Lush Training Prize 2013

Background Paper

1 Executive Summary

The category of Training and Education within the Lush Prize focuses on rewarding individuals and organisations whose work involves training others, whether they are researchers, budding researchers, children or regulators, in non-animal methods. Many established scientists may not have been trained in alternative methods or might not even be aware of them, while future scientists and students need to be provided with education in alternatives in order to be able to pursue further research in this area. Establishing training programmes and increasing capacity, whether as one-off workshops or ongoing programmes, can make a huge difference to this field. This prize recognises the importance of dissemination of methods among commercial scientists, researchers and students and seeks to reward individuals, teams or organisations who have excelled in this area.

1.1 Definition of training

Following last year's initial in-depth report, it was established that the definition of training could be interpreted in a number of ways. It was decided to take a very broad view with the criteria and definition of training and to include a number of elements, including training existing scientists in new techniques, open-source databases, and the education of school children.[1] This year's prize has taken a similarly broad view, given the importance of all aspects of training and education, and following a discussion with a number of people about where resources should be concentrated.

1.2 Areas included in the research

This year's research paper included a look at most of the organisations included within last year's paper – including those nominated and rewarded. Additional organisations, particularly those focusing on resources and education for school children, were also included as well as some one-off workshops. Altogether, the research included a look at organisations and initiatives involved in the following: training organisations and programmes, databases, toolboxes, lending libraries, search guides and other web-based resources, short courses, teaching centres, industry collaborations, organisations specialising in in vitro methods, societies and funders of animal alternatives. Given that last year's paper was very thorough, this year's paper focused on any progress, new initiatives or courses occurring over the past twelve months or planned for the near future. It also explored some of the barriers that might be facing those seeking to provide training and education on alternative methods.

Despite the emphasis of the Lush Prize on rewarding organisations working solely within a replacement framework, organisations fitting the general broad definition of

1 Lush Prize Training Prize 2012, Research Paper, August 2012

training and education but operating under a more general 3Rs framework are still mentioned and included within this research in order to provide the wider picture and for a more complete and accurate representation of the training landscape.

1.3 Outstanding projects

As with last year's research paper, this paper applied a 'replacement only' filter for any outstanding projects, in line with the replacement focus of the Lush Prize. It also filtered out last year's two winners, although they continue to do outstanding work, to allow other organisations to be rewarded for their work too. The following two organisations stood out during 2013:

- Alexandra Project, Monaco (Alternatives to Experiments on Animals Designed to Research Applications)
- Doctors Against Animal Experiments, Germany

1.4 Conclusion

It is clear from the primary and secondary research that the demand for training in non-animal alternatives has increased over the past twelve months and is only likely to increase further. While there are some new initiatives and collaborations, it is equally clear that existing training providers and initiatives are struggling to keep up with demand.

Funding for training, both commercial and non-commercial, is clearly an issue and may also not be rising with the demand. Sending scientists across the world is an expensive process, and the laboratory equipment and space may also be costly. Add to that the fact that some countries may just have limited funds for training. As a result, funds may need to be raised from commercial sponsors or charity donors. Work by the Institute for In Vitro Sciences (IIVS) in China, for example, was funded from a donation by PETA while InterNICHE's work was funded by various anti-vivisection charities. InterNICHE's website points out that further funding for its programmes in Uzbekistan, Kyrgyzstan and Iran is needed. It points to the costs of flights and the purchase, duplication or translation of alternatives required to directly replace animal use, as well as just the core costs of running its operations.[2]

Sending educators into schools is also not a financially profitable exercise and the costs for this must come from donors or monies raised. Training and education on alternatives within higher education institutions continues to be a tiny percentage of curricula, and this is likely to be the case across disciplines and in countries worldwide. The availability of alternatives training within an educational institution is likely to be influenced by the individual personnel within the institution rather than be offered as standard.

Education at all levels continues to be essential in changing the landscape for non-animal alternatives – from budding scientists being aware of alternative methods and

2 InterNICHE news piece, 18/3/2013

being offered a choice not to dissect in high school, through to regulators approving animal tests who may not be aware of the validity of non-animal alternatives, and to scientists across the world in countries such as China and Russia, where non-animal testing is a relatively new area. An increase in capacity within those countries, as well as in countries where non-animal testing is more standard can only save more animals' lives. Pioneering work by the Alexandra Project highlights the importance of data sharing – not just of methods, but of technology too. 3-D tissue models are often protected by patents and these patents belong to just a handful of companies.[3] More Open Source technologies could advance research much further, and thus training in their production and application could ultimately result in a radical reduction of the number of animals used worldwide.[4] Finally, initiatives which are training people to train others are essential if knowledge is to be disseminated on a wider scale.

2 Methodology

Last year's paper for the Training and Education category of the inaugural Lush Prize took a very broad view to explore what Training and Education could include. A range of training organisations, programmes, databases, toolboxes, courses (short and long), and collaborations were all deemed worthy of inclusion under this category. As a result, last year's short-list included organisations working on education in alternatives in universities, training in non-animal in vitro methods for commercial organisations, a data sharing initiative and a toolbox which specifically looked at chemical testing. For this year's paper, we have revisited 2012 nominees to see what developments have taken place, and cast the net further, to identify additional projects or organisations and track any progress in this area.

A number of key individuals were contacted in order to gain some primary research. Some interviews were conducted over Skype or the telephone, others by email. A majority of information was gleaned from major websites providing news and information in this area as well as organisational websites.

Last year's paper went into a great deal of depth around the definition and criteria of training, so this will not be repeated in such detail here. Instead, the focus has been on any progress, new initiatives, increase in demand, and on emerging markets. It has also tried to ascertain whether any particular area of training should be prioritised if resources are limited.

2.1 Summary of last year's paper

Last year's paper discussed extensively what should be included within the category of training and education. It reported that much of the training found appeared to be "quite ad hoc, such as one-off training days, or booklets on alternatives" and that

3 Conversation with Dr Bart De Wever, from Alexandra Project 31/7/2013
4 Conversation with Dr Bart De Wever, from Alexandra Project 31/7/2013

"training in non-animal methods is a much neglected area in general".[5] The paper concluded that "a much more comprehensive, systematic approach to encouraging the use of existing non-animal methods is required, in toxicology and beyond – from classrooms through universities to the commercial testing laboratories themselves. It would seem that in this area, with quite simply better communication, many animals' lives could be saved."[6] The research found very few projects or organisations focusing on "hands-on training" but came up with some outstanding projects, two of which went on to win the prize last year – InterNICHE and the Institute of In Vitro Sciences (IIVS).

The paper conducted a thorough literature review, and talked to experts and discussed the issues around training and education. The main conclusions are listed below:

- An emphasis on teaching on alternative approaches rather than alternative methods is important within academia, including educating students on how to find alternative methods as appropriate so that every researcher knows about relevant alternatives. This particularly important because the pace of new technologies coming to market means that it's difficult to teach any specific approach. It's also important within general science training to include education about the scientific limitations of an animal approach.

- Teaching of alternative approaches is necessary at many places within education and within many curricula.

- Education and training also needs to include keeping scientists and regulators updated in the development of knowledge and techniques.

- Several duplications of on-line resources exist, while the "actual work conducting practical hands-on training to implement non-animal methods appears to be left at present down to the hard work of motivated non-profit organisations".[7]

- A much more comprehensive, systematic approach to encouraging the use of existing non-animal methods is required in toxicology and beyond – from classrooms, through universities to the commercial testing laboratories themselves.[8]

3 2013 Consultation

5 Lush Prize Training Prize 2012, Research Paper, August 2012
6 Lush Prize Training Prize 2012, Research Paper, August 2012
7 Lush Prize Training Prize 2012, Research Paper, August 2012
8 Lush Prize Training Prize 2012, Research Paper, August 2012

3.1 Increase in Demand

A survey conducted during 2012, by the European Commission's Joint Research Centre (JRC) reported that "training needs on the use of alternative methods in predictive toxicology... are expected to evolve rapidly".[9] Training organisations are already seeing an increase in demand. According to Erin Hill, from Institute of In Vitro Sciences (IIVS), one of the joint-prize winners from last year, demand for the organisation's training in in vitro methods has escalated over the past twelve months. "It's a phenomenal amount of requests" says Hill. "It started out a couple of years ago fairly modestly, with a group of scientists, say from China, and that group would consist of a couple of regulators, a couple of people within different sections of a country" she explains. "Then, each of them would respond with more requests for training in their area, so there's now this exponential request for training all over the world".[10] In response, IIVS has started initiatives with different organisations includingNGOs, who are all receiving requests for training. "Over the last year, we've seen requests to get involved in Korea, Vietnam, and Russia is also back on the front burner again". Within China, an area where training had already occurred, IIVS has also seen demand for training increase. "We're seeing demand expanding within a country as well as new countries asking for training."[11]

Dr Marcel Leist, Dorenkamp-Zbinden Chair at the University of Konstanz, agrees that there is a growing interest in new methods, and that interest is growing at a very high speed for a number of reasons. "Not necessarily for animal protection or ethical reasons, but people are realising that these methods are also a way to save money, time or get better data and to get more reproducible data" he says.[12]

According to Anna Maria Bassi from The Analysis and Research Laboratory of Pathophysiology (LARF), her courses in Italy are consistently oversubscribed, with unlucky participants asking to be registered on future courses to secure a place.[13] A training course at the EUSAAT 2013 conference only has limited places (24) for the second, practical, day.[14] If training workshops such as these only run as one-offs or a couple of times a year, they clearly cannot reach the sheer numbers of scientists and regulators who would need them in order to make huge leaps in this field.

