

Lush Training Prize 2014

Background Paper

1 Executive Summary

The Lush Training Prize recognises outstanding achievements in education and training towards the replacement of animal testing with non-animal methods. As one of five categories of award within the £250,000 annual Lush Prize which now enters its third year, the Training Prize rewards the vital work of both individuals and organisations in raising awareness across a wide range of audiences from school children through college, university, postgraduate education and beyond. The prize also considers training of scientists and stakeholders in acceptance and use of non-animal methods. To date, the Lush Prize is pleased to have awarded four winners from the UK, Italy and the USA a total of £100,000 from the Training Prize fund for their international efforts.

Outstanding projects and individuals shortlisted this year

For this year's Training Prize, nine outstanding organisations and individuals have been identified and shortlisted for their contribution to education and training in non-animal methods as follows:

1. The Institute for In Vitro Sciences (IIVS) - for its International Outreach Program (IOP) and ongoing work with the Chinese authorities in acceptance of non-animal test methods
2. Anna Maria Bassi - LARF - Dept. Experimental Medicine - University of Genova – for her work in education of fellow scientists and workshops in cell culture techniques as well as outreach to universities
3. Andre Menache – for his continued work in educating university students and researchers on non-animal methods as well as work on several animal ethics committees across the EU and worldwide
4. The Alternatives- Italy- for continued efforts in education in human based research to replace animal experiments
5. The Alexandra Association, Monaco – for their educational work on 'Open Source' Tissue Engineering to replace animal testing, as well as educational outreach in schools.
6. Dutch Society to Replace Animal Testing- for providing education in non-animal methods to scientists and regulators

7. Prof. Ovanes Mekenyan, (Laboratory of Mathematical Chemistry, Bulgaria)- for his ongoing work on the QSAR Toolbox
8. Doctors against Animal Experiments (DAAE) based in Germany, is a charitable organisation of several hundred doctors and scientists who work in the medical field. DAAE supports the immediate abolition of all animal experiments on ethical and scientific grounds. In order to make the cruel and unscientific nature of animal experiments public, they provide information on animal experiments both for doctors and scientists, as well as for the general public, universities and schools
9. Africa Network for Animal Welfare- for their work in promoting alternatives to harmful use of animals in education

The key messages remain clear for the 2014 Training Prize cycle. While significant progress is being made in raising awareness on non-animal research by dedicated groups and individuals, outside of this the interest in reaching a wider, mainstream audience can still largely depend on the attitudes and acceptance by individual researchers or teaching staff. That said, the environment for discussion of both the ethical and scientific issues of animal testing is expanding on an ongoing basis.

Also, it is a change in *attitudes* to animal-free research methods, as well as acceptance and training *in their actual use* which remains vitally important. The Training Prize relates to funding and support for educational initiatives across a broad scope of areas, incorporating not only education of children from a young age through to university students and beyond, but training of teaching and lecturing staff and also training of later career scientists and stakeholders in the acceptance and use of non-animal methods.

These challenges also present the Lush Prize with opportunities to continue to promote the message in training and education on ending animal testing and replacement with non-animal methods. A number of committed organisations continues to push for change in this area. There is also a clear link between the Training Prize and another award category, the Young Researcher Prize. This link is reflected in both research papers this year.

2 Methodology

In preparing this report, a number of resources, articles and information have been collated and reviewed to establish an up to date picture of training and education in non-animal methods for this year's prize.

Substantial research has been carried out for the Training Prize in 2012 and 2013. The information in this paper is intended to build on previous years, providing updates and new information on progress within this area on relevant organisations, useful tools, databases, other web resources and opportunities relevant to training and education in non-animal methods. These updates are highlighted throughout the paper for clarity.

As summarised in previous Training Prize research, the principles of the '3Rs' are defined as follows:

- **Replacement** refers to the preferred use of non-animal methods over animals
- **Reduction** refers to methods minimise the number of animals used
- **Refinement** refers to methods that alleviate or minimize potential pain, suffering or distress to the animals used

Therefore, Lush Prize considers only the final 'R' (replacement) to be a genuine alternative as the other '2Rs' still involve animals. This also aligns with the Lush Prize eligibility criteria which outline the '1R of replacement' rather than refinement or reduction. Whilst reduction or refinement methods are positive steps, they are not achievements. It is also important to explain further the term 'replacement' as this is open to wide interpretation. For example, some would consider any method which does not entail the use of *live* animals to be a replacement, even though it may still use animal-derived cells or tissues, for which the animals have been purposely killed.

The Training Prize therefore continues to use a 'replacement filter' for identifying and rewarding outstanding work, as only those organisations or individuals who focus on '*replacement only*' methods are considered directly eligible. However, for information and reference, those which cover the wider definition of '3Rs' in training and education are still included.

In compiling this report, a 2014 literature search was also performed to find new publications and useful articles on aspects of training and education in non-animal research released since the last Lush Training Prize cycle.

As the Training Prize maintains a broad scope in recognising efforts in education and training, this paper therefore includes information and updates on all aspects of animal use including dissection, use of animal tissues and replacement of live animals in testing.

2.1 Previous Training Prize winners - 2012 and 2013

A brief update on the four previous Lush Training Prize winners is summarised below;

2012

Interniche won a training prize in 2012 for their educational work in former Soviet states, South America and Africa, including lectures and demonstrations on alternatives to teachers, students and universities.

The Institute for In-Vitro Sciences (IIVS) was awarded a 2012 prize for its vital work in 'International Practical Training on Alternative methods' in several countries including Brazil, Japan and China. The IIVS continues its highly successful 'International Outreach Program' to train scientists in the adoption and use of non-animal methods with ongoing focus on China. IIVS also meets regularly with regulators and industry to bridge the gap in faster approval and implementation of guidelines and methods to replace animal testing.

2013

XcellR8, an exclusively in-vitro research company specialises in the support, development and implementation of '*scientifically advanced and ethically sound alternatives to animal testing*'. XcellR8 won a 2013 prize for their training achievements in human cell culture technologies.

LARF (The Analysis and Research Laboratory of Pathophysiology) is a specialist organisation based in Italy, focused on alternative models in toxicological assessment of chemicals. LARF was awarded a 2013 prize for its successful and very popular training workshops on in-vitro methods of toxicity testing, to explore cellular and molecular pathways of cellular damage, recovery, inflammation and cancer. LARF is also highly experienced in the supervision of students and organisation of academic and professional training courses.

3 Background Research and Updates for the 2014 Training Prize

As shown clearly by previous Training Prize research, education and awareness in non-animal methods needs to focus on attitudes to replacing animals in research as much as the methods themselves, presenting non-animal technologies where appropriate as simply the best, cutting edge science, rather than as an alternative to animal testing, to avoid misperception that it is the gold standard that will always require a 'like for like' alternative. While some areas of toxicity testing in animals require replacement, others can simply end. A recent example is the removal of a single dose toxicity test on animals from European Medicine Agency (EMA) guidelines.¹

A broad scope of education and training is included in the prize, with one of its key aims of targeting audiences as early as possible in the educational system, from schoolchildren (when exposure and attitudes to dissection are critical, as this may pave the way to a risk of desensitization and somewhat passive acceptance of animal testing later on) through college and sixth form/baccalaureate students choosing their career options, to undergraduates, postgraduate study and beyond into young scientist or early career research. Training can also apply to adoption and use of non-animal methods by scientists and researchers at all stages of their careers.

