 46 participants who attended the workshop were from all the districts of Korea, except for Cheju Island (paper in progress).
4. The Universities Federation for Animal Welfare (UFAW), UK, has provided funding for a three-year subscription to the journal, *Animal Welfare*, for Korean users, from November 2012.

Limitations and challenges

Close collaboration between government, academia and industry is essential for the formulation of evidenced-based education policies (9). The

KNIC3Rs emerged from 2011 with the feeling that some progress was being made with government support (10). The KNIC3Rs is intended to be actively engaged in the production of a system for searching for Three Rs information (11), and in the dissemination of information, to encourage the use of methods which reduce or replace animal use or which minimise pain and distress to those animals that are used in research, in testing or for teaching purposes. However, we recognise that this joint collaborative project has encountered challenges associated with differences in understanding and expectations, challenges to individual values, and conflicts between academic and government outcomes (9). Consistent funding for the operational and support staff, as well as adequate space allocation, are the biggest issues which currently inhibit the progress of this collaborative project. Other current challenges to the sustainability of the KNIC3Rs include:

- policy changes, resulting from the frequent positional changes of the decision makers;
- slow decision-making, based on the priorities of the KNIC3Rs' collaborating partners;
- limited funding for operational and support staff;
- lack of interest within academia;
- space limitations for the resource library;
- lack of professional trainers and experts;
- intellectual property barriers; and
- national and global expertise support.

The way forward: CITI-KOREA

To improve the quality of the Three Rs platform and proactively maintain its objectives, we decided to fund and promote a Three Rs platform specifically aimed at effective and efficient decision-making. In December 2012, we established an independent, non-profit organisation, the Collaborative Institutional Training Initiatives, Korea (hereafter referred to as CITI-KOREA), to provide research ethics education for the protection and welfare of animals (and also humans) used in research. The welfare promotion and protection of animal and human research subjects is one of the core competences of well-educated, involved personnel (12). The aim of CITI-KOREA is to provide the research community with a high-quality and credible source of information and resources on the protection of animal and human research subjects. This is in the form of a web-based research ethics education programme, the Collaborative Institutional Training Initiatives Program (hereafter referred to as CITI-Program), at the University of Miami.

The CITI-Program is one of the first web-based laboratory animal training programmes (13), developed in 2000 by Professor Paul G. Braunschweiger at the University of Miami, together with Karen Hansen at the Fred Hutchinson Cancer Research Center. It now provides a multi-language service to more than 2,250 organisations around the world, and about 65,000 people per month complete a CITI course.

The corresponding author introduced a Korean language service (14) for the first version of the CITI course on the Protection of Human Research Subjects in 2010, and has also published a series of books (15). This is a 12-monthly subscription service, initially operated by the Korean Association of Institutional Review Boards (KAIRB; 16), for institutions and individuals. CITI-KOREA took over the operation from KAIRB at the beginning of 2013. As of 20 April 2013, there were 91 subscribing Korean institutions, and over 1,000 people per month were completing a CITI course in Korea. The objectives of CITI-KOREA are:

- to provide consistent and efficient educational training materials through a web-based platform (www.citi-korea.org);
- to provide online education through CITI-Program's contents: Animal Care and Use, Good Clinical Practice, Human Subjects Research, Information Privacy and Security, Responsible Conduct of Research Biosafety and Biosecurity course, including Korean laws and regulations;
- to facilitate an open library (the library is located in Itaewon, Seoul, Korea) for sharing books, publications and training materials related to bioethics and the protection of research subjects, and non-animal methods for use in science teaching and studies;
- to share up-to-date information on research ethics and on resources for the protection of both animal and human research subjects;
- to organise offline education through conferences, symposia and workshops, by providing reliable information and resources through our collaborating partners and sharing knowledge more effectively;
- to provide cultural competence and customisable courses;
- to provide quality education, resources, and networking opportunities for Korean scientists and researchers, by seeking to link the welfare of research subjects with good science;
- to access comprehensive learning materials available from personal collections all over the world, and by sharing donated resources from the Participants;
- to support and provide training and consulting services/educational resources in the areas of

animal and human research protection, and research ethics and compliance, for, *inter alia*, Institutional Review Board members, Institutional Animal Care and Use Committee members and research support staff; and

- to foster young scientists and bioethicists: the CITI-Program annual subscription fees will be used to enhance the quality of the contents, and to provide a scholarship fund for scientists and bioethicists in related fields.