JRC's survey concluded that there was a need for "increased attention to be paid to the development of well-targeted training activities and media that support the use and implementation of alternative methods".[15]

Clearly, while a rise in demand is a good thing, organisations and courses need to be able to meet this demand, and this is looking increasingly difficult when only a limited number of organisations are offering training and education in alternative methods.

---

9 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012
10 Conversation with Erin Hill, IIVS, 16/7/2013
11 Conversation with Erin Hill 16/7/2013
12 Conversation with Marcel Leist, 22/7/2013
13 Email from Anna Maria Bassi, 20/7/2013
14 EUSAAT
15 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012

3.2 Main obstacles to training and education

One of the challenges with the emerging markets for non-animal testing is the lack of capacity within countries. This is something that IIVS is trying to change within China – although that seems to still be a long way off. “We’ve toyed with the concept of setting up training facilitators or permanent training facilities within China and then as methods are approved, we can train a set of individuals and then they can go off and train other scientists within China. That’s probably the most efficient way to do it. Otherwise, our staff would be travelling to China once a month”.[16] Capacity building is clearly much needed across these markets. According to Hill, there aren’t really any in-country training organisations emerging in many countries. “Not really, not in any sustained way”, she says. “It’s not to say that they don’t exist, but I don’t know of any”.[17] Research across the internet and other conversations have also not yielded much information about in-country training in the emerging markets of Brazil, India, Russia and China.

Hill emphasises that just because the EU has legislation around animal testing, it does not mean that education and training is any less important in EU countries. “The same problems exist – new labs need to be trained and the publically available OECD guidelines don’t really provide enough information to become proficient”.[18] She points out the reference laboratories identified by the European Commission as an important step as these will act as experts within each country and help train different scientists. The 2012 survey on training needs conducted by JRC asked experts in regulatory agencies, industry, national research organisations, NGOs and consultations about training needs and concluded that “the development of well-targeted and tailor-made training opportunities that inform about the usefulness of alternative methods...deserves more attention”.[19] Respondents also pointed to the different ways that such training could be delivered, including “regular training events, workshops, lectures and laboratory visits, but also IT-supported options, such as webinars and video learning modules”.[20] Clearly, there is still a need for increased focus on training and education within Europe, as well as further afield.

Hill explains that the obstacles to in-country training vary between countries. “We have seen some common themes and they include a lack of education and a lack of experience with the new methods”.[21] So, although a test method may be included within test guidelines, there is not the detail included for a contract laboratory, regulator or scientist to just start using it straight away. This was also raised in the 2012 survey, which found that training topics identified by the experts contacted included “guidance for applying alternative testing methods”.[22] Erin Hill says that the guidance itself is not enough and that “it’s the practical training, the hands-on training

16 Conversation with Erin Hill, IIVS, 16/7/2013
17 Conversation with Erin Hill, IIVS, 16/7/2013
18 Conversation with Erin Hill, IIVS, 16/7/2013
19 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012
20 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012
21 Conversation with Erin Hill, IIVS, 16/7/2013
22 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012

that's really missing".[23] The survey also found that although general information for many of the topics surrounding alternative methods were available and accessible, "this information may still be too fragmented and dispersed".[24] Analysis of the survey indicated that "though stakeholders addressed a range of different alternative methods, we observed a preference for training on the use of in silico approaches and in vitro methods".[25]

According to Dr Bart De Wever (ALEXANDRA), there are further issues complicating the advancement of alternatives to certain animal tests. For example, in Brazil, "due to legal procedures required by local customs, it is not possible to import these models (from France or the USA) in timely and ideal conditions in order to be used in Brazilian laboratories without losing their validity".[26] This means that training scientists there on the use of this particular method may not be enough unless they are able to create the models themselves - something which the Alexandra Association has begun to do.[27]

While hands-on training is the area which the Alexandra Association and IIVS focus on, Dr Leist believes that to some extent, it's not as high priority as just spreading the knowledge about replacements to animal tests, even though it's "nice to have some practical experience".[28] "Such practical training is expensive" he says and emphasises that training without practical experience is still important, worthwhile and of high interest to people.[29]

Another obstacle to training and education is money – both the costs of running training and the funding to pay for it. Lack of money can definitely be an obstacle for countries and for organisations, explains Erin Hill, whether it's for infrastructure or for laboratory space. Helmut Appl from The European Society for Alternatives to Animal Testing (EUSAAT), says that previous EUSAAT conferences have not offered training due to the costs involved in delivering such workshops. As well as the potentially costly infrastructure and equipment, there are additional costs such as venue hire which are associated with any types of training.[30] Added to that, is the fact that many people requiring such training (such as student scientists and young researchers) may not have the funds to pay for additional courses and therefore the workshops need to be offered for low or no fees, particularly practical courses which are more expensive. Practical training at The Analysis and Research Laboratory of Pathophysiology (LARF) has been subsidised by a sponsor so that it is the fees are kept extremely low (60 Euros for two days). The two-day training at EUSAAT has been funded by Zet and AcrossBarriers, and has been specifically planned so that no expensive infrastructure is required and the additional costs of venue hire are saved.[31]

23 Conversation with Erin Hill, IIVS, 16/7/2013
24 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012
25 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012
26 Tridskin
27 Conversation with Bart De Wever 31/7/2013
28 Conversation with Dr Marcel Leist, 22/7/2013
29 Conversation with Dr Marcel Leist, 22/7/2013
30 Email correspondence with Helmut Appl 5/8/2013
31 Email correspondence with Helmut Appl 5/8/2013

Where trainers and educators are not available in-country, flying over organisations such as InterNICHE or IIVS to deliver such training can be difficult to finance. Much of the training taking place in the emerging markets of China, Russia and other countries has been funded by charities and campaign groups such as PETA, Anti-Vivisection Union in Australia, and Humane Society International. It is of concern that it was PETA who put up funds for training in China, rather than the cosmetics companies (who had been "secretly paying for Chinese officials to test their products on animals") because they had not themselves provided the training in the use of the non-animal methods.[32]

According to Dr Candida Nastrucci, President of the newly funded NGO TheAlternatives.eu, lecturer in courses on alternative methods and research scientist, "the main barrier for scientists who believe that better science means using alternatives to animals is to find funding to create courses."[33] She says that funding for teaching and developing alternatives is very limited. Ideally, a training laboratory should be set up with materials and instruments "to be able to show students the different methods, how to use them, in order to apply them to their particular scientific problem. The more the students would be able to be stimulated to think about new ways to answer scientific questions, the more chances there are that the alternatives to animal experiments will be used and implemented" she says. "Italy is well behind the UK and other EU countries in funding and training on alternatives" and is a "real problem that is actually stopping the progress of research."[34]

Dr Bart De Wever concurs, explaining that funding to run training is limited. His organisation has now employed a fundraiser specifically to try and attract funds for the organisation to continue its work. "Our work in schools has to be paid for by someone" he points out "and we're a non-profit organisation". While the organisation's training for other professionals might be funded by organisations, it is expensive to run, "and scientists in less developed countries may not have the resources to pay".[35]

3.3 Where should training and education resources focus?

Hill and others agree that methods need to be introduced earlier in the educational system. "In the US, when you're training for your board exam in toxicology, I don't believe they discuss much about in vitro methods. They're also not discussed within toxicology programmes at the PhD level... I think that if we start to make them mainstream at the university level, then the adoption will be much easier. Scientists learn about the animal model early in their career, and we need to insert concepts of in vitro methods at the same time," she says.[36]

According to Dr Marcel Leist, whether you would have education about in vitro methods at university varies between establishments and will depend very much on the staff within a university. "Sometimes it happens early, sometimes it doesn't. So in