As highlighted by Interniche, a previous Lush Training Prize winner, there is a 'hidden curriculum' of animal testing² which encourages an early attitude that use of, or harm to animals is not only necessary but acceptable. Examples include dissection guidance information for schools on national curriculum websites.³

Another key issue highlighted in research for the Training Prize is a lack of awareness and implementation of alternative methods where animals are routinely used, because research staff may not be up to date on specific replacement techniques. While '2Rs' (reduction or refinement) recommendations may be made at best, a proactive attitude to finding and using wholly non-animal techniques is lacking, as shown by systematic reviews of 3Rs implementation⁴ and investigative reports of animal research establishments.⁵

¹ EMA: Questions and answers on the withdrawal of the 'Note for guidance on single dose toxicity': http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2010/07/WC500094590.pdf

² Lush Prize 2013 <http://www.lushprize.org/past-years/2013-prize/lush-prize-judges-2013/>

³ [Looking at \(dissecting\) animal organs in primary schools: Health and safety aspects](#)

⁴ Balcombe, J. et al. (2013) Prolonged pain research in mice: trends in reference to the 3Rs *J Appl Anim Welf Sci.* 16(1):77-95 [<http://www.ncbi.nlm.nih.gov/pubmed/23282295>]

⁵ The Brown Report [<http://brownreport.info/wp-content/uploads/2014/02/The-Brown-Report.pdf>]

This is still of great concern. While outstanding efforts are made on an ongoing basis by animal protection groups and research organisations devoted to non-animal methods, training, education and general motivation for their use in the mainstream continues to depend largely on the attitudes of individual staff.

This must be addressed by dissemination of appropriate information on how alternative methods provide equal and in many cases superior information. Also, the realities of use of both live animals and/or animal tissues must be communicated, what is carried out and why, as well as how methods of replacement or alternative techniques e.g. human cell based methods or computer simulations) not only save animals from suffering, but are more reliable and faster, leading to more relevant results in prediction of human safety. Lush Prize is very pleased to have received a number of nominations from individuals and organisations who continue to work in this field, to educate and inform attitudes on animal use, as well as how such use can end, or be replaced. On a further positive note, with regard to hands on or 'one to one' education and training, a researcher may be fortunate to work with a supervisor, senior colleague or project team also dedicated to research in non-animal methods, as highlighted by a previous 2012 Lush prizewinner in the Young Researcher category; 'I felt very lucky, my supervisor is hugely dedicated to replacement, the work was interesting, I was learning a lot and the model we developed was very promising'.⁶

3.1 Attitudes to use of non-animal methods

Given that in many circumstances, animal use continues due to conventional opinion, inertia and resistance to change rather than any specific mandatory requirements, there are significant opportunities to introduce change and encourage an attitude of 'try this way instead, it's more scientific and saves animals'. Furthermore, training that refers to the historical perspective of animal testing i.e. 'this is what's traditionally been done until now, but this is where we want to focus in future' is a useful approach, supported by good examples of cutting edge, new technologies which are not only humane but more reliable, human-relevant and less costly, a major factor given that the 'per test' cost of an animal toxicity test is estimated to be up to 372,000 Euros.⁷ This is echoed in a previous interview for the 2013 Training Prize with Dr. Marcel Leist, Dorenkamp-Zbinden Chair at the University of Konstanz who agrees that there is an increase in motivation for

⁶ 2012 Young Researcher Prize winner Liz Woehrling

⁷ Bottini, A. and Hartung, T. (2009) Food for Thought..On the Economics of Animal Testing. *ALTEX* 26 1/09 [http://www.altex.ch/resources/ALTEX_1_09_fft_economics_hartung_bottini_.PDF]

development of non-animal methods, not necessarily for ethical reasons but because scientifically and financially, they make much more sense as *'people are realising that these methods are also a way to save money, time or get better data and to get more reproducible data'*.⁸

Attitudes to animal testing and a shift towards both acceptance and development of replacements to non-animal methods (and to some extent, the other '2Rs') have developed as a result of the bans on animal tested cosmetics included in the EU Cosmetics Regulation, which came into force in July 2013. In a recent report to address the issues faced by the cosmetics industry a year into the Regulation,⁹ 14% of respondents from industry considered 'alternatives to animal testing' as their biggest challenge. Whether this refers to a perceived lack of alternative methods, or a lack of awareness, guidelines or training on their use is not available from the survey results, however it still means that there is an ever increasing need for both research and training in safety testing without the use of animals.

3.2 Supply and Demand – a need for 'Hands On' training in Non-Animal Methods

A finding from previous Lush Training Prize research is that, while a number of online resources are freely available, there is still a lack of important 'hands on' training in non-animal methods. This is because those relatively few dedicated organisations involved are often working at 'saturation point' in terms of time, resources and funding available.

In relation to this issue, two key achievements include the operation of workshops by 2013 Training Prize winner LARF (The Analysis and Research Laboratory of Pathophysiology) which were sponsored by ZET (The Centre for Alternatives and Complementary Methods to Animal Testing)¹⁰ and Across Barriers¹¹ to achieve a subsidised cost of 60 Euros for two days. This is an initiative that other industry groups could be approached to fund, to combine the expertise and training knowledge of those who campaign and educate in this area, with the financial backing of companies who will benefit from providing affordable training of their research staff in not only more humane, but faster, cheaper and reliable methods. Similarly, the appointment by previous prize nominee the ALEXANDRA Project of a

⁸ Lush Training Prize 2013 – Background Paper

⁹ EU Cosmetics Regulation one year on: How is industry coping? [<http://www.cosmeticsdesign-europe.com/Market-Trends/EU-cosmetics-Regulation-one-year-on-How-is-industry-coping>]

¹⁰ ZET- Centre for Alternative and Complementary Methods :<http://www.zet.or.at/>

¹¹ Across Barriers:<http://www.acrossbarriers.de/en/>

fundraiser has been vital to raise money for their outreach and education work in schools.

It remains clear in the 2014 Lush Prize cycle that the scientific expertise is available to provide more courses, training workshops, academic programmes and educational talks on all aspects of modern, human-relevant science. Where necessary, this expertise can be applied to encourage a shift away from use of animals towards better methods, but in many cases, especially earlier in the education system, a fresh approach to humane science using cutting edge technologies can simply be presented as the way forward, to stimulate thinking and research ideas, so that by the time a young student or researcher reaches a more critical decision path in their scientific education, using animals would not even be considered.

It is clear from previous interviews with nominees and prizewinners who are experts in this field, that there is a continued need for funding to match the educational expertise available. There is also a requirement for direct and sustained communication to university departments, heads of research teams, schools and colleges to establish dialogue and a transparent approach. Again, the potential for further funding and sponsorship would allow industry to directly benefit from the expertise that they are paying for, in training the next generation of young scientists, perhaps linking to internship or graduate placements.

