

Lush Young Researchers Prize 2012

Research Paper

1. Executive Summary

The Lush Prize aims to encourage young scientists to develop a career in toxicology without harming animals by offering £10,000 bursaries to allow them to advance in this area. In 2012 it is seeking nominations from keen young scientists with a desire to fund the next stage of a career focussed on an animal-test free future.

Methodology

After a review of the current regulations relating to animal testing, interviews were conducted with five representatives from the following organisations.

- Fund for the Replacement of Animals in Medical Experiments (FRAME):
- New England Anti Vivisection Society
- Center for Alternatives to Animal Testing
- National Centre for the Replacement, Refinement and Reduction of Animals in Research UK (NC3RS)
- People for the Ethical Treatment of Animals (PETA)

Opportunities and Obstacles

In one sense there are more opportunities for young researchers than ever before. This is partly because legislation such as the EU's directives has spurred research and released funds for developing alternatives. There is also an increasing belief that non-animal methods are scientifically superior to traditional testing involving animals.

However, there are still many obstacles including: prejudices, lack of funding compared to mainstream opportunities, obstacles to validation and lack of support for innovation.

Conclusions and Recommendations

What came out of the interviews clearly is that young researchers wishing to go into a career without ever using animals need to be determined, resourceful and tenacious. Many of the current awards and programmes are for 3Rs research rather than research specifically for replacement.

At the moment, the award is set at £10,000 for five students. On the positive side this allows the judges to spread the award among five people and so benefit a greater number of individuals. Funding five people also allows for a range of different types of projects (by the young researchers) to be funded. This means that the funding can be spread out to include some 'safe' options and some more radical, innovative ideas, which often find funding difficult to get.

On the negative side, when compared to other examples of young researcher awards, it is a small amount compared to many looking to support early stage high-level research.

£25,000 for two researchers may then be better – but may still not be sufficient for completion of research or programme. Alternatively, a higher award of £50,000 may attract MORE worthy nominations, and create more competition, because it is a more realistic sum of money when it comes to research.

2. Background to current animal test requirements

Animal testing for cosmetics products and ingredients happens throughout the world. Even though there are bans in some countries, according to Cruelty Free International, “over 80% of the world allows animals to be used in... cosmetics tests”.¹ Such tests involve a range of animals including rabbits, guinea pigs, mice and rats.

According to Cruelty Free International, there are three main reasons that animal tests may still be carried out:

- Regulators have not yet approved or accepted new non-animal tests
- Some cosmetics companies are selling products with innovative ingredients where they are still using traditional animal tests
- Governments in some countries are still allowing tests to take place.

Some countries, such as China, stipulate that companies do safety tests on animals.²

Tests still being used include:

- Repeated dose toxicity
- Reproductive toxicity
- Toxicokinetics
- Skin sensitisation
- Carcinogenicity.³

One way to eradicate animal tests is for companies to stop producing products using novel ingredients. According to a 2008 paper written by Thomas Hartung, now director of the Centre for Alternatives to Animal Testing, (CAAT) the European cosmetics industry alone represents “2,009 relatively profitable companies with €60 billion turnover”.⁴ He points out that the sector is characterised by “quick product exchange” which means that in Europe, 5,000 new products enter the market each year, 22,000 entering worldwide. According to Hartung, “400 new substances enter the market worldwide every year. The finished products have extremely short shelf-lives, with 25% of turnover made with products that have been on the market for less than 6 months.”⁵ Many of these may be food ingredients and chemicals already tested for other purposes, he points out.

2.1 Legislating against tests

In the EU, the animal testing of finished cosmetic products was banned in 2004, and in 2009, the testing of ingredients for cosmetics on animals was also banned. The 7th amendment to the EU Cosmetics Directive prohibits any animal-tested cosmetics being put onto the market in Europe after 2013. However, three animal tests, toxicokinetics,

¹ Cruelty Free International website, viewed 8th August 2012: <http://www.crueltyfreeinternational.org/>

² Conversation with Alistair Currie from PETA Monday 20th August 2012

³ Cruelty Free International website, viewed 8th August 2012: <http://www.crueltyfreeinternational.org/>

⁴ Hartung, T. (2008b). Food for thought ... on alternative methods for cosmetics safety testing. *ALTEX* 25, 147-162.

⁵ Food for Thought ... on the Economics of Animal Testing, *Annamaria A. Bottini*^{1,3} and *Thomas Hartung*^{2,4}
 EU Joint Research Centre, Ispra, Italy, IISD and 2IPSC / TRiVA,

repeated dose and reproductive toxicity, were considered to be harder to replace, and a “last minute compromise” to the directive provides that if alternatives aren’t available by the 2013 date, the European Commission could extend this deadline. A 2011 paper looking at the status and prospects of alternative methods concluded that: “it will take at least another 7 – 9 years for the replacement of the current in vivo animal tests used for the safety assessment of cosmetic ingredients for skin sensitisation”, although alternative methods may be able to give hazard information ahead of this. A timescale of 5 to 7 years was given for toxicokinetics to “develop the models still lacking to predict lung absorption and renal/biliary excretion, and even longer to integrate the methods to fully replace the animal toxicokinetic models”. No timescale at all was estimated for non-animal alternatives to the “systemic toxicological endpoints of repeated dose toxicity, carcinogenicity and reproductive toxicity”.⁶ This paper was criticised by BUAV as “incomplete and negative” with BUAV concluding that the “scientific case for an extension to the 2013 is not made out”.⁷

As well as the EU legislation, Croatia and Norway have also banned animal tests for cosmetics and ingredients, and “in 2015 Israel will also implement a ban.”¹ However, as Cruelty Free International point out:

*“In a global market it is important that all countries ban the practice to avoid animal testing simply being moved around the world to those countries with no effective laws”.*⁸

It is therefore clear that while companies are still intent on introducing new cosmetic products onto the market, if animal tests are to be replaced altogether, more needs to be done to develop non-animal methods of testing new ingredients – and getting those methods accepted and validated by companies and regulators. Getting young researchers involved in non-animal methods has been identified by the Lush Prize as a key element in making this change happen.