32 PETA news release 7/11/2012
33 Email correspondence with Dr Candida Nastrucci 1/8/2013
34 Email correspondence with Dr Candida Nastrucci 1/8/2013
35 Telephone conversation with Dr Bart De Wever 31/7/2013
36 Conversation with Erin Hill, IIVS, 16/7/2013

our university, it is included early on in curricula, for instance for biologists, but this is because [of] my professorship, which is part of the curriculum. However, in most universities, there is no such background".[37] He points to the importance of education about non-animal methods for biology, for veterinary medicine and for medicine "because these are the big fields for animal use and often they're not at all aware of the alternatives, especially in medicine".[38] Dr Candida Nastrucci reported that during her various studies – at undergraduate, masters and PhD level, very limited information about alternatives was included. "This was true at the time of my studies, which began in 1992 in the UK, and it is still true now all across Europe" she says.[39] This may partly be down to a resistance of existing lecturers and scientists to admit they are using the wrong model, says Anna Maria Bassi. "Many colleagues, experts in drug development and toxicology in vivo, do not even want to hear the scientific and ethical questions about alternative models, considering them as not credible". She argues that they can tend to remain "tightly anchored to the old methods since this upgrade takes effort".[40]

Dr Nastrucci says that training students to use and develop alternatives is "fundamental" and that "we need to train the scientists of the future, giving as much information on the alternatives as possible, so that they can think of different ways to answer scientific questions, which are different to what they had always thought before". She says that we need to increase funding for such training, and offer courses on alternatives across all levels "both at graduate and post-graduate level".[41] Anna Maria Bassi agrees: "I think it's useful to begin in the early years of the courses of science studies and always provide updates or basic courses in all post-graduate courses".[42]

Dr Nastrucci points out the need to train those currently involved in education in order to increase the amount of education available: "We need to train lecturers to teach alternatives at all levels, perhaps with advanced courses on particular areas of research. Usually, scientists specialise in one subject, but alternatives are applicable to many subjects, to different areas of research, from learning about the mode of action of drugs to toxicology; from cancer research to brain studies or stem cell research".[43] She believes that we need to targets scientists, students, lecturers and heads of university departments so that all subjects could start including within their study programs a course on alternatives. Helmut Appl agrees that "within the 'regular education' at universities, very often you still do not get as much information about such models as needed".[44]

A 2011 survey in Germany found that "studying without animal use is nearly impossible" when studying biology, human medicine or veterinary medicine in Germany" despite the fact that there are alternative teaching materials available and

37 Conversation with Dr Marcel Leist, 22/7/2013
38 Conversation with Dr Marcel Leist, 22/7/2013
39 Email correspondence with Dr Candida Nastrucci 1/8/2013
40 Email from Anna Maria Bassi, 20/7/2013
41 Email correspondence with Dr Candida Nastrucci 1/8/2013
42 Email from Anna Maria Bassi, 20/7/2013
43 Email correspondence with Dr Candida Nastrucci 1/8/2013
44 Email correspondence with Helmut Appl 5/8/2013

legislation which stipulates that they should be used preferentially.[45] SATIS (Project for Humane Education of People for Animal Rights Germany) said, “Other EU countries, such as Italy, Sweden or the Netherlands are far ahead of Germany. Conscientious objection is regulated by laws or policies and ethical alternatives are promoted. This is important, because our society expects scientists and especially medical professions to act ethically. This foundation is already laid during training”, says biologist Astrid Schmidt, project leader of SATIS.[46]

Dr Leist agrees that replacement methods need to be taught across the board – at different levels and for different specialisms. Currently, they are more likely to be taught within toxicology. The JRC research paper concluded that there need to be “specific educational programmes on systems toxicology... in order to effectively prepare and support the next generation of researchers and risk assessors”.[47]

However, if toxicology is not someone’s main subject and only a side subject for them, or they’re more involved in biomedical research, it’s less likely to be included within someone’s education. “It would be good to have non-animal alternatives included in the normal curricula and also to be clear that it’s a scientifically important and exciting topic which has progress” says Dr Leist. He says it’s important to emphasise the science over the moral arguments, and that emphasis should be placed on the fact that it’s “one of the most dynamic fields, with rapid development and evolution as well as offering lots of job opportunities”.[48]

All agree that resources should not be focused in one area. “We have to offer solutions today” says Hill, and continues that while education of students and the public is still important, the organisation chooses to focus its attention on training scientists on existing methods.[49] Anna Maria Bassi agrees that training initiatives must be focused on both targets,[50] as does Dr Bart De Wever, whose organisation is targeting both school children and scientists, educating them on one specific area, which is the use of 3D tissue models.[51]

If training only focuses on new scientists and researchers, it will miss out a group of people who are crucial to train, says Dr Leist, and these are more established scientists working commercially and within academia, who may never have had training in new methods. “There’s also many people, for instance at the ECA in Helsinki (where there are hundreds of people who don’t have a background on this) deciding on these things, but at the time that ECA was built up, there were no toxicologists on the market. So they hired biochemists, or whomever they could find. They would benefit a lot from training in this area. And there aren’t many institutions that are really offering good courses for these kinds of institutions.”[52]

45 14.04.11 New: Ethics ranking of German universities, Survey shows studying without animal use is nearly impossible
46 14.04.11 New: Ethics ranking of German universities, Survey shows studying without animal use is nearly impossible
47 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012
48 Conversation with Dr Marcel Leist, 22/7/2013
49 Conversation with Erin Hill, IIVS, 16/7/2013
50 Email from Anna Maria Bassi, 20/7/2013
51 Conversation with Bart De Wever 31/7/2013
52 Conversation with Dr Marcel Leist, 22/7/2013

Strategically, industry and authorities are very important to train, he says, as are the regulators. “As long as they don’t know about the methods, they won’t accept them”. Therefore, he argues “as long as there is not a broad teaching capacity, it’s most efficient to teach the teachers, to identify key target audiences, like professors in universities or people in authorities who can spread the knowledge”. The other strategy, he says “is of course to start more broadly with young people and to try and have this at least in every curriculum of veterinary science”. He explains that this is because it’s these students who go on to become responsible for animal experiments in companies and universities and that they need to know about the alternatives to animal experiments. “They should be able to say, ‘do you need this experiment, I have heard that this alternative is available and it’s validated in this way, would you consider this as an alternative’ but if they don’t know this, then this will not happen.”[53] The JRC survey respondents also stressed the importance of training “members from regulatory agencies... and referred to training as a potential means of improving regulators’ general understanding, and acceptance, of alternative methods.”

A further barrier mentioned by a couple of the interviewees was that of the dominance in the field by multinational organisations that may not be willing to share their data or knowledge. Dr Bart De Wever of ALEXANDRA explains that many of the in vitro tissue models are often protected by patents, inhibiting training and research in this area. “If they’d patented cell culture in the same way” he says “research would have been stuck”.[54] Wever believes that scientists need to share what they know. However, currently just a few companies dominate. L’Oreal, for example, has just bought two of the biggest companies in this field: EpiSkin and SkinEthic RHE. “Technology is in the hands of a few big companies, but it should be freely available”, he says. “It’s all about know-how”.[55]

Dr Nastrucci also points to the fact that “industry has a real possibility for investing in the use and development of alternatives, but the information and funding may be kept within a company” and they are not, therefore, particularly focussed in on sharing of information and training others.[56]

Despite this, it should also be noted that a number of initiatives do involve some of the multinationals who do stand to benefit from the increase in alternatives. The Industry Council for the Advancement of Regulatory Acceptance of Alternatives (ICARAA), for example, is a new initiative comprised of a number of multinationals, including Avon Products, BASF SE, Colgate-Palmolive Company and Unilever as well as IIVS.[57] ICARAA’s activities will focus on educational programs including lectures, demonstrations, hands on training and data interpretation. Chemical company BASF has also provided IIVS with equipment “critical to replacing the use of animals for eye irritation testing of certain chemicals. IIVS will place the units at

53 Conversation with Dr Marcel Leist, 22/7/2013
54 Conversation with Bart De Wever 31/7/2013
55 Conversation with Bart De Wever 31/7/2013
56 Email correspondence with Dr Candida Nastrucci 1/8/2013
57 Press Release, 28/5/2013, IIVS website: www.iivs.org/news-events/press-releases/industry-council-formed-to-advance-regulatory-acceptance-of-non-animal-testing-methods/

each of its newly developed training laboratories in Xi'an, Beijing, and Guangzhou, China." [58]

4 Conclusions and recommendations

The research, both primary and secondary, indicates that while the demand for training may be increasing worldwide, the resources to train others are not keeping up. There are still relatively few organisations with the capacity and funding to offer the level of training and education required to make big shifts. Dr Bart de De Wever says that the area of training in alternatives is a relatively small world. So, although the individuals involved in this area are passionate and dedicated, they are still relatively few in number. Applying a 'replacement-only' filter to outstanding projects may prove to be problematic in the long-term because of the relatively small organisations and projects operating in this field.

4.1 Outstanding projects

As with last year, the paper applied a 'replacement only' filter to any likely outstanding projects in line with the replacement focus of the Lush Prize. This means that though some of the projects and organisations mentioned in the data section of the report are doing important work to progress this area, they were not included because they also promote reduction and refinement at the same time.

The following two organisations stood out for a number of reasons.