Encouragingly, the in-vitro toxicity testing market is undergoing rapid growth and is predicted to be worth over \$17,000 million in the next four years¹² driven by both the cosmetics and pharmaceutical industries. This is encouraging and reflected in the fact that the Institute for In Vitro Sciences (IIVS), another former Lush prizewinner and nominee has seen demand for its training courses increase dramatically. This was highlighted in last year's Training Prize paper and since then, the IIVS has continued to run its highly successful Technical and Training workshops, as well as free webinars on the latest technologies.¹³ The IIVS sees education and the sharing of free information as vital to its mission to develop and drive regulatory acceptance of humane scientific testing tools to replace animal testing. The IIVS has made significant progress in China on this issue, most recently at the end of 2013 when a Memorandum of Understanding was signed with the National Institute for Food and Drug Control (NIFDC), a subordinate agency of the China Food and Drug Administration (CFDA). The two organizations will work collaboratively on a number of projects focused on cosmetic safety testing designed to promote in vitro (non-

¹² In-Vitro Toxicology Testing Market worth \$17,227 million by 2018: <http://www.digitaljournal.com/pr/1828520>

¹³ The IIVS Education Workshops: <http://www.iivs.org/education/>

animal) techniques in China.¹⁴ The IIVS has also successfully trained Chinese scientists in starting to use non-animal safety testing methods for cosmetics, made possible by funding from both HSI and PETA.

The growth in need for in vitro methods is highlighted by another major project – TOX-21, a major project using robotics technology to screen thousands of chemicals for potential toxicity, using the screening data acquired to predict the potential toxicity of chemicals and developing a cost-effective approach for prioritizing the thousands of chemicals that need toxicity testing.¹⁵ Aside from putting an end to animal suffering, large scale, 'high-throughput' projects such as TOX-21 foster the view that this is modern, innovative toxicology at its best.

3.3 Training in non-animal methods is still needed in the EU as a result of new legislation

An important point raised by the IIVS is that despite progress and legislation being more focussed towards replacement of animal tests (for example the EU cosmetic testing bans now in place and REACH testing in full flow) training is still urgently needed and must be encouraged in the EU and beyond. 'Hands on' experience with new methods is vital according to the IIVS,¹⁶ as information on a new method itself may not be enough for personnel to start using it straight away, as extra guidance may be needed. This is particularly critical with major chemicals testing legislation such as REACH, where an estimated 13 million animals could still suffer in tests until the final 2018 deadline.¹⁷

In 2014, this continues to be the case, reflected in workshops and training courses offered on an ongoing basis, for example the 'Practical Training Course on Alternative Methods: Skin and Eye In Vitro Toxicity' which will be offered at the forthcoming 9th World Congress on Alternatives to Animal Use in Prague.¹⁸

¹⁴ China FDA Signs MOU with US Laboratory to Promote Non-Animal Testing Methods in China :<http://www.iivs.org/news-events/press-releases/china-fda-signs-mou-with-us-laboratory-to-promote-non-animal-testing-methods-in-china/>

¹⁵ TOX-21: <http://www.epa.gov/ncct/Tox21/>

¹⁶ Lush Training Prize 2013- Background Paper

¹⁷ BUAV: We have until 2018 to stop 13 million animals being poisoned and killed [<http://www.buav.org/our-campaigns/reach>]

¹⁸ WC9 Practical training course: Skin and Eye In Vitro Toxicity [http://altweb.jhsph.edu/news/2012/wc9_training.html]

In other aspects of training, the Alexandra Association highlighted the 'cross-border' issues of validation, using the example that methods cannot be imported from France or the US into Brazil easily, resulting in a need to not only train scientists, but training to recreate the methods or models required too.¹⁹

A May 2014 publication by ALTEX on a recent discussion by the IVTIP (In Vitro Testing Industrial Platform) highlighted the successes and challenges of methods which replace animals and concluded that '*Education will be crucial to achieving change. Young scientists in universities and even in schools need to be aware of animal use and inspired to explore alternative methods*'²⁰.

On the technical issues of training, important points have been raised previously by CAAT, FRAME and HSI which remain in the 2014 Lush Prize cycle, in that clear distinction should be made between training and education of researchers and students i.e. changing attitudes and removing barriers in moving away from animal use (which links to some extent to lobbying) versus 'end-user' training in accepted, validated methods of toxicity testing. The issue of training users before an actual validation study begins is also considered very important, as it could severely impact on the validation success of the test itself, if those who tried to use the method did not have the necessary skills or competence required to use it.²¹

3.4 The Global Situation- education in non-animal methods outside the EU in 2014

Major campaigns by organisations including PETA, Humane Society International, Cruelty Free International and the IIVS have all seen huge success in engaging with the Chinese authorities to change attitudes and encourage acceptance of non-animal methods of safety testing, with China now using such methods for the first time and requiring further training for researchers and students.²² PETA has also campaigned continuously to achieve victory in India on acceptance of non-animal

¹⁹ Lush Training Prize 2013- Background Paper

²⁰ Ashton, R. et al. (2014) State of the Art on Alternative Methods to Animal Testing from an Industrial Point of View: Ready for Regulation? *ALTEX* 31: 3/14 [http://www.altex.ch/resources/altex_2014_3_357_363_Ashton.pdf]

²¹ Lush Training Prize 2012- Research Paper

²² Interest grows in animal testing alternatives [http://sinosphere.blogs.nytimes.com/2014/05/02/interest-grows-in-animal-testing-alternatives/?_php=true&_type=blogs&_php=true&_type=blogs&_r=1]

methods and securing bans on animal testing for cosmetics and household products.²³

3.5 Animal use in education

With regard to both live animal use and dissection in earlier stage education, guidelines vary across different countries in schools and colleges. For example, in the USA, NEAVS highlights that an estimated 20 million animals are used in all areas of education each year.²⁴

This is where campaign groups continue to make a real difference in directly saving animals, by educating schools and universities in alternatives. For example, collaboration between Doctors Against Animal Experiments (DAAE), People for Animal Rights Germany and Interniche saw a very successful campaign first launched in 2006, visiting universities across Eastern Europe to educate and provide alternative teaching software materials to replace the use of animals. Their work directly changed the attitudes and experimental practices of the establishments they visited, resulting in up to 5,400 animals per year being saved. The campaign has seen continued success into 2013 with more university departments across Eastern Europe pledging to end all animal use in education and switching to the alternative teaching methods provided by DAAE instead.²⁵

Under the UK law for animal experiments (Animals (Scientific Procedures) Act or ASPA) the use of live animals in primary and secondary schools is prohibited, however the guidance on ASPA states that '*applications for higher education or for training to acquire, maintain or improve vocational skills*' may be considered²⁶

This relates only to the use of live animals and there is no prohibition on the use of dead animals or tissues for dissection, which largely depends on whether teaching staff choose to include it in their curriculum. However, research for last year's Young Researcher Prize made some encouraging findings which link into education and training. For example, the research found that UK school curriculums contained

²³ Victory: India ends all Animal Testing for Cosmetics following PETA India campaign: <http://www.peta.org/media/news-releases/victory-india-ends-animal-testing-cosmetics-following-peta-india-campaign/>

²⁴ NEAVS : Education overview <http://www.neavs.org/education/overview>

²⁵ Doctors Against Animal Experiments: Further Successes in Ukraine [<http://www.aerzte-gegen-tierversuche.de/en/projects/eastern-europe/277-further-successes-in-ukraine>]

²⁶ Guidance on the operation of ASPA [https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291350/Guidance_on_the_Operation_of_ASPA.pdf]

alternatives to dissection, as well as consideration that some students may not be comfortable with dissection or use of materials of animal origin (e.g. blood or tissue) and finally, although dissection was suggested in many cases, it was not mandatory and left open to teaching staff to decide what to do²⁷. Unfortunately, it was not possible to obtain similar information at university level as although a number of universities were contacted, none replied, the reasons for which are unknown but could relate to staffing absence or resources devoted to admissions over the summer period. To address the need for this information and as part of the Lush Prize communications strategy going forward, academic institutions will be contacted again on an ongoing basis, to obtain up to date information on use of animals and their tissues on all relevant science courses, to inform future research papers.