3. Methodology

In order to get an understanding of the issues, challenges, and opportunities facing young researchers in toxicology, a number of organisations and individuals were contacted. These included campaigning organisations, universities, toxicologists, funding bodies, toxicology societies, individual scientists and students. Not all those contacted replied or were willing (or had time) to be interviewed.

6 Alternative (non-animal) methods for cosmetics testing: current status and future prospects—2010, Arch Toxicol (2011) 85:367–485 DOI 10.1007/s00204-011-0693-2

7 BUAV Meeting the Deadline of the 2013 EU Marketing Ban, a Scientific Review of Non-Animal Tests for Cosmetics”

8 Cruelty Free International website, viewed 8th August 2012: <http://www.crueltyfreeinternational.org/>

Interviews were conducted with spokespeople from:

- **Fund for the Replacement of Animals in Medical Experiments (FRAME):**
Andrew Bennett, School of Biomedical Sciences, University of Nottingham Medical School and two PhD students, Richard and Louis.
- **New England Anti Vivisection Society (NEAVS), USA:** Dr Capaldo, President and Executive Director
- **Center for Alternatives to Animal Testing (CAAT),** Department of Environmental Health Sciences, John Hopkins Bloomberg School of Public Health: Joanne Zurlo, PhD Director of Science Strategy
- **National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3RS)**
- **People for the Ethical Treatment of Animals (PETA):** Alistair Currie, Senior Research & Campaign Coordinator

These interviews helped inform the following sections. A number of websites were also visited. All interviewees spoke to were based in either the US or UK. This means that much of the information in this report is most relevant to these countries. However, this does not mean that it isn't be applicable in other European countries or on other continents. Unfortunately, although individuals and organisations in other European countries were contacted, none of them were available to talk, or replied to correspondence.

4. Opportunities

According to interviews and extensive searches on the internet, there are more opportunities for young researchers than ever before.

*"The door is open to non-animal methods in a way that it wasn't a few years ago. Previously, those people who wanted to do it were pushing on a closed door, now the door is very much open. There are opportunities out there for people who want to develop expertise to get funding and to do good work which is a much improved situation to how it was a few years ago."*⁹ PETA

These opportunities have arisen for a variety of reasons. Firstly, legislation such as the EU's directives has spurred research and released funds for developing alternatives.

According to PETA,

*"it's important to acknowledge that the cosmetics directive ban has driven a lot of interest and attention on alternatives. The EU is putting a lot of money into the development of alternatives for cosmetics tests and the industry is also putting money into the development of alternatives"*¹⁰

⁹ Interview with Alistair Currie from PETA 20th August 2012

¹⁰ Interview with Alistair Currie from PETA 20th August 2012

According to a spokesperson from CAAT in the US, although there is not currently similar legislation, it's likely that the EU legislation will still impact on the US in terms of opportunities and development.

Secondly, there is an increasing belief that non-animal methods are scientifically superior to traditional testing involving animals. According to CAAT, a 2007 report¹¹

*“spurred a lot of movement within the toxicology community to say, ‘there’s got to be better science out there. We need to work on something that’s firstly going to be able to better predict what happens in humans, secondly, that uses fewer animals, and thirdly that’s financially feasible’.”*¹²

As a result, CAAT says that there have been some paradigm shifts and a push to put the development of alternatives onto the front burner. “The animal testing model is very old and it’s been knocking around for a long time” say PETA. “There is finally recognition that we can’t keep counting numbers of dead animals”.¹³

This shift in thinking has had a knock-on effect, creating more opportunities for those working within the area of toxicology, including young researchers. The opportunities to develop new models mean that there are both academic and personal rewards.

“Alternatives are such a breakthrough area” says one PhD student.¹⁴

For young researchers wishing to pursue a career *specifically* in animal-free toxicology and in “replacement’ methods, there are a number of different awards, prizes, bursaries and funding opportunities available to them. Awards range from small travel bursaries, to three years of full funding. The table overleaf includes the following: ¹⁵

11 TOXICITY TESTING IN THE 21ST CENTURY, A VISION AND A STRATEGY (2007): Committee on Toxicity Testing and Assessment of Environmental Agents, Board on Environmental Studies and Toxicology, Institute for Laboratory Animal Research, Division on Earth and Life Studies, NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES, THE NATIONAL ACADEMIES PRESS

12 Interview with Joanne Zurlo, Director of Science Strategy The Center for Alternatives to Animal Testing (CAAT), 13 August 2012

13 Interview with Alistair Currie from PETA 20th August 2012

14 Skype interview with FRAME laboratory including two PhD students, 21th August 2012

15 (this is not an exhaustive list but the most visible opportunities gleaned through a number of internet searches and websites)

