



Pioneering Better Science

Are 3Rs Centres making a difference?

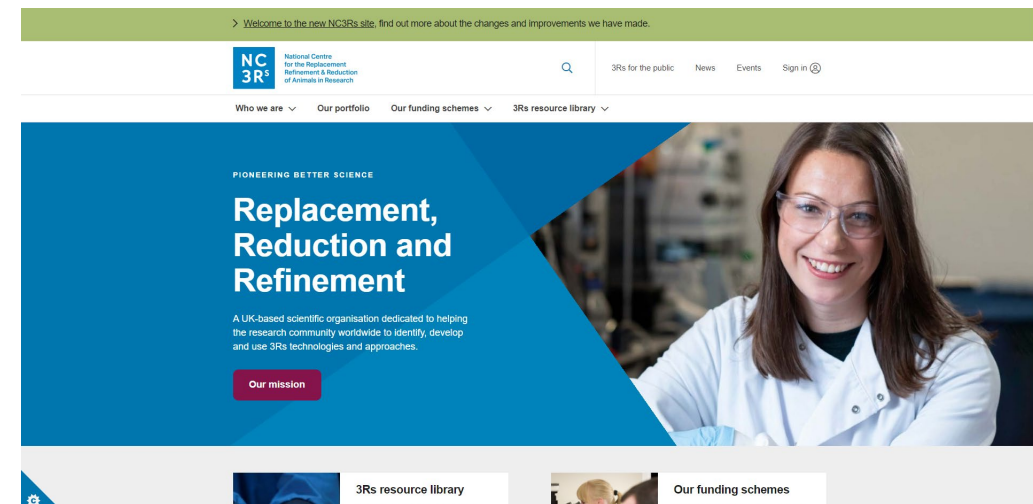
A personal perspective

Dr Elliot Lilley
NC3Rs

NORECOPA Annual Meeting, 4 June 2024

NC3Rs – the UK's national centre for the 3Rs

- Established in 2004, following House of Lords review, to accelerate the development & uptake of the 3Rs
- Work with industry, academia, regulators & funders – not just UK, but also with collaborators in Europe, North America & Asia
- Remit includes any area of animal use for research purposes
- Team based in London, plus regional staff
- Budget ~ £10 million p.a.
- Independent Board
- Reviewed every five years



3Rs definitions in 1959

Replacement: Avoiding or replacing the use of animals in experiments where they otherwise would have been used:

Absolute: human tissue, established cell lines, computer models

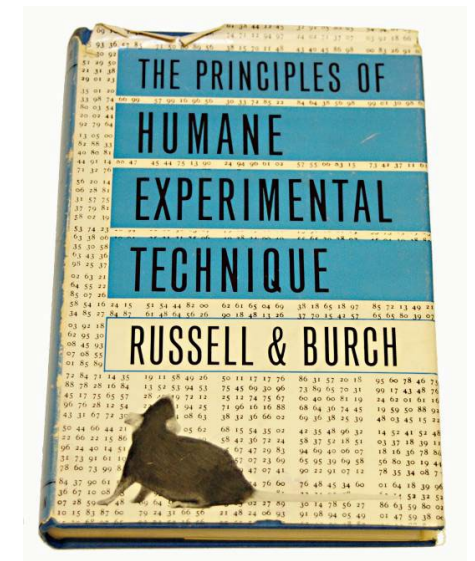
Relative: invertebrates, early forms of vertebrates, (non-regulated)

Reduction: Minimising the number of animals used in an experiment consistent with scientific aims

Refinement: Minimising the pain, suffering, distress or lasting harm that lab animals might experience e.g. by giving pain relief, providing appropriate caging, training animals to cooperate with procedures.



Rex Burch and Bill Russell



The 3Rs

A continuum

- Ultimate goal is replacement
- Refinement and Reduction should always be considered.
 - Reducing impact on animals on the way towards full replacement
 - Aggregation of marginal gains

Should not be viewed in isolation

- Refinement can lead to reduction
 - Statistical power has an inverse square relationship to noise (variation).
 - Poor welfare can be a source of variation in animal research
 - Improving welfare has greater impact than increasing sample size
- Refinement can lead to replacement.
 - Mechanistic models with biomarker-driven experimental and humane endpoints can reduce suffering and point the way towards cell-based alternatives

Where do the 3Rs stand?