Similarly on a worldwide scale, the use of animals in educational research continues with both confusion and inconsistency and is open to interpretation. This is also evident in the comprehensive information provided in nominations that the Lush Prize receives. For example, a 2014 publication on the use of animals in experiments at medical colleges in India states that '*The dilemma to continue animal experiments in education and research continues with varied and confusing guidelines*' and that '*animal use and their handling vary in each laboratory and educational institution*'.²⁸ However, more encouragingly the researchers also state that '*The use of live animal experiments is decreasing in many medical colleges across India. These are gradually being replaced by certain alternatives that are available at relatively low cost and with proven educational efficacy*'.

Animal rights progress in education is also being made in Australia. At the University of Adelaide for example, a policy has been implemented which considers the conscientious objection of students to the use of animals in veterinary medicine education.²⁹ Student groups are also active in voicing objection to animal research in generally for research and educational purposes. For example, the Canadian based Queens Animal Defence is a student and non-student advocacy group which promotes information on alternatives to animal use in education and also campaigns on other animal rights issues.³⁰

²⁷ Lush Young Researcher Prize 2013- Background Paper

²⁸ Badyal, D. and Desai, C. (2014) Animal Use in pharmacology education and research: the changing scenario. Indian J Pharmacol. 2014 May-Jun; 46(3): 257–265. [<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4071700/>]

²⁹ A Policy at the University of Adelaide for Student Objections to the Use of Animals in Teaching [<http://utpjournals.metapress.com/content/c756j1v4pj800873/?genre=article&id=doi%3A10.3138%2Fjvme.0411.045R1>]

³⁰ Queen's Animal Defence [<http://queensanimaldefence.org/about-us/>]

3.6 Education and Training in replacing animals in *veterinary testing*

According to the latest figures,³¹ almost 340,000 animals are used annually in the EU in the production or quality control of veterinary medicines, with a further unknown number included in over 3 million animals used for research or toxicity testing for 'human medicine, dentistry or *veterinary medicine*'. Veterinary research is frequently presented simply as 'animal research for the benefit of animals' which conceals the fact that a significant proportion of the animals used are deliberately made sick, experimentally infected with disease or subjected to invasive procedures funded by external bodies (for example the racing or betting industries supporting invasive fertility studies in horses³²). In many cases, the animals being used are not even the species a new treatment is being developed for (e.g. mice used to test vaccines intended for cattle ³³

This is clearly anything but beneficial to the animals used and in conflict with the aims of genuine veterinary care for the protection and wellbeing of all animals, causing a moral dilemma for many veterinary students. PETA India confirms that it frequently receives requests for help from distressed students who have witnessed the suffering of cattle slaughtered in their training classes and is now taking action with the Veterinary Council of India to require training methods that don't involve harming or killing animals.³⁴

Interniche have previously highlighted how use of ethically sourced animal tissues from veterinary surgery, routine procedures or post mortem, as well as use of in-vitro testing, computer simulations and other models saves many animals from unnecessary use in veterinary research.³⁵ Similarly, maximising the information obtained from animals presented at veterinary clinics requiring treatment helps not only the patients, but other animals in future.

³¹ Seventh Report on the Statistics on the Number of Animals used for Experimental and other Scientific Purposes in the Member States of the European Union (2011)[http://eur-lex.europa.eu/resource.html?uri=cellar:d2e73ac5-60d0-11e3-ab0f-01aa75ed71a1.0001.01/DOC_1&format=PDF]

³² Schauer, S. et al. (2011) Supplementation of equine early spring transitional follicles with luteinizing hormone stimulates follicle growth but does not restore steroidogenic activity. *Theriogenology* 75:1076–1084.

³³ Bannantine, J. et al. (2014) Evaluation of eight live attenuated vaccine candidates for protection against challenge with virulent *Mycobacterium avium* subspecies paratuberculosis in mice. *Front Cell Infect Microbiol.* 1;4:88

³⁴ PETA Holds National Workshop With Mafsu To Promote Humane Teaching Methods For Veterinary Students; Veterinary Council Of India President A Keynote Speaker[<http://www.petaindia.com/media/news-releases/peta-holds-national-workshop-mafsu-promote-humane-teaching-methods-veterinary-students-veterinary-council-india-president-keynote-speaker/>]

³⁵ InterNICHE:What do you think animal experiments teach you? [<http://www.petaindia.com/media/news-releases/peta-holds-national-workshop-mafsu-promote-humane-teaching-methods-veterinary-students-veterinary-council-india-president-keynote-speaker/>]

3.7 One person *can* make a difference

There are some encouraging examples of where persistence on a personal level within education can enforce recognisable change. In a recently published article on conscientious objection in students,³⁶ Andrew Knight highlights the case of a University of Colorado vet student who, twenty years ago refused to lethally inject a dog as her course content required. The university failed her and she sued as a result, winning the case and graduating successfully (despite having to repeat a study module at a more ethical institution). Another major success of this case was that the court ruled that the university must entirely replace such cruel and unnecessary procedures with humane alternatives for use by future students.

This year's Lush Prize is also very pleased to receive nominations from students and researchers who have conscientiously objected to animal use in their education and training.

³⁶ Knight, A. (2014) Conscientious Objection to Harmful Animal Use within Veterinary and Other Biomedical Education. *Animals* 4(1), 16-34; [<http://www.mdpi.com/2076-2615/4/1/16>]

4 Conclusions and Recommendations

Outstanding projects and individuals shortlisted this year

For this year's Training Prize, nine outstanding organisations and individuals have been identified and shortlisted for their contribution to education and training in non-animal methods as follows:

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- Dutch Society to Replace Animal Testing- for providing education in non-animal methods to scientists and regulators
- Prof. Ovanes Mekenyan, (Laboratory of Mathematical Chemistry, Bulgaria)- for his ongoing work on the QSAR Toolbox
- Doctors against Animal Experiments (DAAE) based in Germany, is a charitable organisation of several hundred doctors and scientists who work in the medical field. DAAE supports the immediate abolition of all animal experiments on ethical and scientific grounds. In order to make the cruel and unscientific nature of animal experiments public, they provide information on animal experiments both for doctors and scientists, as well as for the general public, universities and schools
- Africa Network for Animal Welfare - for their work in promoting alternatives to harmful use of animals in education

5 Conclusion

The key messages remain clear for the 2014 prize cycle. While significant progress is being made in raising awareness on non-animal research, by dedicated groups and individuals, outside of this the interest in reaching a wider mainstream young audience can still largely depend on the attitudes and acceptance by individual researchers or teaching staff, indicating a 'bottom up' rather than 'top down' approach. That said, the environment for discussion of both the ethical and scientific issues on animal testing is expanding on an ongoing basis.