Name of Award, prize or bursary	Organisation behind Award
3Rs Science Award	The European Partnership for Alternative Approaches to Animal Testing (EPPA)
Russell & Burch Award	Humane Society of the United States
Charles River Laboratories' Excellence in Refinement Award	Charles River Laboratories/ CAAT, (Johns Hopkins Center for Alternatives to Animal Testing)
David Sainsbury Fellowships	National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs).
NC3Rs Studentships	National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs).
LRI Innovative Science Award	The European Chemical Industry Council (Cefic), in conjunction with the Society of Environmental Toxicology and Chemistry (SETAC), the Association of European Toxicologists and European Societies of Toxicology (EUROTOX), the International Society of Exposure Sciences (ISES) and Chemical Week
Macquarie University Eureka Prize for Outstanding Young Researcher	Australian Museum/Macquarie University
Society for In Vitro Biology Young Scientist Award	Society for In Vitro Biology
Young Investigator award	British Toxicology Society
Colgate-Palmolive Postdoctoral Fellowship Award in In Vitro Toxicology	Society of Toxicology, sponsored by Colgate Palmolive
Scholarships alternatives to animal testing	Juliana von Wendt Fund, Finland

A fuller summary of these awards is available in the appendix.

The 3R's referred to are the 'replacement, reduction and refinement' of animal experiments. These are defined as follows:

- Refinement: minimise suffering and distress
- Reduction: minimise the number of animals used
- Replacement: avoid the use of living animals

Overall, although there is some funding is available for in vitro methods and for the 3Rs, it should be noted that there is no particular priority placed on 'replacement' over and above the other two Rs.

5. Challenges

Despite the increase in opportunities available to young researchers, there are still a substantial number of challenges.

5.1 Being put off entering in the first place

Some budding scientists may well be put off entering science, particularly toxicology, because of the issue of animal welfare. According to Dr Capaldo of NEAVS, not all states in the US have laws which guarantee students the right to choose alternatives to traditional animal dissection, so even at high school levels, students may be put off. “Our message to budding scientists is that if you aren’t willing to hurt or harm animals, then you may go into another field”.¹⁶ What this means, says Dr Capaldo, is that for students who don’t want to be harming animals, “by the time they’re getting to PhD programmes, they’re going to be more surrounded by people willing to use and harm animals” because these are the type of people who won’t have been put off at the high school level. “We had an epidemiologist who was told point blank that she would have to do rat research as part of her post-doc epidemiology programme or to not even bother applying”, even though she had chosen epidemiology specifically because she didn’t want to do animal research.

As Alistair Currie from PETA points out, it’s unlikely that “anyone gets into toxicology *because they’ve got a burning desire to test on animals*”. However, the issue is more likely to be whether or not they can avoid doing animal tests at some point in their career, and that may well be putting off potential researchers.

“There’s also the possibility that you might find that in some circumstances, is that even someone who is validating new methods may, on occasion, still find themselves in a situation where they have to be involved in animal tests for comparison. That’s likely to put a lot of people off... Forging an entire career in toxicology where you’re never involved in animal testing is much more challenging... what’s needed is enough options so that the people who are highly committed against animal tests feel that toxicology is something that’s open to them.” Alistair Currie, PETA¹⁷

5.2 Lack of funding

One of the biggest issues for young researchers is a general lack of funding. The UK’s main funding body for the 3Rs is the NC3RS. However, the total funding is still, according to some, a tiny fraction, and just a drop in the ocean of what’s really required. “If you take an equivalent body for another pot of research, they’d be getting a lot more funding than they are at the moment, and there would be a lot more awareness for it”, says Richard, a PhD student. “A lot of the funds get swallowed up by the menial tasks of a laboratory” points out Louis, another PhD student. “So much of the funds can go very quickly on general lab equipment and not be research specific to developing alternatives to testing on

¹⁶ Skype conversation with Dr Capaldo, 20 August 2012

¹⁷ Conversation with Alistair Currie, PETA, 20 August 2012

animals”. Both agree that developing alternatives and running a lab is costly.¹⁸

“One of the issues in toxicology is that people are highly motivated NOT to do any animal tests... but what may happen at the moment is that people may have good ideas about non-animal methods but they’re continually going to be seeking support for those, and funding for those.” Alistair Currie, PETA

There is also the issue that most of the funding available – worldwide – is being put towards all of the 3Rs, rather than focusing on replacement only.

“Realistically, we have to acknowledge that the 3Rs is the model that has been recognised as being a package which helps to solve the problem that no one likes animal experiments. Presenting things in terms of the 3Rs is uncontroversial. The reality is that a national centre for replacement is liable to get less money than a national centre for the 3Rs.” Alistair Currie, PETA

Dr Capaldo agrees that if more money was put into replacement, more progress might be made. “In 2012, there’s absolutely no excuse to continue to advocate the animal model in today’s biological sciences at all”, she says “There’s just no reason for it”. Like Alistair, she concludes that “institutions that give money to development won’t be given as much money if it was just ‘replacement’.” She points to CAAT in the US as being an example of an institution working on the 3Rs that might still be “comfortable with reducing the number of animals, or not making the end point terminal, rather than having that 100% commitment to replacement”. Dr Capaldo also points to the World Congress on Alternatives and Animal Use in the Life Sciences, which used to have a heavier emphasis on replacement than it has had recently.