- **Alexandra Association, Monaco (Alternatives to Experiments on Animals Designed to Research Applications):** Chosen for its focus on Open Source 3D tissue skin models (it appears to be the only organisation doing this), and also for its two-pronged approach to training and education – in schools as well as in the education of existing scientists and laboratories.

- **Doctors against Animal Experiments:** For its Eastern European project, which has had a quantifiable impact on the number of animals used in educational institutes.

4.2 Conclusion

Demand for training in non-animal alternatives has increased over the past twelve months and is only likely to increase further. The existing training providers are struggling to keep up with the demand coming from countries worldwide. As well as the financial costs of training, there are logistical obstacles as well – flying key individuals to deliver training back and forth across the world is time consuming and adds further costs to an already costly exercise. In the medium to long term, it makes

58 www.iivs.org/news-events/press-releases/basf-supports-us-non-profit-laboratory-to-promote-non-animal-testing-methods/

much more sense for key individuals and laboratories within emerging markets to be trained with the skills and knowledge to be able to train others.

Finding the funds to pay for such training is also still an issue with many training initiatives funded by various anti-vivisection charities. In today's current squeezed economic climate, this may not be sustainable in the long- term and is unlikely to meet demand if it continues to rise.

Within the education system, money is an issue too. Sending educators into schools is not a profitable exercise and the costs for this must also come from donations. Within higher education, training and education on alternatives is still only a tiny percentage of the curricula, across disciplines and countries. The likelihood of alternatives courses and training is currently more likely to occur if there are personnel within a university who will influence this, as can be seen by the determination by the Italian scientists and Dr Leist's influences. What's needed worldwide is a dedication to including alternatives within mainstream education, from science taught in high schools through to university education and across a range of disciplines rather than being confined to toxicology.

Education on alternatives is essential not only to increase the number of non-animal tests taking place commercially and within education, but also to increase the likelihood of more alternatives methods coming to market to replace animal tests. Scientists need to be aware of alternative methods in order to choose them where appropriate, but they also need to be working on developing new methods to replace the methods where there are no approved alternatives. In countries where non-animal testing is still relatively new, more education is needed in how to apply existing methods. PETA's grant to IIVS for training in China came after it was revealed that Avon, Mary Kay, and Estee Lauder – companies which had been listed by PETA as ones which didn't test cosmetics on animals, had been "secretly paying for Chinese officials to test their products on animals". According to PETA, the companies had not provided Chinese scientists with training in the use of the non-animal methods currently used in the US and the European Union.[59]

Data sharing is still an issue. The Alexandra Project is dedicated to data sharing technology and to an open data 3-D tissue model, as many are protected by patents belonging to a few companies, possibly pricing the models out of the reach of some countries. More Open Source technologies could be instrumental in advancing research and ultimately in reducing the number of animals used in laboratory tests worldwide. Collaboration and data sharing is also crucial to further progress, and although there are a number of collaborative initiatives – such as the Industry Council for the Advancement of Regulatory Acceptance of Alternatives (ICARAA), there is still scope for further collaboration and co-operation.

Resources for education and training need to focus on different intervention points – on students in schools and universities; on research scientists within both academia and commercial laboratories; and on those who approve tests and research or are involved in the regulation of them. There is a clear need for a wide variety of training topics from general knowledge about alternatives to the use and application on

59 PETA news release 7/11/2012

various methods, “with a clear focus on the practical use and application of alternative methods” and which are delivered in a variety of ways including lectures, workshops, laboratory visits, and webinars and video learning modules. [60]

However, there is a capacity issue and resources may best be spent focusing on training others to trainprovide training because of the relatively small numbers of people and organisations currently operating within this area. CAAT Europe’s course programme aimed at getting people involved in teaching alternatives is one important initiative in this area.[61]

From the research, it looks as if you could separate the training and education in this area into two categories: Those those run by organisations such as IIVS with some fundraising and financial resources behind them, and those spearheaded by individuals who have the passion and determination to spread the knowledge, but who do not necessarily have the financial resources to offer large-scale trainings or to have a huge impact. If the main criteria set by the judges is to be impact then the former types of organisation would win the prize every time. However, it’s important to recognise that the effort and determination of individuals is also crucial in this field. While they may not have as wide a reach and impact, they are part of a wider movement and, in many ways, may need the financial resources of a financial prize such as the Lush Prize more, in order to fund and continue their work. It should also be recognised that it’s often these determined and focused individuals who, with wider backing, go on to create and establish organisations that grow and are then able to make a wider impact. It would seem unfair, therefore, to pitch the two types of project against each other, and it’s suggested that perhaps the prize could be split into two, with some financial reward given to individuals (whom it may make a larger impact on), and some to the larger organisations.

The two types of project could be judged on different merits, with ambition and scalability considered when it comes to individuals’ efforts (and smaller projects).

5 Data section – organisations and initiatives identified in this area

This section includes some of the major players identified in this area, some smaller projects and other training courses or workshops. It includes a majority of organisations identified in the 2012 research paper, but focusing focuses on any new or updated information. For this reason, some organisations involved in the area appearing in 2012’s paper may not reappear in this paper. It also includes some organisations not identified in the 2012 paper, but who are contributing important work in this area.

60 Training Needs for Toxicity Testing in the 21st Century: A Survey-informed Analysis, Silvia Lapenna, Silke Gabbert and Andrew Worth, December 2012

61 Conversation with Dr Marcel Leist, 22/7/2013

5.1 News on last year's nominees

The 2012 inaugural Lush prize category Training and Education nominees were:

5.1.1 Dr Hadwen Trust for Humane Research, UK

For its Summer Studentship Scheme to give students practical lab experience. www.drhadwentrust.org

In 2013, Dr Hadwen Trust Summer Studentship Awards ran for the second year. The scheme enables undergraduates to gain practical lab experience using non-animal approaches during the summer. The award is worth up to £1,440 over a maximum 8 week period, and there is a separate budget for consumables, up to £500. Kailah Eglington, Chief Executive of Dr Hadwen Trust said of this scheme: "Our Summer Studentship award is an opportunity to inspire the next generation of research students".[62]

5.1.2 Portuguese Society for Humane Education

For their proposed conference on Alternatives in Portugal.

www.icaae.com

The proposed conference mentioned in last year's nomination took place in Almada, Portugal on 26th and 27th January 2013. The conference aim was to promote the debate and sharing of information regarding 3Rs policies on animal use, and also "highlighting the replacement of animal models for suitable and ethical alternatives, such as in vitro and in silico models, as well as alternative experimental designs".[63] New England Anti VivisectionAnti-Vivisection Society (NEAVS) offered 13 places at the conference "to students committed to the animal protection and aiming to pursue a career in alternatives to animal experimentation, testing and use in education and training".[64] The website domain ceased to exist after 26/7/2013 so no information could be found on the success of this conference. The Portuguese Society for Humane Education was contacted to comment on the success of the conference, but did not respond.

5.1.3 PETA (People for the Ethical Treatment of Animals), USA

For their work on arranging and funding training on non-animal tests for Chinese officials.

www.peta.org

62 Dr Hadwen Trust, 26/6/2013, visited 23/7/2013
63 International Conference Of Alternatives to Animal Experimentation
64 International Conference Of Alternatives to Animal Experimentation

During 2013, PETA gave a $33,000 grant to the Institute for In Vitro Sciences for training in China on how to use non-animal tests.[65] This was a the second grant given and the training was held at the end of October 2012 for 30 students and faculty at the Beijing Technical and Business University. During the training, scientists were educated in the use of the Bovine Corneal Opacity and Permeability assay, which replaces the eye irritation test. PETA had awarded this grant following the discovery at the end of 2011 that a number of cosmetics companies had been secretly paying for Chinese officials to test their products on animals. The companies hadn't provided Chinese scientists with any training on the use of the non-animal methods which are used elsewhere. "China is now poised to accept its first ever non-animal test" as a result of IIVS's initial work".[66]

5.1.4 Institute for In Vitro Sciences, USA

For their vital work on training researchers in non-animal methods from Brazil to Japan

www.iivs.org

Over the past year, IIVS has been to China, funded by PETA, to train scientists in the use of non-animal tests (see PETA, above). In November 2012 it signed a Memorandum of Understanding with The European Partnership for Alternative Approaches to Animal Testing (EPAA) to establish "a strategic partnership dedicated to the international dissemination of alternative techniques for safety evaluation".[67] EPAA will be providing €100,000 over two years to be used to support further training activities in key regions, including China and Brazil.[68] In May 2013, IIVS announced the formation of the Industry Council for the Advancement of Regulatory Acceptance of Alternatives (ICARAA).[69] The focus of ICARAA will be on educational programmes, including lectures, demonstrations, hands-on training and how to interpret data. ICARAA comprises a number of companies including Avon Products, British American Tobacco Group and Research & Development, and Unilever, as well as IIVS. According to Erin Hill, demand for IIVS training has increased over the past twelve months with a "phenomenal amount of requests". According to Erin, demand has expanded within countries where training has already taken place, and also with new countries asking for training, including "Korea and Vietnam" and demand increasing in Russia where it there had been a lull.[70]

5.1.5 Norecopa, Norway

For their work on the NORINA database of non-animal testing products and teaching aids.

www.norecopa.no

65 PETA News release, 7/11/2012
66 PETA press release, 7/11/2012
67 Institute for In Vitro Sciences
68 Institute for In Vitro Sciences
69 IIVS press release, 28/5/2013
70 Conversation with Erin Hill, IIVS, 16/7/2013

Norecopa is the Norwegian Consensus Platform for Replacement, Reduction and Refinement of animal experiments. It maintains NORINA, a database (in English) "containing information on over 3,900 audiovisualaudio-visual aids that may be used as alternatives or supplements to the use of animals in teaching and training, including dissection alternatives, at all levels from Junior School to University".[71] There is little information on its website about any new developments in 2012/3.