Also, it is a change in *attitudes* to animal-free research methods, as well as acceptance and training *in their actual use* which remains vitally important. The Training Prize relates to funding and support for educational initiatives across a broad scope of areas. The term 'training' itself continues to carry a wide definition for the purposes of the Lush Prize, referring not only to education and training from a young age through to university students and beyond, but training of teaching and lecturing staff and also later career scientists and stakeholders in the acceptance and use of non-animal methods. An important distinction is also made in the technical 'end-user' training of scientists in the use of validated and approved non-animal methods of safety testing.

There is a continuing need for supply to match demand in education and training on non-animal research. The good news is that there is an increasing worldwide requirement for educational initiatives in this specific area, but it continues to be a challenge to provide resources to meet those requirements, mainly in terms of cost. Those individuals and organisations already dedicated to non-animal methods are stretched and relatively few in number. A way to address this issue would be to increase interest and motivation within academia and industry to take on training and education responsibilities in their own research environments, by using the wide variety of resources available.

These challenges also present the Lush Prize with opportunities to continue to promote the message in training and education on ending animal testing and replacement with non-animal methods. A number of committed organisations and individuals continue to push for change in this area. There is also a clear link between the Training Prize and another award category, the Young Researcher Prize. This link is reflected in both research papers this year.

6 Data Section

6.1 international organisations and initiatives identified in this area

A number of organisations have been identified previously and can be reviewed in full in the 2012 and 2013 Training Prize papers. Some of those groups have been included again here, with specific 2014 updates on activity for this Lush Prize cycle, as well as several new groups identified for their commitment to education and training in non-animal methods. Key campaign groups which continue to provide useful and relevant information are also listed. As outlined above, given the link between the Training and Young Researcher Prize categories, review of organisations listed in *both* papers is recommended.

Africa Network for Animal Welfare (ANAW)

<http://www.anaw.org/>

Established in 2006 and based in Kenya, the ANAW has committed itself to spearheading a number of animal welfare of campaigns while building networks with governments, political leaders, media and other institutions to press for effective policy and legislation changes and for the protection and care for animals at national and community level. ANAW partners with international bodies and institutions of higher learning to promote use of alternatives to lab animals.

The Alexandra Association, Monaco

<http://www.alexandra-project.org>

The Alexandra Association aims to develop and promote alternative methods to animal research for both scientific and ethical purposes in both toxicity testing and medical research. The founders of the association are experts in scientific research and technical innovation. The organisation is a previous Lush Prize nominee recognised for ongoing efforts in education and training in alternative methods, including 'OpenSource' 3D Tissue Engineering in human tissue reconstruction and cell culture.

AltTox (Non-Animal Methods for Toxicity Testing)

<http://www.alttox.org/>

AltTox is a vital resource for anyone interested in animal free science from a research or training perspective. Alttox provides various levels of useful information, from basic descriptions of toxicity tests, up to date information on alternatives and newsletters through to various tools and databases as well as information on forthcoming courses and events.

The Alternatives Research & Development Foundation (ARDF)

<http://www.ardf-online.org/>

Established in 1993, The ARDF based in the USA awards research funds that support the development, validation, and/or adoption of non-animal methods in biomedical research, product testing, and education. ARDF aims to bring 'alternatives technology and compassion to modern laboratories and classrooms'.

Animal Aid

www.animalaid.org.uk

Animal Aid is one of the UK's most experienced and long-established animal rights organisations, campaigning for animals on a number of issues, including an end to animal testing. The education department at Animal Aid provides a school speaker training service whose speakers are available to present and train volunteers on animal testing. They can also provide educational materials for both teachers and pupils on request.

Animal Ethics Infolink

<http://www.animaethics.org.au/education-and-training/alternatives-to-animal-use>

Animal Ethics Infolink is an Australian based online resource. While focus is broadly across the 3Rs, the site provides useful information on training and education materials in the replacement of animal testing

Animalearn

<http://www.animalearn.org>

Animalearn, based in the USA and a division of the American Anti-Vivisection Society (AAVS) continues to promote its highly useful 'Science Bank' for alternatives to animal use in education. The tool is an easy to use 'drop down' search facility on the Animalearn website, to find resources by education level (from early school stages through to medical training), type of animal or type of alternative (e.g. video, computer simulation, models and more). Animalearn also rewards students and schoolchildren for their achievements in educating others on the choice to object to dissection or question teaching curriculums which contain animal use.

BUAV (British Union for the Abolition of Vivisection)

<http://www.buav.org>

The BUAV is one of the UK's leading campaigning organisations on animal testing with successful undercover investigations exposing the hidden animal suffering in laboratories. The BUAV provides a 'Schools' guide also aimed at students, to raise awareness and provide a truthful insight into the realities of animal testing. They also produce a number of science reports providing further information

CAAT- Centre for Alternatives to Animal Testing – John Hopkins University

The CAAT is based in Maryland, USA. As well as its US site it has European Headquarters at the University of Konstanz in Germany and operates Altweb, a website dedicated to the 3Rs and dissemination of information on humane science to researchers, students and educational staff. CAAT continues to provide workshops and educational materials in alternative methods. In 2013/2014 CAAT has provided the following courses and events;

- In-Vitro Medical Device Testing
- Green Toxicology Information Day
- Functional Non-animal Biobarrier Models in Research and Risk Assessment
- DNT4 (Alternatives in Developmental Neurotoxicity Testing)

and a forthcoming workshop in Nov 2014;

- Emergence of Systematic Review and Related Approaches in Toxicology -an EBTC Workshop

DAAE (Doctors Against Animal Experiments)

<http://www.aerzte-gegen-tierversuche.de>

DAAE, based in Germany, is a charitable organisation of several hundred doctors and scientists who work in the medical field. DAAE supports the immediate abolition of all animal experiments on ethical and scientific grounds. In order to make the cruel and unscientific nature of animal experiments public, they provide scientifically based information on animal experiments both for doctors and scientists, as well as for the general public. DAAE manage and update their own database to inform the public about the reality of animal experiments³⁷ as well as a database on in-vitro methods.