“The first congress I went to did not have a table of a biomedical supply company that was advocating pygmy pigs to replace dogs. That’s ridiculous to say that this is where we want science to go – to trade off a less popular species that still has the same sentience, social needs and biology as another species. With that World Congress you’re starting to see that the industry has really grabbed onto the 3Rs and is using it as a little bit of a safety blanket to say that ‘we care about animal welfare’... The end point has to be to find the scientific methods that replace animal use because that’s the truly ethical position. Why would you consider reducing the number from 100 to 50 animals as an ethical accomplishment? It’s a step, but it’s not an accomplishment”. Dr Capaldo¹⁹

Ultimately, a lack of funding of alternatives – through whatever reasons, but including a diversion of the existing funding towards refinement and reduction – is likely to impact on young researchers, from the funding of academic programmes available to them, to the funding of entry-level posts within development companies.

5.3 Lack of opportunities

Another challenge – linked to a lack of funding – is a lack of opportunities for young researchers. CAAT concede that there are opportunities in the US – but there aren’t that many research programmes that are specifically focused on finding alternatives.

¹⁸ Interview with FRAME laboratory PhD students, and Andrew Bennett, Director, FRAME Laboratory, Nottingham School of Biomedical Sciences, University of Nottingham Medical School

¹⁹ Conversation with Dr Capaldo, 20 August 2012

“If a student really wants to work in that area, they would have to do a lot of background research. They’d have to apply to a programme that a specific investigator happens to have money for, and happens to want to bring someone on to work on a particular area. I would say that it’s not too widespread”. Joanne Zurlo, CAAT²⁰

According to NEAVS, in the US, there aren’t many companies working on alternatives, so a young researcher wishing to enter this field is going to struggle to find a company to work for that’s committed to the development of in vitro alternatives.

Many of the interviewees agreed that there are limited undergraduate programmes, PhD programmes and a lack of job opportunities post-degree. So, even though the NC3Rs has increased the number of awards it makes and has introduced the David Sainsbury’s fellowships for ‘exceptional early-career researchers’,²¹ young researchers might still find it a challenge to find an appropriate host organisation.

In the US, “there are few organisations focused on those types of research” says CAAT. “Toxicity testing is an applied science and there aren’t many academic programmes that are dedicated to applied science – especially in the sense of working on developing new test methods for toxicology”. What that means is that in the long-term,

“it’s not just about funding individual scientists it’s having a place for them to do that research – either at the graduate level, PhD level or post-doc level. The bottom line is that there really aren’t enough opportunities”.²²

5.4 Prejudices

Most of the interviewees talked to agreed that one of the obstacles facing young researchers in developing alternatives to animal tests is an establishment which may not be ready to change its way of working. “There’s a dogma – we must do it this way or tough” said Louis, one of the PhD students.²³ “There really is a status quo mentality” says Dr Capaldo “even though what they’re bringing into it is a fresh perspective”. The prevailing attitudes by many scientists – within academia at least, many agree is that “we do it that way because we’ve always done it that way”.

“Just because your lecturer, who’s about to retire, says that it’s the best way to do it, doesn’t mean that it IS the best way to do it. It’s just the way that he or she has always done it. There needs to be a shift towards ‘this is what we want to look at, now what’s the best way of doing it’.” Richard, PhD Student²⁴

Even though there is an increasing belief that non animal tests could be better science, there is still:

“A status quo old boy network that doesn’t want to give up their way of doing it, because it means learning new techniques, it means giving up their position of

20 Conversation with Joanne Zurlo, CAAT, 13 August 2012

21 David Sainsbury’s Fellowship Scheme: Guidance For Applicants. Downloaded August 2012 from NC3Rs website <http://www.nc3rs.org.uk>

22 Conversation with Joanne Zurlo, CAAT 13 August 2012

23 Skype Interview with FRAME laboratory students 21 August 2012

24 Skype Interview with FRAME laboratory students 21 August 2012

authority and power within a system when someone young comes in with an idea that's better science, faster science, more humane and less costly than the animal model. I think it's the same obstacles that any progressive young professionals face. I don't think it's any different". Dr Capaldo, NEAVS.²⁵

However, Dr Capaldo does have a solution to this:

"I think the solution for graduate students who want to do more progressive in vitro research is to find the granting agencies that will help bring money in [to an institution].... The key to changing institutions is bringing in grant dollars. When someone who wants to develop in vitro alternatives can show that they can bring in million dollar grants, then institutions are going to have to accept it. They're not going to turn money away even if they want to try to suppress a certain ideology". Dr Capaldo, NEAVS.

The young PhD students agree that it's quite hard to say "as a recent undergraduate" that things could be done in a different way, "a way that hasn't been done before – when people have thought that it's been working for decades. Trying to change people's opinions is quite hard".

Andrew Bennett points out that toxicologists in particular are quite resistant to change.

"There's a good reason for that, because whatever they do has to end up being approved", and the bodies doing the approving don't change easily. "So why would you set up a major programme using something novel and alternative if you had no idea whether or not it was going to be accepted?" Andrew Bennett, FRAME²⁶

And this brings us to the next challenge – that of validation.

5.5 Validation issues

Without exception, everyone interviewed for this report highlighted that the major issue that will affect all of toxicologists, including young scientists, is the difficulty of getting new methods validated by the regulatory bodies. Once a test has been developed, it needs to be proved suitable, that it's at least as good as the current tests using animals, can be validated and used by a lab anywhere in the world and have comparable or the same results. It also needs to be accepted by the various regulatory authorities that require data from those types of tests. So, even if you have science and innovation working to develop alternatives, a key issue is the problem of validation and international acceptance. There may be different attitudes to animal welfare, and regulators may not always appreciate the strengths of the new technologies. There is also a tendency for a level of conservatism – in that regulators know what animal tests do, because of their history. As long as tests aren't accepted by regulators, they're not going to get used, say PETA. "If you're developing good methods, that's the start, but you also need a process of validation and acceptance" and this requires a change in culture with the regulators.