5.1.6 The Alexandra Association, Monaco

For their work on the open source models for cell culture technologies.

http://alexandra-project.org

Since the organisation's nomination for the 2012 Lush Prize, the Alexandra Association have been very busy in the area of training and education. On World Animal Day, 4th October 2012, the Alexandra organised an information day on the use of alternative methods to animal experimentation, together with Dr. Christophe Capallere, head of tissue culture laboratories of Sterlab SA, France. Students of different schools in Monaco were educated about the issue of animal testing, and the currently available alternative methods. They learned about use of tissue engineered reconstructed human skin and oral tissues to test cosmetic, oral care products and household chemicals. The day also addressed how these models could be applied to animal-free medical research. The Alexandra Association said that they were very pleased with the "enthusiasm and genuine interest of these young students in animal welfare and how tissue engineered models offer a solution to animal experimentation: their active participation in the experimental session and multiple questions on the topic prove the necessity of educating youngsters and make making them aware of the issues related to animal testing."[72] The organisation is convinced that these sessions are extremely important and intend to organise them more frequently in several schools, hoping to reach a 'critical mass' "that one day will help us to change to a better, more ethically responsible world…."[73] Dr Bart De Wever from The Alexandra Association emphasised the importance of educating future generations about alternatives to animal tests.

The organisation's other focus is on training existing scientists on Open Source 3D tissue models. During 2013, this took the organisation to Brazil where, for legal reasons, skin models can't be imported, and so the training focused not just on the use of 3D models, but also on the construction of them. Dr Bart De Wever explained that the technology for the 3D models is currently in the hands of "a few big companies", and emphasised that open data models are essential for advancing research.[74]

The organisation is still relatively new (it's been in existence since 2011) and in that time seems to have made huge inroads into this area. Its pioneering in open source

71 Lush Prize Training Prize 2012, Research Paper, August 2012
72 Alexandra Project
73 Alexandra Project
74 Telephone conversation with Dr Bart De Wever 31/7/2013

approach to modelling appears to be unique, and could radically increase the numbers of laboratories using such methods where appropriate. It seems to be the only organisation focusing solely on training users on tissue development methods in terms of production and use and has ultimate aims to train scientists at a dedicated training centre in Monaco itself.

5.1.7 InterNICHE, UK

For their work in training in former Soviet states, South America and Africa.

www.interniche.org

During April to June 2012, InterNiche InterNICHE ran a series of seminars, exhibitions and meetings in Iran, Uzbekistan and Kyrgyzstan providing the first major exposure to replacement alternatives in these countries. In a report published in March 2013, this outreach was deemed a success on a number of levels; : one university in Kyrgyzstan agreed to end all of its animal use.[75] In March 2013, InterNICHE co-ordinator Nick Jukes also presented at a conference in Giza, Egypt, on the use of animal alternatives in veterinary education.

5.1.8 T8: The International QSAR Foundation

For their international database on chemicals and toxicity.

www.qsari.org

The website was visited for the course of the research but no new information regarding this project had been added.

5.2 Other organisations: new initiatives, projects or resources since last year's paper

More in-depth descriptions of many of these organisations can be found in the 'data' section of last year's paper. The organisations are presented in alphabetical order.

5.2.1 CAAT and CAAT-Europe (USA/Europe)

http://caat.jhsph.edu/

http://cms.uni-konstanz.de/leist/caat-europe/

The John Hopkins Center for Alternatives to Animal Testing (CAAT) is part of the Baltimore-based John Hopkins University Bloomberg School of Public Health. It aims to promote humane science by "supporting the creation, development, validation,

75 InterNICHE

and use of alternatives to animals in research, product safety testing, and education".[76] The organisation focuses on the 3Rs, rather than just replacement.

CAAT-Europe is housed at the University of Konstanz and co-ordinates "transatlantic activities to promote education in humane science".[77] Dr Thomas Hartung is a program liaison representing John Hopkins, with Dr Marcel Leist serving as the University of Konstanz liaison. CAAT and CAAT-Europe plan to develop a joint education programme which will include: e-courses, ; CAAT's certificate programme on humane science, ; a student exchange; and collaboration in the International Graduate School.[78]

During 2012/13, workshops provided by CAAT in the US and Europe included the following:

- Joint US Workshop: Scientific Roadmap for the Future of Animal-Free Systemic Toxicity Testing
- Developing Microphysiological Systems for Use as Regulatory Tools - Challenges and Opportunities
- Alternative In Vitro Methods to Characterize the Role of Endocrine Active Substances (EASs) in Human Hormone-targeted Tissues
- Organotypic 3D-cell Culture Models and Engineered Tissues
- European Parliament Workshop on Advancing Safety Science with Innovative, Non-animal Tools: October 10, 2012

It also continues to run courses including "Alternative Methods in Animal Testing" which discuss and evaluate "strategies for reducing the number of animals utilized in basic and applied research". The course addresses traditional in vitro methods, including cell culture and analytical chemistry as well as newer, and evolving techniques such as informatics, genomics, and proteomics. It also covers governmental regulatory processes for approving new testing methods, especially in vitro methods.[79]

According to Dr Marcel Leist, CAAT Europe has compiled a course programme published in Altex, with the aim of getting different people involved in the teaching of alternative methods. "The argument is to get people involved in the teaching, and it includes a rough outline of a teaching programme for a day, two days or a week, which would be modular, and this could be a starting point".[80]

5.2.2 Cefic-LRI, Belgium

http://www.cefic-lri.org

76 CAAT
77 CAAT
78 CAAT
79 Alternative Methods in Animal Testing, Johns Hopkins course
80 Conversation with Dr Marcel Leist, 22/7/2013

Cefic is the Brussels-based organisation representing the European chemical industry, and the LRI is its long-range Research Initiative. In February 2013, along with The European Partnership for Alternative Approaches to Animal Testing, it hosted a workshop on skin sensitisation entitled “moving forward with non-animal testing strategies”. More than 50 people took part, including representatives from regulatory agencies. Participation was by invitation only.[81]

5.2.3 CELLTOX (Italy)

www.celltox.it

CellTox is an Association founded in 1991 in Milan. It aims to bring together researchers in Italian public and private institutions that who carry out in vitro activities to “promote the circulation of information of information and knowledge and provide opportunities training in the field of alternative methods to young researchers”.[82] It organised a 4 day theoretical course on alternative methods in Milan and will partner with LARF for the practical part of an upcoming edition of the course. It will also contribute 1,000 Euros€1,000 x 2 to reimburse the expenses of two participants in the 18th International Congress on In Vitro Toxicology in 2014 for young researchers under the age of 32.

5.2.4 Doctors Against Animal Experiments, Germany

www.aerzte-gegen-tierversuche.de/en/

Doctors Against Animal Experiments was founded in 1979 and is a charitable organisation of doctors and scientists who work in the medical field with the aim of abolishing animal experiments on both ethical and scientific grounds. It is involved and campaigns and lobbying and, relevant to this category, schools and university educational projects. It has recently published a “trilingual website in Russian, Ukrainian, and German” to inform and educate students and teachers of the organisation’s Eastern European project.[83] This project has mainly worked in the Ukraine, where educational institutions are provided with “alternative teaching aids if they agree per contract to abstain from animal experiments in their study courses”. Since this programme was instigated in 2008, “36 institutes in 15 Ukrainian towns have signed the contract” receiving laptops, multimedia programmes, videos and beamers. Doctors Against Animal Experiments estimate that this has reduced animal use by around 35,000 per year.[84] The Society also works with InterNiche InterNICHE in projects in Russia, Uzbekistan, and Kyrgyzstan and has also financed the production of educational films in Russian. The trilingual website gives details of the programme and provides information on alternative teaching methods as well as listing arguments against animal experiments in education and research. During 2013, the organisation has signed contracts with two additional institutions in the Ukraine where the establishments committed to refrain from using live animals and in return received laptops and multimedia programs to convey the subject matter.[85]

81 Skin sensitisation training workshop: "Moving forward with non-animal testing strategies", Long-range Research Initiative
82 Lab4Life
83 Towards alternative methods in education in Eastern Europe, ALTEX
84 Towards alternative methods in education in Eastern Europe, ALTEX
85 Doctors Against Animal Experiments, Germany

Also of relevance is its work in Germany with young people. It maintains a website called “Harry Helps Animals” aimed at children and young people of 10 to 13 years [86], has created teaching materials related to animal testing, and offers animal welfare education in three regions of Germany where trained animal welfare teachers work in schools, focusing on animal testing.[87]

5.2.5 The European Society for Alternatives to Animal Testing (EUSAAT)

www.eusaat.org

The European Society for Alternatives to Animal Testing holds has held an annual conference which has been held since 1991 and is the oldest congress on alternatives to animal testing. The congress aims are to bring important stakeholders together to discuss the 3rs 3Rs and exchange scientific developments. 2013’s Congress, the 18th, will be held at the University of Linz, Austria. Previous years had sessions accredited and accepted for ‘further training’ although they were not specifically training sessions. However, during this year’s congress, a training course will be held for congress participants for the first time.