The Dr. Hadwen Trust (DHT)

<http://www.drhadwentrust.org>

The **Dr Hadwen Trust** (DHT) is the UK's leading non-animal medical research charity and a previous Lush Prize nominee, as well as funding a variety of research projects on an ongoing basis. DHT has awarded seven 'Summer Studentships' in 2014 to young researchers to enable them to continue their work in replacements to animal testing over the summer period. This year's projects support a variety of new methods into disease including Parkinson's disease, cancer and diabetes. The DHT launched the Summer Studentship scheme in 2012, to assist undergraduate students in gaining practical, laboratory-based experience in research methods to replace animals. Funding is offered for a period of up to eight weeks and includes a budget for research consumables. Additionally, in 2014 the DHT is looking for a student (aged 18+) to take up a free bursary place to attend and represent the DHT at the British Science Festival from 6-11 September in Birmingham³⁸

DsRAT - Dutch Society for the Replacement of Animal Testing

<http://www.proefdiervrij.nl/>

³⁷ <http://www.datenbank-tierversuche.de/>

³⁸ Would you like to be the DHT's Geek4aWeek? [<http://www.drhadwentrust.org/latest-news/news-and-views/post/254-would-you-like-to-be-the-dhts-geek4aweek>]

DsRAT supports scientists, entrepreneurs and the government in the development of these new techniques by providing educational materials, engaging in collaborations and initiating discussions about animal free solutions to ensure the future replacement of animal testing.

European Coalition to End Animal Experiments (ECEAE)

<http://www.eceae.org>

The European Coalition to End Animal Experiments (ECEAE) was formed in 1990 by organisations across Europe to successfully campaign to ban cosmetics testing on animals. Today the ECEAE campaigns on all animal testing issues in Europe, bringing together extensive expertise, experience and knowledge from major European animal protection organisations, working with politicians and scientists to ensure that animals in laboratories are high on the European political agenda.

European Partnership for Alternatives to Animals Approaches

<http://www.epaa.org>

The EPAA is a collaboration between the European Commission, European trade associations, and industry who are *'are committed to pooling knowledge and resources to accelerate the development, validation and acceptance of alternative approaches to further the replacement, reduction and refinement (3Rs) of animal use in regulatory testing'*. (It must be noted for Lush Prize purposes that the 3Rs remit of the EPAA is particularly broad in that, whilst 1R/replacements are highlighted, other initiatives for example include awards to laboratory animal staff.)

ESTIV (European Society of Toxicology In-Vitro)

<http://www.estiv.org>

ESTIV promotes in-vitro methods both scientifically and educationally across Europe. ESTIV held it's 2014 congress in the Netherlands with a theme of 'Making Sense of In-Vitro Methods' . Topics covered this year included long term toxicity prediction using computer models and integrated, non-animal testing strategies in skin sensitisation. ³⁹ ESTIV is also offering a training course in January 2015 in

³⁹ <http://www.estiv2014.org/files/Programme.pdf>

Lisbon entitled ' Applied In-Vitro Toxicology Course' and welcomes young scientists.
40 ESTIV is sponsored by a number of major chemical and pharmaceutical companies, most recently Roche.

EURL-ECVAM (The European Union Reference Laboratory for Alternatives to Animal Testing)

http://ihcp.jrc.ec.europa.eu/our_labs/eurl-ecvam

In June 2014, EURL-ECVAM released its 'Updated list of alternative test methods' submitted to the organisation for validation and acceptance as alternative methods to animal testing since 2008. EURL-ECVAM continues to organise a variety of workshops, courses and publish formal recommendations, as well as international outreach projects, most recently hosting a visit by the Korean Research and Testing Institute (KRT) to allow the KRT to gain insight into EURL ECVAM's approach towards the development, validation and international recognition of alternative methods to animal testing and to discuss best practices and main challenges with respect to their scientific evaluation. EURL-ECVAM also manages and updates two main databases, DB-ALM (Database for Alternative Methods) and TSAR (Tracking System on Alternative Methods) which are listed separately in this Appendix.

EUSAAT- the European Society for Alternatives to Animal Testing

<http://www.eusaat.org>

EUSAAT has been documented in previous Lush Prize research. The EUSAAT website was recently updated in 2014, to better serve all interested in alternatives to animal testing. One of EUSAAT's key aims is '*promotion of the use of non-animal tests in the area of education*'

In Feb 2014, EUSAAT participated in the ' *10th International Conference and Workshop on Biological Barriers* (10th ICWBB) 'presenting on human based in-vitro studies for the testing and marketing of pharmaceutical products.

The Human Toxicology Project Consortium (HTPC)

<http://www.humantoxicologyproject.org>

⁴⁰ http://www.estiv.org/docs/ESTIV_Training_InVitroTox.pdf?set=a.512417912102502.122630.422812001063094&type=1&l=27051111e7

The HTPC is a major collaboration to advance a new paradigm in toxicity testing and pathway based approaches to chemical safety assessment. The HTPC has been very active during the 2014 Lush Prize cycle, co-sponsoring (with the IIVS and HSI) groundbreaking training programmes for Chinese researchers in non-animal methods for cosmetics testing. HTPC also provide a number of useful information resources including videos on new technologies, such as high throughput drug screening and the 'Virtual Liver'. The consortium also communicates forthcoming events and training courses on it's website.

Humane Society International (HSI)

<http://www.hsi.org>

The HSI 'Be Cruelty Free Camapign' has been particularly successful throughout 2013- 2014, engaging with stakeholders in China to progress towards phasing out mandatory animal testing for cosmetics. HSI, along with it's sister organisation the HSUS (Humane Society of the United States) and The Human Toxicology Project Consortium, recently awarded an \$80,000 grant to the Institute for In Vitro Sciences(IIVS) to provide vitally needed, hands-on training in non-animal tests to China's government regulators and scientists.

The Institute for In Vitro Sciences (IIVS)

<http://www.iivs.org>

The IIVS, a former Lush prizewinner and nominee continues its outstanding efforts to disseminate free information via webinars and 'free to register' events and for its ongoing work with Chinese authorities in the education, training and adoption of non-animal methods to replace animal testing. The IIVS also continues to provide it's much needed 'Practical Methods in In Vitro Toxicology ' annual training courses.

INTERNICHE (International Network for Humane Education)

<http://www.interniche.org>

A previous Lush Training Prize winner, **Interniche** produce a variety of educational materials relevant to study of human medicine, veterinary research and the life sciences and has led international efforts to implement the use of humane, alternative methods and teaching materials in education across a number of

countries. In October 2013, Interniche co-hosted LATINFARMA 2013, a symposium held in Brazil focused on 3Rs Alternatives in Pharmacology, Toxicology and Teaching.

The Innovative Methods and Alternatives to Animal Research Unit, Australia

The Innovative Methods and Alternatives to Animal Research Unit based at the John Curtin Medical School at Australian National University ⁴¹ supports researchers in 'innovative methods to entirely replace the need for an animal model, or the replacement of an animal product in an assay or procedure (e.g. animal derived antibodies for immunoassay).' The Unit collaborates with a number of other academic centres in Australia including the University of Sydney, specifically on a project involving animal free cell culture methods for malaria and vascular pathology and Wollongong University's initiative to 'Replace Animals in Australian Testing' ⁴² which aims to 'create a network of researchers and other individuals or groups interested in advocating non-animal based research and in strengthening the Australian Government/NHMRC guidelines and their enforcement'.