"Alternative tests need to meet very rigid validation criteria. That's okay because that's what we want from science. We want to know that it's valid, predictable and reliable and that when we test something one time, we'll get the same result the

²⁵ Skype interview with Dr Capaldo, 20 August 2012

²⁶ Interview with Andrew Bennett, FRAME, 21 August 2012

next time we do it". Dr Capaldo, NEAVS²⁷

The problem with this, she says, is that the animal tests that are considered as 'gold standard' aren't themselves validated to the same degree.

Even though there were a lot of in vitro companies developing good and better alternatives,

"they started to lose faith because it took so long to get government or regulatory acceptance. Even once a test is validated there are no guarantees to the companies developing their tests that their product is going to be marketable and used". Dr Capaldo, NEAVS²⁸

5.6 Lack of funding specifically for innovation

When it comes to funding, as well as a general lack of funding for alternatives, interviewees also point to a lack of funding for innovation itself.

"If you're trying to develop something that's new, then there's an element of risk involved. There's always an element of 'is this going to work, is this going to be successful'. But the challenge is to continue getting funding, being able to innovate and to push out the envelope, and to do that continually must be a challenge – even though there is more money available than ever before". Alistair Currie, PETA

PETA itself does occasionally fund some research, and similarly only has the resources to fund "established" researchers.

"We're not going to be funding stuff in the early stages because there's simply going to be a risk that it's not going to work. Our interest is further down the line when we are more confident of the applicability or the likelihood of uptake of whatever we're funding".

This aversion to risk is not confined to PETA. Andrew Bennett from FRAME argues that some funding needs to be prepared to take risks. "It's got to be a bit blue skies, it's got to be prepared to fail". However, many funding programmes are "results-based" where "you have to succeed with your first grant or you're dead".

"You don't know if your bioreactor's going to work. You don't know if your bio-model is going to be good enough to replace animals. What you will hopefully do is make a step forward. It might be a big step or a small step, but you will still advance the science. That's what happens in all other branches of science, but with alternatives development, there's the practical end point so if you don't succeed in terms of producing a new model that people can use in the industry – then you're almost deemed to have failed". Andrew, Bennett, FRAME²⁹

Although some funding is available from companies, the risk element is still a factor.

"Companies effectively want a plug and play. They want a unit which they can use straight away. They don't want to do the sorts of things that Louis and Richard do – which is to get your primary cells, culture them, there's a limited supply. Even if the industry might realise that it might be a better alternative, the risks involved are far too great, so they'll stick with what they know". Andrew Bennett, FRAME³⁰

Alistair at PETA agrees.

27 Skype interview with Dr Capaldo, 20 August 2012

28 Skype interview with Dr Capaldo, 20 August 2012

29 Interview with Andrew Bennett at FRAME lab, 21 August 2012

30 Interview with Andrew Bennett at FRAME lab, 21 August 2012

“Businesses have a lot of different things to calculate... Anything new always carries an element of risk. You know if you’re investing in alternatives, that might not come off and you could be spending a lot of money and it might not work at the end of the day”. Alistair Currie, PETA³¹

6. Innovation

As mentioned in earlier sections, some of the funding, and some of the innovation is coming from the companies rather than from academia. It’s those companies who will benefit from alternative methods becoming validated. After all, in the long-run it will be cheaper and safer for them to use non-animal methods.

“Academics are not all that excited by applied toxicity testing, but the companies are because it’s going to make a big difference to them. There are some training opportunities – particularly for post-doc positions – to take people on to work on those particular areas”. Joanne Zurlo, CAAT³²

“Businesses need to innovate and move ahead to stay in a position of strength. They’re investing in non-animal methods NOT for PR reasons, but because in most cases, there’s going to be a pay off in terms of greater productivity for them in terms of costs”. Alistair Currie, PETA.³³

Zurlo argues that what’s important to drive innovation further is collaboration and partnership between industry and academia.

In the UK, the NC3Rs is trying to encourage more collaboration between disciplines, and to getting different communities that wouldn’t normally interact or work together to collaborate. It thinks that when those communities – such as toxicology and mathematical modellers – talk and share experiences, some breakthroughs could come.

Dr Capaldo says that individuals and think tanks are driving innovation, and points to the work of the not-for-profit US-based Institute for In Vitro Sciences Inc and the work of the late Bjorn Ekwall, MD PhD as being centres for innovation and development.

31 Interview with Alistair Currie, PETA, 20 August 2012

32 Skype interview with Joanne Zurlo, CAAT 13 August 2012

33 Interview with Alistair Currie, PETA, 20 August 2012

7. Importance of encouraging young science

All interviewees agreed that “everything should be done to encourage young researchers”. Everyone agrees that the more money is made available, the more likely scientists will want to work on it and the more opportunities there will be for young researchers.

“The more opportunities there are, the more we will get students involved in this area. It’s like anything else, if you build it they will come. If you build these programmes that are focused in these areas, then students will be interested in it because they’ll see a future in it. Everybody’s very focused now on what kind of a career they’ll have and what kind of a job they’ll be able to get so I think offering these types of opportunities and with potentially a future in an industry setting or even developing their own academic programme in this area... If there is an opportunity for funding, people will put their intellectual capacities into coming up with something... You always need to have the youth who have these ideas and hopes and dreams for the future. You need fresh ideas and youth is the best way to do that”. Joanne Zurlo, CAAT³⁴

If any progress is to be made in the long term, then young people need to be provided with resources, development and training early on so that they will take into account the 3Rs – and replacement – throughout their careers.