Although the congress itself is not restricted to replacement of animals, the two day training does centre on replacement and covers both theory and practice with a second day dedicated to practical training. This particular training is aimed at ‘students and young scientists (under 35 years), who are already participants of the 2013 congress. There are two days of training offered altogether. The first, where numbers are not limited includes lectures on validated and pre-validated alternative methods. The second has limited places (24) and includes three sessions of practical training on three different methods. The training is free but limited to two individuals per organisation. The training is aimed at this demographic because the organisers believe that funding for additional training is difficult for young researchers.[88]

5.2.6 The European Society of Toxicology In Vitro (ESTIV) (Europe)

http://www.estiv.org

“ESTIV is the leading organisation in Europe that strengthens the scientific network of in vitro toxicologists and promotes in vitro toxicology, both scientifically and educationally in all countries of Europe”.[89] Although one of its aims is to encourage “education and training in in vitro toxicology at all levels in Europe” no information about exact programmes could be found on its website.[90] Eurotox 2013 (conference for all the European societies of toxicology) will take place in September 2013 in Switzerland and will include educational courses, symposia and workshops.[91]

5.2.7 FRAME (Fund for the Replacement of Animals in Research)

http://www.frame.org.uk

86 Harry Hilft Tieren
87 http://www.aerzte-gegen-tierversuche.de/en/projects/school-project/235-project-for-young-people
88 http://www.eusaat.org/index.php/congress/2013/eusaat-2013-training-course
89 http://www.estiv.org/
90 http://www.estiv.org/general.html
91 http://www.eurotox2013.com/programme.html

Frame runs training schools in Experimental Design and Statistical Analysis of Biomedical Experiments. This training aims to provide postgraduate research scientists "with the tools they need to minimise the number of animals they use and maximise the data they obtain through their work".[92] The training is largely aimed at postgraduate researchers, though it is also open to other interesting individuals. While an important aspect of training, this training is focused on reduction and refinement rather than on training for replacement. During 2013, these courses took place in both Nottingham and Netherlands.

5.2.8 The Human Toxicology Project Consortium (HTPC)

http://humantoxicologyproject.org/

"HTPC is a multi-stakeholder coalition dedicated to accelerating the global implementation of a new paradigm in toxicity testing. Grounded in a mechanistic understanding of chemical-biological interactions, this systems-based approach will generate better data more efficiently on the potential risks of chemicals to humans and the environment".[93] HTPC is included because of its support of the November 2012 International Workshop on Current and Future Prospects of Alternative Methods for Cosmetics safety testing in Brazil. (See Humane Society International below.)

5.2.9 Humane Society International (HSI)

www.hsi.org/about/

Humane Society International is an animal protection organisation working to protect all animals – including "animals in laboratories, farm animals, companion animals and wildlife".[94] It supports many programs around the world and has offices in: Australia, Canada, Costa Rica, India, the UK and the, US. Of particular relevance to this report is its funding of various training programmes conducted by other organisations, and its work in Brazil. In November, HSI hosted Brazil's first "regulatory science workshop" which brought together scientists, authorities and cosmetics companies from Brazil and the rest of the world to "discuss the latest scientific and regulatory developments in the field of alternatives".[95] Brazil currently relies heavily on animal experiments and many much animal testing takes places (for example on in cosmetics) that are not required or even permitted in other countries".[96] The workshop built on earlier training organised by SeCAM and IIVS to provide practical training to government authorities and industry scientists. HSI claims that "already, Brazil has updated its cosmetics testing guidelines for the better" since the workshop.[97] Humane Society International has also partnered with IIVS in order to deliver training in China.[98]

92 http://www.frame.org.uk/page.php?pg_id=244
93 http://humantoxicologyproject.org/
94 http://www.hsi.org/about/
95 http://www.hsi.org/news/news/2012/10/brazil_cosmetics_workshop_101112.html
96 http://www.hsi.org/news/news/2012/10/brazil_cosmetics_workshop_101112.html
97 http://www.hsi.org/news/news/2012/10/brazil_cosmetics_workshop_101112.html
98 http://www.hsi.org/news/press_releases/2013/06/bcf_china_launch_062813.htm

5.2.10 International Society for In Vitro Methods (Invitrom), Belgium

www.invitrom.org

"INVITROM focuses on the promotion of, the development, the application and the acceptance of in vitro models in biomedical research."[99] It believes that believes that in vitro ""approaches, in combination with other, preferably animal-free, test methods may lead to effective new strategies and paradigms in toxicity testing for human risk assessment". IVITROM organises workshops and a congress promoting in vitro methods. In 2014, the 18th International Congress on in vitro Toxicology, will take place in the Netherlands during 2014 and will be organised in collaboration with The European Society of Toxicology In Vitro (ESTIV). The programme will be focused around the slogan "Making sense of in vitro methods" and will centre on how "new technologies can strengthen the interpretation and application of in vitro methods in toxicological research and risk assessment".[100] Young scientists are invited to present their work, and attendees are expected to come from academia, companies and organisations. A symposium, called "iIn Vitro Models: the Cell is the Limit" has also been organised for October 2013.

5.2.11 The Joint Research, Institute for Consumer Health and Consumer Protection (JRC-IHCP), Italy

http://ihcp.jrc.ec.europa.eu/our_institute

Based in Italy, the JRC-IHCP is part of the European Union's Joint Research Centre. Its mission is to "provide scientific and technical support to the EU policies for the protection of the interests and health of European citizens in the areas of food, consumer products, chemicals and public health."[101] It organised a four-days training and information exchange event for a delegation of the Chinese regulatory authorities in November 2012.[102] The European Union Reference Laboratory for alternatives to animal testing (EURL ECVAM) and European Commission Directorate-General for Health and Consumers (DG SANCO) took part in the information exchange, while scientists gave presentations. Practical training was also given.

5.2.12 1st Latin American Conference on Alternative Methods for Use of Animals in Education Research and Industry (COLAMA 2012)

COLOMA 2012 took place in Brazil in November 2012 in collaboration with InterNicheInterNICHE. The conference provided a forum for Latin American countries interested in alternative methods. Almost 200 people attended, including over 40 speakers and 12 supporting organisations.[103] Topics covered included:

- Ethical considerations, policies and laws regarding the use of animals in science and industry

99 www.invitrom.org
100 http://www.estiv2014.org/welcome.html
101 http://ihcp.jrc.ec.europa.eu/our_institute
102 http://ihcp.jrc.ec.europa.eu/our_activities/alt-animal-testing-safety-assessment-chemicals/alternative-methods-to-animal-testing-training-course-delegation-of-aqsiq
103 http://altweb.jhsph.edu/news/2012/COLAMA2012.html

- Alternative methods for teaching and training - Humane Education
- Animal welfare and refinement for high-quality science
- IV - Reduction and replacement of animal use in science and industry.
- According to SkinEthic (see below) more than 250 participants from 15 countries “underlined the soaring demand for alternative methods in all Latin America”.[104]

5.2.13 LATINFARMA 2013: 3Rs Alternatives in Pharmacology, Toxicology and Teaching Workshop

InterNicheInterNICHE, along with the Latin American Society of Pharmacology and the Cuban Society of Pharmacology, the Cuban Society of Toxicology and the Cuban Society of Laboratory Animals will host a four day symposium in Havana, Cuba during October 2012. Different Symposia and Workshops will be running in parallel, including a Workshop focused specifically on 3Rs Alternatives in Pharmacology, Toxicology and Teaching.[105]

5.2.14 LARF: The Analysis and Research Laboratory of Pathophysiology, Department of Experimental Medicine, University of Genoa, Italy