Joint Research Institute for Health and Consumer Protection (JRC)

<https://ec.europa.eu/jrc/en/institutes/ihcp>

The JRC 'Science Hub' collates a variety of information and forthcoming training courses and events. In June 2014, the JRC launched an online tool to identify chemicals useful for the development and validation of alternative methods to animal testing. CheLIST ⁴³ is the first world-wide attempt to compile a cross-referenceable "list of substances lists"; its uniqueness consists of the combination of both regulatory and scientific areas, and its openness to integrate new lists to be considered in the database. For specific scientific, industrial or regulatory purposes chemicals are grouped and included in various lists. The fact that a given chemical is included in a specific list reveals many details about its properties. Easy access to such information, which is typically scattered across numerous databases, project websites and peer-reviewed literature, should facilitate the work of researchers looking for the right reference chemicals to develop, characterise or validate tests as alternatives to animal-based testing.

⁴¹ <http://jcsmr.anu.edu.au/research/research-facilities/innovative-methods-and-alternatives-animal-research-unit>

⁴² <http://lha.uow.edu.au/hsi/research/raat/index.html>

⁴³ <http://chelist.jrc.ec.europa.eu/>

Laboratory of Mathematical Chemistry (LMC)

<http://oasis-lmc.org/products/software/toolbox/training.aspx>

The LMC are the developers of the QSAR (Quantitative Structure Activity Relationship) toolbox (further information on the toolbox is provided in the database section of this paper). Throughout 2013 -2014 the organisation has continued to offer training on site (on demand), as well as regular annual training courses, organised in co-operation with REACH Monitor.⁴⁴

LARF (The Analysis and Research Laboratory of Pathophysiology)

<http://www.larf.unige.it>

LARF, headed by Dr. Anna Maria Bassi was a winner of the 2013 Training Prize . LARF continues to devote it's expertise to in-vitro, alternative methods of research including human cell cultures, 3D organ toxicity and investigation of mechanisms of cellular injury in disease e.g. cancer. LARF continues to organise training courses in alternative methods throughout 2013-2014 to young scientists as the organisation firmly believes in the dissemination of knowledge and data sharing.

Mahatma Gandhi-Doerenkamp Center (MGDC)

<http://www.mgdcaua.org/>

The MGDC has remained active during 2013-2014 in it's aim of educating the Indian scientific community on alternative methods to animal testing. While the MGDC works to a broader '3Rs' scope rather than solely on replacement methods, training workshops held during the last year include ' Handling of reconstructed 3D tissue models'.

National Anti Vivisection Society (NAVS) USA

<http://www.navs.org>

NAVS USA continues it's campaign for compassionate science and education without animal use, providing educational materials and scientific information on alternative methods. In May 2014, its educational exhibition began at the National

⁴⁴ <http://www.reachmonitor.com/index.php?lang=2&aptd=4&id=38>

Museum of Animals & Society in Los Angeles entitled ' Light in Dark Places: Anti-Vivisection from the Victorian Era to Modern Day,'⁴⁵ and is the first such exhibit to focus on the movement's long history in the United States and around the world. The exhibit was made possible through the participation of the American Anti-Vivisection Society, the Beagle Freedom Project, the National Anti-Vivisection Society, the New England Anti-Vivisection Society, Stop Animal Exploitation Now, PETA, the Physicians Committee for Responsible Medicine, the Ernest Bell Memorial Library and White Coat Waste.

National Anti Vivisection Society UK

<http://www.navs.org.uk>

NAVS UK continues to promote research projects via the Lord Dowding Fund. Projects have included alternatives to the use of animals in education and funding for teaching of humane alternatives to university students.

The NC3Rs

<http://www.nc3rs.org.uk>

The NC3Rs is included as an information source. As previously described, this is under the broader '3Rs' category rather than the 'replacement only' focus of the Lush Prize. In 2012-2013 the NC3Rs awarded just over £7 million⁴⁶ in funding to projects considered under their '3Rs' (reduction, refinement, replacement) criteria.

NEAVS (New England Anti Vivisection Society)

<http://www.neavs.org>

In 2014, NEAVS awarded it's Fellowship Grant for Alternatives to Animal Research for postdoctoral research into vitally needed animal replacements in skin allergen testing. The project is based on development of a human cell based microchip to accurately predict allergy responses where animal tests continue to fall short. As part of it's 'Ethical Science Education Campaign', NEAVS also continues to provide a

⁴⁵ <http://www.navs.org/pages/news/anti-vivisection-history-exhibit-inspires-and-educates>

⁴⁶ http://www.theyworkforyou.com/wrans/?id=2014-03-11a_188641.h&s=caroline+lucas

number of educational outreach materials for schools and colleges, including posters and brochures on animal testing and alternative methods.

Netherlands Knowledge Centre on Alternatives to Animal Use (NKCA)

<http://www.nkca.nl>

The NKCA promotes the application of the 3Rs in the Netherlands. The Centre is a collaboration between the RIVM (National Institute for Public Health) and the University of Utrecht since 2010 and offers 'animal testing alternatives' modules as part of postgraduate training for professionals. NKCA also advises teachers on the animal-free testing models available for secondary schools, and recommends animal-testing alternatives as a potential subject for student projects.

PETA (People for the Ethical Treatment of Animals)

<http://www.peta.org>

PETA continues as one of the world's major animal rights organisations campaigning against animal testing, among many other issues. Most recently and as highlighted in previous Lush Prize papers, PETA has directly funded Chinese scientists in training in non-animal methods 47 as well as a hugely successful campaign by PETA India towards ending animal use in the national education curriculum.

SAFE (Save Animals from Exploitation)

<http://www.safe.org.nz>

SAFE are a New Zealand based organisation and previous 2013 'Public Awareness' Lush Prize winner, promoting a number of educational materials. They also offer school speaking services to educate and raise awareness on a variety of animal rights and welfare issues, including animal experiments. For example, SAFE recently presented at the 'Humane Education Symposium'.

SATIS- People for Animal Rights, Germany

<http://www.satis-tierrechte.de/>

SATIS continues to partner with Interniche to communicate a variety of educational materials on replacement methods to animal testing and continues to provide it's

47 <http://www.peta.org/blog/chinese-scientists-learn-non-animal-testing-thanks-peta/>

information on national university rankings and Master's degree programmes. SATIS also communicates on innovative new technologies in medical research training, for example a training course in June 2014 on use of the 'RealSpine',⁴⁸ a highly realistic spine simulator for aspiring surgeons developed at the University of Leipzig. Junior doctors from different hospitals train using the tool under the guidance of experienced surgeons. While previously practiced on animal models, simulation systems such as the "RealSpine" are increasingly used. Training courses allow new surgeons to familiarize themselves with the complex structures of the spine and to identify risk structures in this area of the body, before any work on patients begins.

SEURAT-1 (Safety Evaluation Ultimately Replacing Animal Tests)

<http://www.seurat-1.eu/>

SEURAT-1 is an international scale collaborative project funded under the EU Seventh Framework Programme (FP-7). SEURAT recently hosted its second 'Young Scientists Summer School' in collaboration with ESTIV (European Society of Toxicology in Vitro) to discuss replacement of repeat dose toxicity testing in animals.