Many interviewees said that young scientists don’t always have the prejudices about animal testing being the ‘best’ way of doing things. Although some pointed out that the increasing recognition that animal models aren’t particularly predictive and that the scientific drive to find a better alternative does cut across generations.

“I don’t suppose anyone gets into science because they want to be counting bodies of dead animals. They want to be doing something which is effective, novel and clearly that’s a strong motivation for young researchers. The more opportunity that there is to see that their job won’t be doing grunt work poisoning mice, but actually doing creative work looking at the way things happen inside human bodies, that’s got to attract more people into the profession.” Alistair Currie, PETA³⁵

34 Skype interview with Joanne Zurlo, CAAT 13 August 2012

35 Interview with Alistair Currie, PETA, 20 August 2012

8. Conclusions and recommendations

What clearly came out of the interviews is that young researchers wishing to go into a career *without ever using animals* need to be determined, resourceful and tenacious.

“Really do an assessment of your personality because you do have to have a bit of a fighter in you. I don’t mean that in a belligerent way, but you have to be someone who understands that even in 2012, you’re going to be going against the grain a bit. You’ve got to get used to the fact that it may not always be an easy route”. Dr Capaldo, NEAVS.³⁶

As Alistair Currie has already pointed out,

“Forging an entire career in toxicology where you’re never involved in animal testing is much more challenging”.³⁷

Though there are some opportunities out there, young researchers may have to dig quite hard to find them. As the two PhD researchers told me, there isn’t much awareness of what PhD opportunities there were when they were undergraduates.

“I didn’t even know what people did in a research lab... I think there needs to be more publicity so that people know what research opportunities there are around that might be available to them. I don’t think it’s well enough publicised”³⁸.

Young researchers ‘going against the grain’ will also need to seek support and ‘find their friends’ says Dr Capaldo. This means researching the resources and funding opportunities both within the sciences and within animal protection organisations committed to scientific as well as ethical argumen.

It’s not enough, point out NC3Rs, to want to develop alternatives to testing on animals, if your research proposal is not based on good science. Alternatives need to have scientific credibility in order to get validation so alternatives need to be approached as a scientific challenge first and foremost – whatever the motivation is behind the work. PETA doesn’t think that science and campaigning are incompatible, but agrees that you need to make sure you’re scientifically credible to get anywhere, and to get funding. Any award for replacement – including the Lush award – needs to ensure that it goes to the best science, because that will enhance credibility and open more doors in the long run.

8.1 Next year’s award

Have we got it right? How should the money be distributed or directed?

This is the first year that the award has run, and therefore there are bound to be unforeseen issues that crop up. These are my thoughts as a result of having done the research for the Young Researcher award:

- Only 8 nominations were received for the Young Researcher award. Is this enough? If not, what could be done to attract more nominations next year?
- The low number of nominations may be down to a number of factors:

³⁶ Skype interview with Dr Capaldo, NEAVS 20 August 2012

³⁷ Interview with Alistair Currie, PETA, 20 August 2012

³⁸ Interview with FRAME laboratory PhD students – Richard and Louis

- Any award in its first year is new and won't have reached the consciousness of all the potential nominees. Hopefully the publicity of the awards themselves might create more interest in people and result in a higher number of nominations for next year.
- Is the category title limiting potential nominees? Perhaps it might be more apposite to change the award title to "Early Career Researcher" rather than just Young Researcher. This is more inclusive and allows for those researchers who may have changed disciplines or come into education later in life.
- The prize money could be a factor in putting off potential nominees. *See below.*
- Perhaps additional work could be done on trying to attract nominations. Some suggestions are included.

8.2 Money

At the moment, the award is set at £10,000 for five students. This has both advantages and disadvantages as far as I can see. They are as follows:

Positives

Allows the judges to spread the award among five people and so benefit a greater number of individuals. This is positive because it gives more people a boost to their career and more research topics a funding boost.

Funding five people also allows for a range of different types of projects (by the young researchers) to be funded. This means that the funding can be spread out to include some 'safe' options and some more radical, innovative ideas which often find funding difficult to get. Doing this will not "put all eggs in one basket" and perhaps lead to a greater chance of success – and possibly a greater chance of multiple successes.

Negatives

- It may be difficult to find five worthy winners. This is the launch year of the prize so it is hoped that next year will produce more nominations. However, despite the publicising and the contacting of a few key academics, only eight nominations were received. Not all of these eight were working within the field of toxicology (which was this year's theme) and some were more relevant to medical testing issues rather than that of cosmetic ingredient testing. This effectively means that there is very little competition for the award, and this could be problematic in terms of reputation and potential positive outcomes.
- The low prize money may be putting off some potential worthy winners.
- £10,000 may go further in some countries than others. This is both a positive and a negative!
- £10,000 may not be enough money to fund individuals to pursue their research idea full time and they may struggle to get match funding or additional funding to make up. Thus £10,000 may not be enough to be effective and could be no better than £0,000. *See summary below.*
- The low monetary value of the award may not fund the length of time that the research may require. Thus a number of projects may start with funding running out before the project can be completed.