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

Larf LARF has been involved in in vitro experiments using the twenty years of experience of its staff in various fields of experimental pathology. Its activities are based around the belief that alternative methods can be very useful for the advancement of science for the benefit of human health. It focuses on research devoted to a range of study areas including: the construction of alternative models to animal testing for the evaluation of the biological potential of natural and synthetic chemical compounds; and standardisation and validation of in vitro models to use for the toxicological assessment of chemical compounds. It also offers some training and education. In April 2013, “Cell cultures, the alternative methods” was aimed at a mix of attendees including doctors, biologists, chemists, pharmacists, technicians and students. The course focuses focused on describing and demonstrating alternatives to animal testing and is was both theoretical and practical. Fees are were kept low as a result of sponsorship, meaning that the 2-day course only costs 60 Euros. Due to increased requests, courses have expanded to include 24.[106]. The course was initially run in 2008, again in 2010, then in November 2012, April 2013 and again in December 2013. According to Anna Maria Bassi, the research team is also involved in training courses for managers, corporate executives, lab technicians and researchers “interested in the acquisition of expertise and in-depth [knowledge] and comparison with industry experts”.[107] It should be noted that not all of LARF’s activities exclusively use alternative methods.[108]

104 http://www.skinethic.com/news00010931.asp
105 http://altweb.jhsph.edu/news/2012/LATINFARMA_2013.html
106 http://www.larf.unige.it/
107 Email from Anna Maria Bassi of larfLARF, 20/7/13
108 Email from Anna Maria Bassi of larfLARF, 20/7/13

5.2.15 Mahatma Gandhi-Doerenkamp Center (MGDC)

http://www.mgdcaua.org/

The Mahatma Gandhi-Doerenkamp Center (MGDC) was established in India by the Doerenkamp-Zbinden Foundation (DZF), Switzerland to motivate the teachers and students to take to “alternatives” in place of animals in life science education along the lines of the 3Rs principle. It was commended in the 2012 Lush Prize paper for its in vitro toxicology workshops. However, as it was framed within a wider 3Rs context rather than simply on replacement, the organisation could not be shortlisted. The organisation website includes details of courses in 2012, but not mentioneddoes not mention anything for 2013. Correspondence with the organisation indicates that it was active in 2013, but that the website had not yet been updated. No details were given on its 2013 activities in the correspondence.[109]

5.2.16 NC3Rs

www.nc3rs.org.uk

NC3Rs announced in February 2013, a boost of £1 million to help develop networks of shared resources to reduce and refine their animal use. The initiative supports the development of shared tissue banks, databases and equipment. Whilst this will result in the reduction of animal use, it is not a scheme focused on replacement. The NC3Rs’ Infrastructure for Impact awards launched in 2013 was aiming to fund infrastructure and resources and was encouraging applications including ‘resource sharing’, ‘data sharing’, ‘establishing networks’, and multi-user equipment.[110]

In June 2013, NC3Rs hosted training in Imaging Technology Development to “connect end users with technology developers in considering a number of technological challenges which, if addressed, could advance science and reduce reliance on animal models or improve animal welfare.”[111]

Clearly, while such collaborations and workshops are important, they do not fit the replacement only criteria for a Lush Award.

5.2.17 The New England Anti-Vivisection Society (NEAVS)

www.neavs.org

The New England Anti-Vivisection Society is an American organisation dedicated to “ending the use of animals in research, testing, and science education”. It does this through research, outreach, education, legislation, litigation and lobbying for policy change. In 2013, NEAVS offered 13 places to the 1st International Conference of Alternatives to Animal Experimentation which took place in Almada, Portugal. The places were for students wishing to pursue a career in alternatives to animal experimentation. NEAVS also operates a loan library, which includes software, manuals, charts, human curriculumscurricula, and animal resuscitation and

109 Correspondence from MGDC 2/8/2013
110 http://www.nc3rs.org.uk/news.asp?id=1906, February 2013
111 NC3Rs event, June 2013 http://www.nc3rs.org.uk/event.asp?id=1923

intubation models. See Ethical Science Education Campaign (ESEC) below at section 5.2.

5.2.18 People For Animal Rights, SATIS, Germany

www.satis-tierrechte.de

SATIS is a project of the People for Animal Rights in Germany. Its focus is on humane teaching methods. It is partnered with InterNiche InterNICHE and provides information on its website about alternatives as well as a German ethics university ranking.

5.2.19 SEURAT-1 Research Initiative

http://www.seurat-1.eu

The Seurat-1 Research Initiative was set up "to overcome the lack of scientific knowledge needed to implement alternative safety solutions" by the Health Theme of the Directorate General of Research and Innovation of the European Commission and Cosmetics Europe.[112] The Research Initiative, "Towards the replacement of in vivo repeated dose or SEURAT-1", has had joint funding by the European Commission and the Cosmetics Europe. SEURAT-1 was designed as "a cluster of seven projects: five complementary research projects, a central data management and servicing project, and a co-ordination and support project" and involves almost 100 scientists from over 70 European organisations.[113] Although training may not be its primary aim, it is organising "a training programme aiming at spreading knowledge on the scientific domains covered by this Research Initiative and the related ethical, industrial and regulatory matters. This training programme addresses young scientists, in particular research fellows from the organisations that are involved in this Research Initiative. When the capacity of the training courses allows it, they will also be opened to external participants."[114] The courses include a number of areas including: in vitro toxicity test systems;, modern concepts in toxicology, ; industry and regulatory requirements, ; ethical aspects, ; practica,l hands-on data analysis, ; and automation of stem cell culture. The training programme includes two types of training – summer schools, and hands-on lab training. The first summer school took place during June 2012 in Portugal and involved 100 young fellows from SEURAT-1 partners and external organisations.

The objective of hands on training "is to transfer skills and expertise to researchers already involved in SEURAT-1, potential future users and scientists from other research projects." The practical courses are particularly focused on "transferring knowledge about state of the art and leading edge technologies and operating procedures to the trainees".[115]

In June 2013, Seurat-1 with Tox21 (one of the largest US-based research initiatives in the field of animal-free safety assessment) came together for a three-day

112 http://www.seurat-1.eu/pages/background.php
113 http://www.seurat-1.eu
114 http://www.seurat-1.eu/pages/about-us/outreach.php
115 http://www.seurat-1.eu/pages/about-us/outreach.php

workshop to discuss opportunities for co-operation. Such collaborations are important to recogniseIt is important to recognise such collaborations.[116]

5.2.20 SkinEthic

www.skinethic.com

SkinEthic is a commercial company (owned by multinational L'Oreal) offering "the global science community – academic and industry – in vitro solutions for safety testing and efficacy profiling to support research and development activities." The organisation offers training sessions on its tissue models – on on-demand as well as customised training sessions, as required. Training sessions take place in its facilities in Lyon, France and are aimed at new users and trained in vitro professionals who need to be updated on current validated protocols. The one- and and-a a-half day training sessions run once a month in 2013 and are kept small – a maximum of 5 trainees. They include "hands-on training on in the validated methods for skin and eye irritation using 3D models". The training costs are 1000 Euros€1,000, inclusive of VAT.[117] Such costs may be prohibitive for some individuals and organisations.

5.2.21 VITA – Russia

www.vita.org.ru/english/english.htm

In 2010, the Russian animal rights organisation VITA organised a competition for students under the heading "research without animal suffering". The project was funded by the German Doctors Against Animal Experiments, VITA and InterNicheInterNICHE. Its website includes about a free free-to to-download film illustrating the alternatives to the use of animals within teaching.

5.3 Organisations educating young people about alternatives

Not all of the following organisations and resources were included in last year's report. They are all offering students a range of resources in alternatives to using animals in education. In the US, dissection of animals is an accepted teaching tool in schools and in colleges, particularly in the study of anatomy and physiology. In the American education system, "an estimated six million animals are dissected every year"[118], many of them being bred specifically for this purpose. Intervention at this level is crucial according to Dr Capaldo from NEAVs who, when interviewed in 2012 said: "Not all states allow dissection choices, even at high school levels, so from the very get-go, our message to budding scientists is that if you aren't willing to hurt or harm animals, then you may want to go into another field. So the work to get students [who want to do] ... progressive, non-animal research goes all the way back to sophomore year at high school when they were forced to do a frog or cat dissection in order to get into the next level of their biological studies".[119] Erin Hill of IIVS agrees, arguing that alternative methods to the use of animals within science

116 http://ihcp.jrc.ec.europa.eu/our_labs/eurl-ecvam/seurat-1-meets-tox21
117 http://www.skinethic.com/pageLibre000101a2.asp
118 http://www.animalearn.org/faq.php
119 Conversation with Dr Capaldo, NEAVS, 20/8/12

need to be introduced earlier within education.[120] The resources offered by BioLEAP and AnimalLearn and others are therefore essential for increasing awareness about these concepts and allowing and facilitating more potential scientists to achieve their educational goals without resorting to the dissection of animals. Young people in schools are the scientists and animal testers of tomorrow so any programme challenging the ethos of using animals in testing could be said to be creating the alternative researchers of tomorrow.