The goals:

- the 3Rs are an integral part of mainstream biosciences
- there is active participation from scientists at all levels and in all sectors, because of recognition of the scientific value of the 3Rs
- there is sustained and real progress in 3Rs technologies that is translated into action (policy, practice and regulations)
- there is greater willingness to critique the existing models and approaches

How are we doing?



Where do the 3Rs stand?

The goals:

- the 3Rs are an integral part of mainstream biosciences (7/10)
- there is active participation from scientists at all levels and in all sectors, because of recognition of the scientific value of the 3Rs (5/10)
- there is sustained and real progress in 3Rs technologies (8/10) that is translated into action (policy, practice and regulations) (5/10)
- there is greater willingness to critique the existing models and approaches (5/10)

Could do better



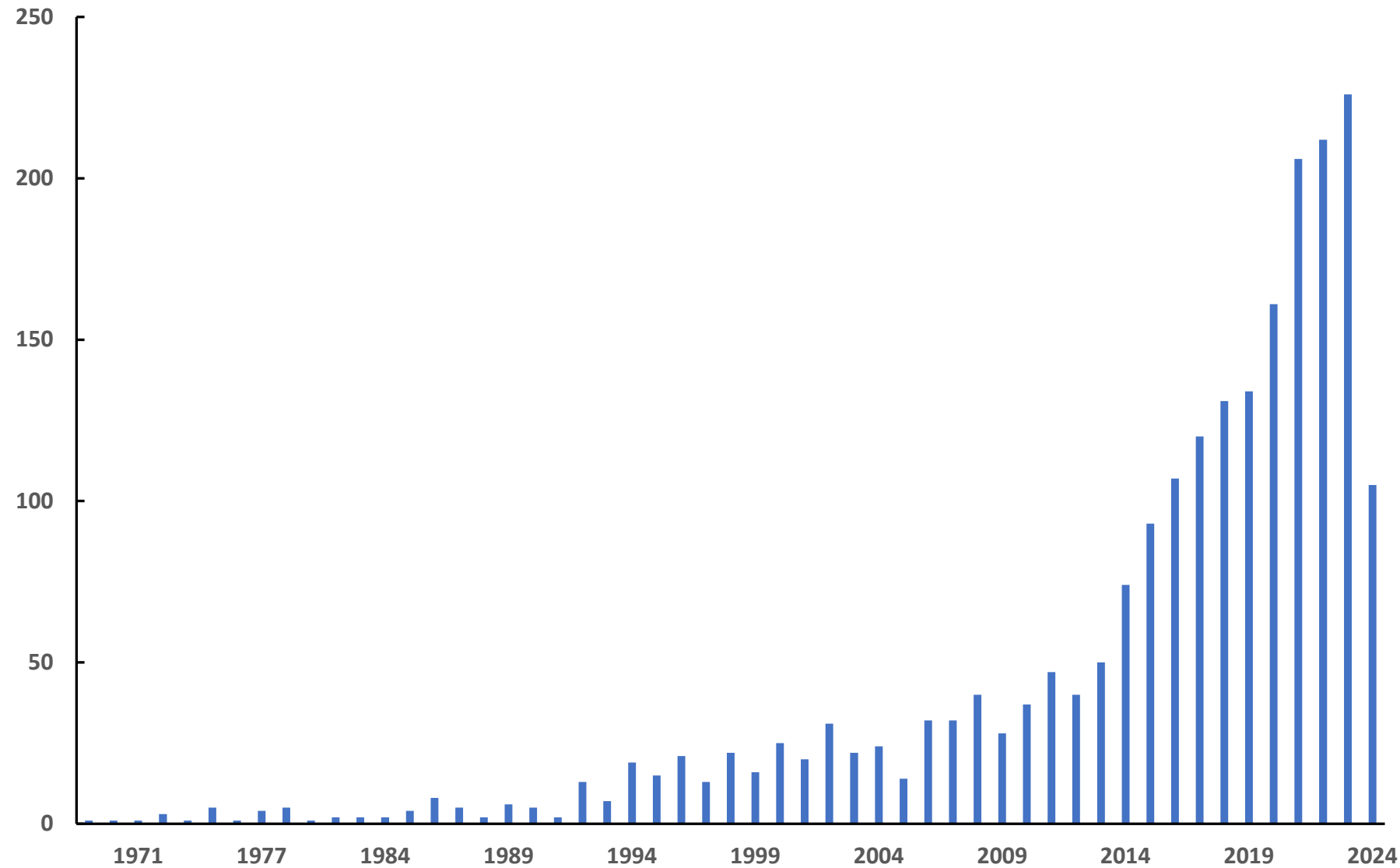
Not universally accepted....