Summary of how the award compares financially to other awards of posts at similar levels:

- **NC3Rs:** UK PhD studentships: **£30k** per annum for three years to cover: A student stipend in line with the UK Research Councils, fees, consumables, small items of equipment, travel costs.
- **NC3RS:** David Sainsbury's Fellowships: **£65K** per annum for three years to cover: salary of fellow, consumables, animal costs, equipment, travel costs.
- **Society of Toxicology** Colgate-Palmolive Postdoctoral Fellowship Award in In Vitro Toxicology/: Up to **\$44,000** for a year.
- **Wellcome Trust:** Research Fellowship: £250,000 over three years.
- **Post-doc fellowship in Berkeley, USA:** **\$38,496**
- **Post-doc career development fellowship, Leicester, UK.** **£26,022 - £27,078** for three years.
- **R & D Technician - Genetic Toxicology - North West:** £22K/£23K
- **Costs of PhD: Manchester University PhD (full-time)**
 UK/EU students (per annum): Low £6,600, Medium £12,300, High £17,800
 International students (per annum): Standard £15,700, Low £17,800, Medium £23,000, High £29,100
- **PhD (part-time)**
 UK/EU students (per annum): Low £3,300, Medium £6,150, High £8,900
 International students (per annum): Standard £7,850 Low £8,900, Medium £11,500, High £14,550
- **Daimler & Benz young scientist fellowship:** Annual funding sum is 20,000 Euros per fellowship. Because the Daimler and Benz Foundation wants to promote outstanding young scientists in the autonomy of their research, the use of the funds is placed at the fellowship holder's discretion. It can be used, according to the fellow's individual needs, for financing computers or technical equipment, scientific assistants, research travel, or for participation in conferences. Only printing costs and expendable items are excluded.

Therefore in comparison with most awards £10,000 is a small amount. It also does not offer much security, particularly if it is to cover salary/stipend plus laboratory costs. So then what? Is the work sustainable? Will some research start and then have to finish? Will they have to apply for further funding?

£25,000 for two researchers may then be better – but may still not be sufficient for completion of research or programme. Or perhaps have some further funds set aside to give to previous winners to continue their work. Alternatively, a higher award of £50,000 may attract MORE worthy nominations, and create more competition, because it is a more realistic sum of money when it comes to research. It may mean that a research project is able to continue for multiple years – leading to a greater chance of success.

One suggestion could be to award only one prize in this category per year and make it specifically for potential PhD projects. Or just for a post-doc position for two years?

The Lush award administrators may therefore want to consider the sustainability of the prize and resulting research and consider whether this is a higher priority than spreading funds across different research ideas.

9 Resources & selected bibliography

Selected list of websites of organisations and documents used to help inform this report

Alternative (non-animal) methods for cosmetics testing: current status and future prospects—2010

Arch Toxicol (2011) 85:367–485, Received: 21 February 2011 / Accepted: 3 March 2011 / Published online: 1 May 2011, S Adler et al.

Alternatives Research and Development

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

Description: The mission of the Alternatives Research and Development Foundation is to fund and promote the development, validation and adoption of non-animal methods in biomedical research, product testing and education

Alttox

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

Description: AltTox.org is a website dedicated to advancing non-animal methods of toxicity testing through online discussion and information exchange.

LIFE SCIENCE TECHNOLOGIES, Animal-Free Toxicology: Sometimes, in Vitro is Better

Website: http://www.sciencemag.org/site/products/lst_20120302.xhtml
 LIFE SCIENCE TECHNOLOGIES 02 March 2012

Björn Ekwall Memorial Foundation

Website: <http://www.bemf.eu/>

Description: The Scandinavian Society for Cell Toxicology (SSCT) established the Björn Ekwall Memorial Foundation in 2001. The main goal of the BEMF is to honour the memory of Dr. Björn Ekwall by giving a reward to the scientists who have substantially contributed to the field of cell toxicology, e.g. by developing new in vitro tests, or via mechanistic or validation studies.

British Toxicology Society

Website: <http://www.thebts.org/>

Description: The BTS is a learned society for toxicologists in the UK and represents the interests of approximately 1,000 members.

The Campaign to End All Animal Experiments/ BUAV

Website: <http://www.buav.org/>

Description: British campaigning organisation with a vision to “create a world where nobody wants or believes we need to experiment on animals”.

Cruelty Free international

Website: <http://www.crueltyfreeinternational.org/>

Description: Cruelty Free International is the global campaign to end animal testing for cosmetics. We are calling on governments and regulators around the world to introduce a ban on the testing of animals for cosmetic products and ingredients.

Dr Hadwen Trust for Humane Research

Website: <http://www.drhadwentrust.org>

Description: The Dr Hadwen Trust for Humane Research (DHT) is the UK's leading medical research charity that funds and promotes the development of techniques and procedures to replace the use of animals in biomedical research and testing.

European Consensus-platform for Alternatives/Ecopa

Website: www.ecopa.eu

European Centre for Ecotoxicology and toxicology of chemicals

website: <http://www.ecetoc.org/>

Description: ECETOC is Europe's leading industry association for developing and promoting top quality science in human and environmental risk assessment of chemicals.

EUROECOTOX

Website: <http://www.euroecotox.eu/>

Description: Euroecotox is a European Network established to promote the integration of European activities on the replacement and reduction of animal experiments in ecotoxicology.