5.3.1 Animalearn

http://www.animalearn.org/

Animalearn is a website dedicated to fostering "awareness of and a respect for animals used in education". It is "dedicated to assisting educators and students to find the most effective non-animal methods to teach and study science".[121] Animalearn has created The Science Bank, which is a "lending program of new and innovative life science software and educational products that enable educators and students to learn anatomy, physiology, and psychology lessons without harming animals. Animalearn also provides humane education curricula and materials free of charge for educators and students." Included in the bank are books, brochures, videos and "the latest in high-tech, animal-friendly educational technology for the classroom".[122] It conducts workshops – for free – for educators wishing to implement the animal-free programs and products, and delivers presentations to students and student organisations. It also delivers presentations to classrooms. As with BioLEAP, all levels of education are covered, from elementary school and even pre-school, through to university levels, graduate level, veterinary school, and med school.

5.3.2 Ethical Science Education Campaign (ESEC)

The Ethical Science Education Campaign (ESEC) is the educational affiliate to NEAVS and operates an alternatives loan library. This offers advanced software, manuals, charts, humane curriculumscurricula, and animal resuscitation and intubation models. ESEC works to ensure all students can enter the field of science and be a part of the breakthroughs of today and tomorrow regardless of their ethics.[123]

5.3.3 National Anti-Vivisection Society (US)

www.navs.org

The National Anti-Vivisection Society (NAVS) (not to be confused with the UK organisation of the same name), is a US-based organisation "dedicated to ending the exploitation of animals used in science". The organisation "promotes greater compassion, respect and justice for animals through educational and advocacy programs based on respected ethical, scientific, and legal theory". In 1993, NAVS created an information resource known as the Biology Education Advancement Program (BioLEAP). It is now the most "comprehensive free lending library of

120 Conversation with Erin Hill 16/7/2013
121 http://www.animalearn.org/
122 http://www.animalearn.org/
123 http://www.neavs.org/resources/esecs-inventory-of-alternatives-to-dissection

alternatives to classroom dissection" and offers a "growing archive ... of state-of-the-art dissection alternatives to students, teachers, school boards and others".[124] Materials include "dozens of high-relief, three-dimensional plastic models, computer software programmes, colour transparencies, DVDs and other materials aimed at teaching biological principles without sacrificing the lives of animals".[125] The tools are aimed at all levels of education – from high school, right up until to post-graduate work and represent a selection of animals. BioLEAP enables students and educators who object to, and wish to avoid, dissection to do so while still fulfilling their academic requirements.

5.3.4 Royal Society for the Prevention of Cruelty to Animals (RSPCA) UK

http://www.science-ethics-animals.org.uk

The RSPCA has a dedicated website with a range of resources for use in schools to stimulate debate around animal cruelty – and including animal testing. A lesson plan is included and a number of factsheets are available to download: Ethics, Animal Experiments and the Law; Fundamental Research; Harm/Benefit Assessment; Humans and other Animals; Medical Research; Right or Wrong - Who Decides?; Safety Testing of Non-Medical Products; and Veterinary Research.[126]

Also see the German organisation, Doctors Against Animal Experiments, for its website aimed at young people.

5.4 Databases

The following organisations and databases were profiled in detail in the 2012 paper.

5.4.1 The International QSAR Foundation

http://www.qsari.org/

The organisation's mission is to "develop computerised tools as alternatives to animal testing". It has an '"online training program in QSAR methods and the QSAR application toolbox which has been developed by OECD member countries". "The training program is designed for scientists charged with developing safety assessments for chemical manufacturers and distributors as well as for those charged with evaluating submitted assessments for new chemicals or those already used in commerce".[127] There is no updated information on the QSAR Toolbox or trainings, with the last toolbox training workshop mentioned on the website taking place in Barcelona in February 2012.

The QSAR Toolbox Version 3.0 has been updated and the OECD will be releasing additional training material on its use.

124 http://www.navs.org/page.aspx?pid=416
125 http://www.navs.org/page.aspx?pid=416
126 http://www.science-ethics-animals.org.uk/page/index.cfm
127 Lush Prize Training Prize 2012, Research Paper, August 2012

5.4.2 Laboratory of Mathematical Chemistry (LMC)

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

As the developers of the QSAR toolbox, the LMC claims it is best placed to offer training. The organisation offers training on site (on demand), as well as regular annual training courses.[128]

5.4.3 Effectopedia

This "open source and free software is designed to fill the last remaining gap in the use of QSAR to estimate adverse effects of chemicals without additional animal testing".[129] No new information on Effectopedia was found since last year's paper.

5.4.4 ECVAM/Joint Resource Centre

The European Centre for Alternative Methods (EVCAM) is housed within the European Commission's Joint Research Centre (JRC). It acts "as a focal point for the exchange of information on the development of alternative test methods" and has a database on alternative procedures. During 2013 it updated "Thirty Questions and Answers related to Alternatives in Animal Testing". EURL EVCAM manages the following databases and has a Search Guide on Alternatives to Animal Testing:

- The DataBase service on ALternative Methods, DB-ALM
  A unique collection of data-sets "providing factual information (not only bibliographic references) presented as evaluated (and therefore ready-to-use) data sheets". It 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."[130]

- The Tracking System on Alternative Methods (TSAR)
  This tool is "aimed at providing 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".[131]

5.4.5 AnimAlt ZEBET – database for alternative methods to animal experiments

The German Federal Institute for Risk Assessment (BfR) was set up in November 2002 to strengthen consumer health protection. It is the scientific agency of the Federal Republic of Germany. The BfR also 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

128 http://oasis-lmc.org/products/software/toolbox/training.aspx
129 Lush Prize Training Prize 2012, Research Paper, August 2012
130 Lush Prize Training Prize 2012, Research Paper, August 2012
131 Lush Prize Training Prize 2012, Research Paper, August 2012

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.[132]

5.4.6 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”.[133] 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.”[134] For more details, see the 2012 report. There are no details of any developments during 2012/13.

5.4.7 Toxicology and Environmental Health Information

“The Toxicology and Environmental Health Information Program (TEHIP) maintains a comprehensive web site with access to resources produced by TEHIP and other government agencies and organisations. Its flagship resource is TOXNET, an integrated database system of hazardous chemicals, toxic releases and environmental health. TOXNET's use is supported by the TOXNET and Beyond Training Class Schedule and Workbook. The workbook corresponds to the one-day class TOXNET and Beyond: Using the National Library of Medicine’s Environmental Health and Toxicology Portal offered by the National Library of Medicine Training Center (NTC).”[135]

5.4.8 UC Davis Center for Animal Alternatives Information

The UC Davis Center for Animal Alternatives Information “gathers and disseminates information concerning animal alternatives. The Centre places special emphasis on disseminating information concerning models, computer programs, and other animal alternatives in education through every level of public and private education. It also seeks to provide investigators who use animals with information on the most current methods for improving all aspects of animal care during their work.”[136] There is no new information about developments during 2012/13.

5.4.9 Altweb Guide to Searching for Alternatives

Altweb, published by CAAT/The Johns Hopkins School of Public Health is the global portal for information on alternatives to animal testing on the internet “and beyond”. It

132 http://www.bfr.bund.de/en/education_and_training_on_alternative_methods_to_animal_experiments-62811.html
133 http://www.vero.org.uk/go3r-introduction.pdf
134 Lush Prize Training Prize 2012, Research Paper, August 2012
135 Lush Prize Training Prize 2012, Research Paper, August 2012
136 http://www.lib.ucdavis.edu/dept/animalalternatives/mission.php

is also home to the journal “Altex: Alternatives to Animal Experimentation”, the official publications of CAAT. It publishes its own search guide on its website, which it describes as a step-by-step approach to an alternatives search including databases, policies and regulations, and sample searches.[137]

5.4.10 Data Infrastructure for Chemical Safety (DiXa)

This project is another data based initiative which is “dedicated to developing and implementing a robust and sustainable service infrastructure for data from EU-funded research into non-animal tests predicting chemical safety”.[138] 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 offers a number of training courses and workshops. They include two online training courses, dissemination days, and a range of workshops and courses including this one in September 2013:

Chemical and Biological resources for Toxicology and Toxicogenomics: a 3 day course giving participants an overview of the chemical and biological resources available for researchers in the field of Toxicology and Toxicogenomics. It is aimed at researchers and scientists from academia and industry.

5.4.11 The Humane Society Veterinary Medical Association Alternatives in Education Database

http://alted.hsvma.org/

“The HSVMA's Alternatives in Education Database contains thousands of entries of alternatives to the harming or killing of animals for many levels of education.”[139] An advanced search option allows the user to search for an alternative by species, medium, discipline, educational level or a combination of these.

137 http://altweb.jhsph.edu/
138 DiXa poster on website: www.dixa-fp7.eu
139 http://alted.hsvma.org/