“Please no. the 3Rs is not the accepted global religion of biomedical research. Some people, me included, think it is nonsense. It certainly has NOTHING to do with science and if it is to be policed then this should be at the level of regulators (HO etc) not journals. The best way to comply with 3Rs is to get out of the lab and do something else.”

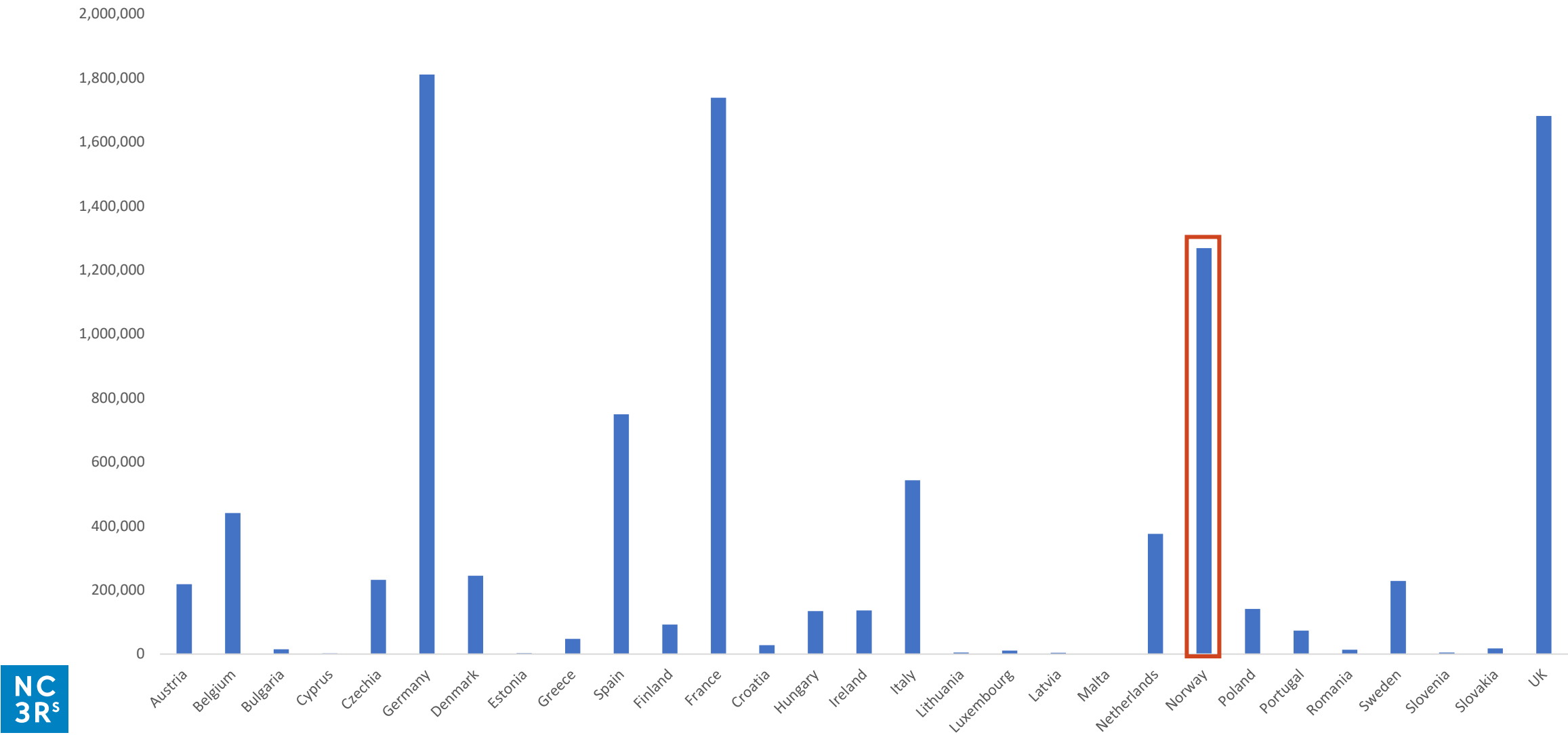
Not universally understood....