The European Partnership for Alternative Approaches to Animal Testing (EPAA)

Website: http://ec.europa.eu/enterprise/epaa/index_en.htm

Description: A voluntary collaboration between the European Commission, European trade associations, and companies from seven industry sectors. The partners are committed to pooling knowledge and resources to accelerate the development, validation and acceptance of alternative approaches to further the replacement, reduction and refinement (3Rs) of animal use in regulatory testing.

Food for Thought ... on the Economics of Animal Testing

Annamaria A. Bottini and Thomas Hartung,
EU Joint Research Centre, Ispra, Italy, 1ISD and 2IPSC / TRiVA, European School of Economics, Milan, Italy, Center for Alternatives to Animal Testing, Johns Hopkins University, Baltimore, USA

Food for Thought ... on Alternative Methods for Cosmetics Safety Testing

Thomas Hartung, Altex 25, 3/08

Fund for the Replacement of Animals in Medical Experiments (FRAME)

Website: www.frame.org.uk

Description: FRAME's ultimate aim is the elimination of the need to use laboratory animals

in any kind of medical or scientific procedures. FRAME is dedicated to the development of new and valid methods that will replace the need for laboratory animals in medical and scientific research, education, and testing.

Group for the Education of Animal-Related Issues (GEARI)

Website: <http://www.geari.org/>

Description: GEARI is a non-profit, educational group dedicated to assisting you in your search for animal rights related information as well as to raising awareness to the many issues affecting other-than human animals, the environment and human health.

Human Society of the United States

Website: <http://www.humanesociety.org/>

Description: The Humane Society of the United States is the nation's largest and most effective animal protection organization. We help animals by advocating for better laws to protect animals; conducting campaigns to reform industries; providing animal rescue and emergency response; investigating cases of animal cruelty; and caring for animals through our sanctuaries and wildlife rehabilitation centers, emergency shelters and clinics.

Institute for In Vitro Sciences

Website: <http://www.iivs.org/>

Description: The Institute for In Vitro Sciences, Inc. is a non-profit research and testing laboratory dedicated to the advancement of in vitro (non-animal) methods worldwide.

In Vitro Jobs

Website: <http://www.invitrojobs.com/>

Description: Many researchers have a strong interest in animal-free research, but find information on institutions and research groups who use animal-free methods hard to come by.

InVitro Jobs was set up by People for Animal Rights (Menschen für Tierrechte - Bundesverband der Tierversuchgegner) in Germany. The aim is to enable researchers to access animal-free research easily. The site includes an up-to-date list of research groups active in the development of animal-free techniques and, job vacancies. The site also aims to provide students with the opportunities to contact research groups to obtain information for their studies and to promote co-operation, networking and the exchange of ideas between researchers.

John Hopkins University Centre for Alternatives to Animal Testing (CAAT)

Website: <http://caat.jhsph.edu/>

Description: We believe the best science is humane science. Our programs seek to provide a better, safer, more humane future for people and animals.

Meeting the Deadline of the 2013 EU Marketing Ban A Scientific Review of Non-Animal Tests for Cosmetics, BUAV 2011

National Anti Vivisection Society (NAVS)

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

Description: The NAVS group is comprised of four NGOs working to end the suffering of animals: the National Anti-Vivisection Society; Animal Defenders International; the Lord Dowding Fund for Humane Research; and the Animal+World Show.

Lord Dowding Fund: The objectives of the Lord Dowding Fund for Humane Research are to support, sponsor, and fund better methods of scientific and medical research for testing products and curing disease, which replace the use of animals. To fund areas of non-animal fundamental research which lead to the adoption of non-animal research methodology.

The National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs)

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

Description: The National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) is an independent scientific organisation, tasked by the Government with supporting the UK science base through the application of the 3Rs. We are also the UK's largest funder of 3Rs research.

NC3Rs is also behind: www.crackit.org.uk an innovative programme from the NC3Rs designed to replace, reduce and refine (the 3Rs) the use of animals in research. It includes a funding competition for research and development to solve 3Rs Challenges identified with sponsors from the industrial and academic sectors, and a technology partnering hub to accelerate the sharing, validation and uptake of potential 3Rs methods.

The New England Anti-Vivisection Society (NEAVS)

Website: <http://www.neavs.org/>

Description: US-based animal advocacy organization, whose mission is to end the use of animals in research, testing and science education and replace it with scientifically superior and humane non-animal alternatives. NEAVS advocates for all animals in laboratories and classrooms through education, public outreach, legislation, policy change, and legal action. *The organisation is closely affiliated with American Fund for Alternatives to Animal Research (AFAAR)*

Platforms and Funds for Alternatives to Animal Experimentation, Live Kleveland

A report from The Norwegian Reference Centre for Laboratory Animal Science & Alternatives, Norwegian School of Veterinary Science, Oslo, Norway 2005

Web address: <http://oslovet.norecopa.no/platform/report/ecopaplatforms.pdf>

Progress without pain - Juliana von Went Fund for Research Without Animal Experiments

Website: <http://www.jvws.org/>

Juliana von Wendt Fund, founded in 1971, is a Finnish charity, which supports humane methods of scientific and medical research. The Fund awards yearly grants to Finnish researchers developing and applying non-animal methodology in a wide range of fields including toxicity testing, cancer research, surgery, antibody production, computer assisted drug modelling, tissue culture techniques, higher education etc. Methods replacing exceptionally harmful use of animals are prioritised, as well as projects which are most

relevant for human or animal welfare. From 1996 onwards the Fund has awarded The Scandinavian Research Prize for Alternatives to Animal Experiments together with the funds of Sweden and Denmark.