The Alternatives

<http://thealternativeseu.wordpress.com/2013/08/16/thealternatives-eu-is-born/>

A nominee for this year's prize, The Alternatives is an Italian based non-profit organization launched in August 2013, which actively promotes alternatives to animal experiments by providing a variety of information, scientific publications and its long term expertise in teaching human based clinical research, as well as experience in engaging with educational authorities and regulators on replacements to animal testing.

6.2 2014 courses and workshops

This brief section refers to some examples of forthcoming events, new courses and workshops in 2014. Other training courses and events are also listed within the updates for each organisation. This is not an exhaustive list and many other courses and events are likely to be available.

⁴⁸ <http://www.realspine.de/>

- 9th World Congress on Alternatives – Prague

<http://www.wc9prague.org/>

24th- 28th August 2014

- EuroQSAR: Understanding Chemical-Biological Interactions- St. Petersburg

[http://www.ldorganisation.com/v2/produits.php?](http://www.ldorganisation.com/v2/produits.php?langue=english&cle_menus=1238915734&cle_data=1360153387euroqsar/)

[langue=english&cle_menus=1238915734&cle_data=1360153387euroqsar/](http://www.ldorganisation.com/v2/produits.php?langue=english&cle_menus=1238915734&cle_data=1360153387euroqsar/)

31st Aug- 4th Sep 2014

- Adverse Outcome Pathways: From research to regulation- Bethesda USA

<http://ntp.niehs.nih.gov/pubhealth/evalatm/3rs-meetings/aop-wksp-2014/index.html>

3rd - 5th Sep 2014

- ARDF Workshop: An unlimited supply of donor free hepatocytes for research- Edinburgh (part of EUROTOX 2014 www.eurotox2014.com)

<http://www.thebts.org/Portals/0/ARDF%20funded%20Workshop.pdf>

5th Sep 2014

- Animal Replacement Science 2014 (Dr. Hadwen Trust) - London

[http://www.animalreplacementscience.com/?](http://www.animalreplacementscience.com/?utm_source=smartmail&utm_medium=email&utm_campaign=Animal+Replacement+Science+Conference+2014)

[utm_source=smartmail&utm_medium=email&utm_campaign=Animal+Replacement+Science+Conference+2014](http://www.animalreplacementscience.com/?utm_source=smartmail&utm_medium=email&utm_campaign=Animal+Replacement+Science+Conference+2014)

27th Nov 2014

- ESTIV-AP TOX Applied In Vitro Toxicology Course- Portugal

<http://estivtraining.webs.com/>

25th -29th Jan 2015

6.3 Web based educational tools and research databases

The following is a list of databases, knowledge bases or software, plus examples of educational tools in alternative methods. Some of these are highlighted in the 2012 and 2013 papers and some are included as new examples or updates for the 2014 Training Prize cycle. (It is not an exhaustive list).

AnimAlt ZEBET – database for alternative methods to animal experiments

http://www.bfr.bund.de/en/animalt_zebet___database_for_alternative_methods_to_animal_experiments-62822.html

The German Federal Institute for Risk Assessment (BfR) incorporates ZEBET, which is the “Centre for the Documentation and Evaluation of Alternatives to Animal Experiments”. It houses AnimAlt-ZEBET, a database aiming to provide scientists with information on alternative methods. It is accessible on the internet without licence fees in German and English and includes validated information on alternative methods. ZEBET has also developed a continuing education course “Laboratory Animals, Animal Experiments and Alternative Methods” in 1992. Participation in the course is a “pre-requisite to the approval of an application for animal experiments”. The course is offered as a “regular semester course at the Freie Universitaet Berlin” and is also available on a “monthly basis as a commercial training programme” in both German and English

The DataBase service on Alternative Methods, DB-ALM (EURL=ECVAM)

<http://ecvam-dbalm.jrc.ec.europa.eu/>

This database aims to “provide an overall picture on the state-of-the-art of alternative methods in use at all stages of development, validation or regulatory acceptance for a given topic area in the form of method summary descriptions and/or more detailed information to allow the transfer and use of a method by a laboratory.

Data Infrastructure for Chemical Safety (DiXa)

<http://www.dixa-fp7.eu/>

The DiXa project states that ' animal-based test models need to be replaced - preferably by robust, non-animal assays which better predict human toxicity , are less costly, and are socially more acceptable'.

The project has a number of collaborators including JRC European Commission, Maastricht University, Imperial College London and EMBL-EBI – a not-for-profit organisation that provides freely available bioinformatics tools and services to the public. DiXa has continued to offer a considerable number of training courses (both on-site and online) and workshops throughout 2013 and 2014, focussing on next generation 'omics' technologies and data structures. Forthcoming 'Open Conference and Hands-on Training Workshop ' and 'Data Infrastructure for Chemical Safety' are to be held in September 2014 .

DEREK Nexus Toxicity Prediction Database

<http://www.lhasalimited.org/products/derek-nexus.htm>

DEREK is an expert toxicity prediction database pioneered by Lhasa Limited, a not-for-profit organisation and educational charity that facilitates collaborative data sharing projects in the pharmaceutical, cosmetics and chemistry-related industries.

Froguts

<http://www.froguts.com/>

An on-line virtual dissection which has been designed to give better understanding of frogs and other life forms by the use of instructional technology

Go3R search engine

<http://www.go3r.org/>

This project, produced by Transinsight GmbH with ZEBET aims to develop a “knowledge-based search engine for alternative methods to animal experiments” It “provides an endpoint-centred semantic literature search for toxicological information (e.g. as required for REACH), highlights animal testing alternatives and organises 22 million abstracts listed in PubMed and TOXNET in an accurate table of contents, enabling fast bibliometric analysis and promising more exhaustive and selective recovery of relevant documents.”

Humane Society Veterinary Medical Association Alternatives in Education (HSVMA)

http://www.hsvma.org/resources#humane_alternatives

HSVMA offers a variety of educational and training materials including publications and databases offering information on alternatives to animal use. They include the Alternatives in Education database, Alternatives Database and Humane Teaching Methods resources, as well as others.

Sniffy the Virtual Rat

http://wadsworth.cengage.com/psychology_d/special_features/sniffy.html

An online 'virtual rat' simulation programme to aid student learning

The Tracking System on Alternative Methods (TSAR - EURL-ECVAM)

<http://tsar.jrc.ec.europa.eu/>

This database is “a tool aimed at providing a transparent view on the status of alternative methods as they progress from purely scientific protocols submitted for pre-validation to being actively used in a regulatory context. This tracking system intends to cover all steps, from the initial submission for pre-validation until final adoption by inclusion in the EU legislation and/or related Guidance Documents, when appropriate. In June 2014, TSAR has been amended, following release of the EURL-ECVAM updated list of alternative methods.

QSAR Toolbox

<http://www.qsartoolbox.org/>

This technical database is for researchers, government bodies, chemical industry personnel and any interested stakeholders. The software works by grouping chemicals into categories in order to identify (and therefore fill) 'gaps' in ecotoxicity data which are needed for a complete risk assessment of a substance. The tool allows for entire categories of chemicals to be analysed, saving costs and animals from being used in unnecessary testing. In its 'Support' section, the toolbox also provides highly useful online training packages such as 'QSAR ToolBox Web Training' and step by step guides for prediction of specific endpoints, e.g. skin sensitisation.