Conclusions

The welfare promotion and protection of animal and human research subjects is one of the core competences of well-educated, involved personnel. CITI-KOREA serves as a platform to provide information, resources and human resources, representing a wide spectrum of professional disciplines in biomedical research and ethics. We have collected information and resources, including books and publications of relevance to ethical animal and human research, from 2002. Thus, we can share with human and animal researchers over 2,000 books and audiovisual aids that can be used as alternatives to animals in teaching and training. We provide information on laboratory animal science, and on alternatives to the use of animals in research, teaching and school dissection classes.

CITI-KOREA demonstrates its commitment to support more-effectively, Korean scientists and researchers who are involved in animal and human research, with expert advice and quality educational support resources. CITI-KOREA will have a proactive role in promoting this concept with the collaborative Participants, and will act as a facilitator for the sharing of information and resources, which will be its initial venture in Korea. We see this process as just one step in an ongoing commitment to the long process of providing high-quality information and resources for the protection of both animal and human research subjects.

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References

1. Russell, W.M.S. & Burch, R.L. (1959). *The Principles of Humane Experimental Technique*, 238pp. London, UK: Methuen.
2. Smith, A.J. & Allen, T. (2005). The use of database, information centres and guidelines when planning research that may involve animals. *Animal Welfare* 14, 347–359.
3. Lee, G.H., Choe, B.I., Kim, J.S., Hart, L.A. & Han, J.S. (2010). Current status of animal use and alternatives in Korean veterinary medical schools. *ATLA* 38, 221–230.
4. Lee, G.H., Han, J.S., Kim, J.S., Yoon, M.S., Hart, L.A. & Choe, B.I. (2012). Development of the 3Rs platform in Korea: Korea National Information Center for the 3Rs. *ALTEX* 29, Special Issue [Proceedings of WC8], 3–5.
5. Van Luijk, J., Cuijpers, Y., Van der Vaart, L., Leenaars, M. & Ritskes-Hoitinga, M. (2011). Assessing the search for information on Three Rs methods, and their subsequent implementation: A national survey among scientists in The Netherlands. *ATLA* 39, 429–447.
6. USDA (2000). *USDA Employee Survey on the Effectiveness of IACUC Regulations*, 75pp. Riverdale, MD, USA: US Department of Agriculture Animal & Plant Health Inspection Service, Animal Care.
7. Animal Protection & Welfare Division (2013). *Annual Report on the Current Status of the IACUC Operation and Use of Laboratory Animals in Korea*, 12pp. Sejong, Korea: Animal and Plant Quarantine Agency, Ministry of Agriculture, Food and Rural Affairs.
8. FRAME (2013). *Latest Training School*. Nottingham, UK: FRAME. Available at: http://www.frame.org.uk/page.php?pg_id=244 (Accessed 04.03.13).
9. Mullan, S., Edwards, S.A., Butterworth, A., Ward, M., Whay, H.R. & Main, D.C.J. (2011). Welfare science into practice: A successful case example of working with industry. *Animal Welfare* 20, 597–601.
10. Balls, M. (2009). Animal experimentation and the Three Rs: Time for honest answers to some leading questions. *ATLA* 37, 229–232.
11. Hudson-Shore, M. (2012). Searching effectively for Three Rs information. *ATLA* 40, P22–P23.
12. De Briyne, N. (2011). *Animal Welfare Education: Everybody is Responsible*, 31pp. Brussels, Belgium: World Veterinary Association. Available at: http://www.worldvet.org/docs/Animal_welfare_education_Accra.pdf (Accessed 10.04.13).
13. SCAW (2013). *Board of Directors*. Bend, OR, USA: Scientists Center for Animal Welfare. Available at: <http://www.scaw.com/about-scaw/board-of-directors/> (Accessed 10.04.13).
14. CITI-Korea (2013). *Collaborative Institutional Training Initiatives Korean Language Service*. Seoul, Korea: CITI-Korea. Available at: <https://www.citiprogram.org/defaultkorea.asp?language=korean&co=95> (Accessed 23.04.13).
15. Choe, B.I. (2010). *Collaborative Institutional Training Initiatives* (Basic [1st edition], 115pp.; Advanced I, II [1st edition], 172pp.; Refresher Course I, II [1st edition], 102pp.). Seoul, Korea: Korea Association of Institutional Review Boards and GCO Science Publishing Co.
16. KAIRB (2013). *Korea Association of Institutional Review Boards*. Seoul, Korea: KAIRB. Available at: <http://www.kairb.org/> (Accessed 10.03.13).