“I ‘do’ reduction: I throw compounds at my model until I see something interesting and then increase the ‘n’ until I can put a star on the graph – I use the fewest number of animals possible”

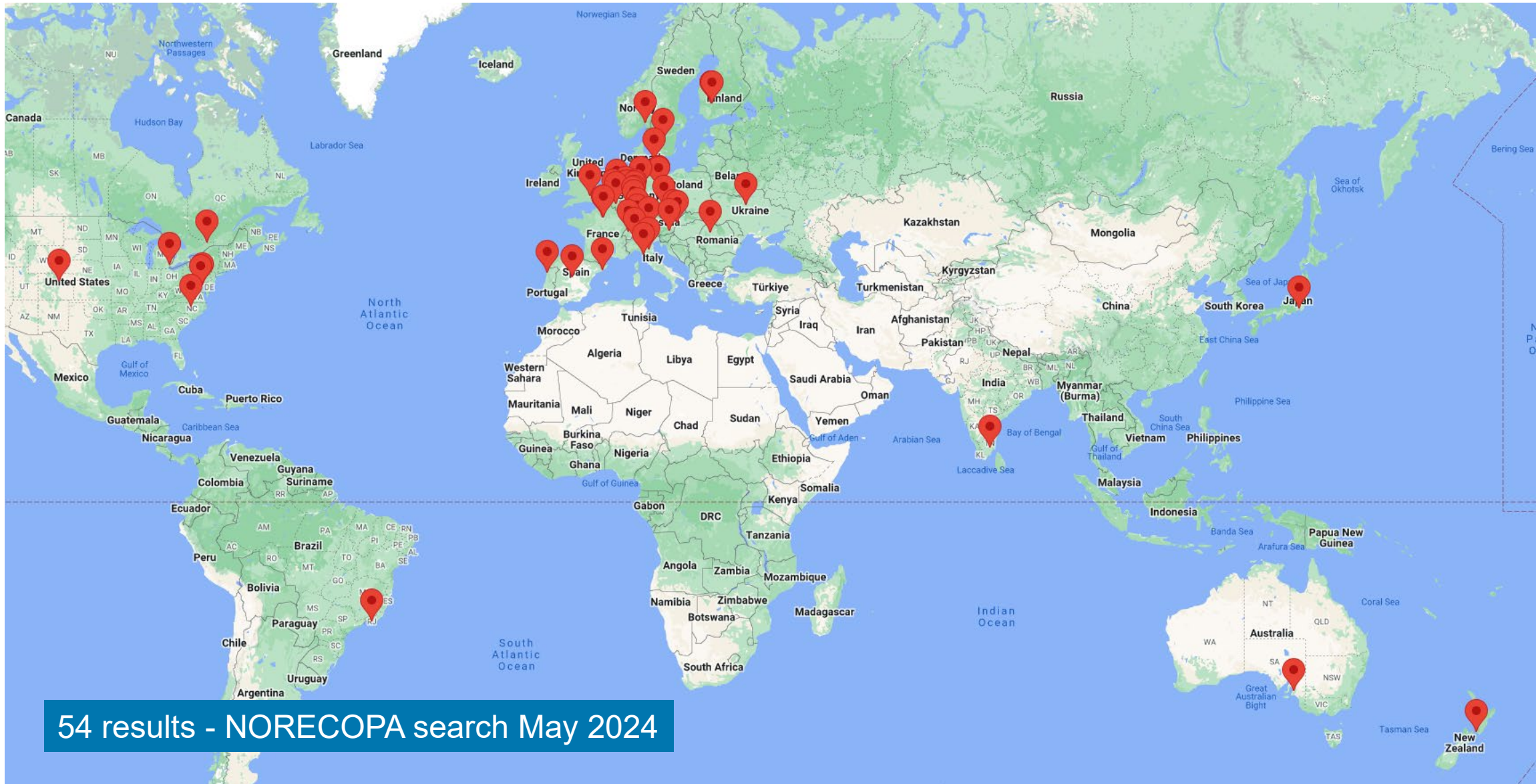
3Rs in the literature



Numbers of animals used for the first time for research, testing, routine production and educational purposes by Member State (2019)



Worldwide 3Rs centres – NORECOPA May 2024



The Rise of Three Rs Centres and Platforms in Europe*

Alternatives to Laboratory Animals
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Abstract

Public awareness and discussion about animal experiments and replacement methods has greatly increased in recent years. The term 'the Three Rs', which stands for the Replacement, Reduction and Refinement of animal experiments, is inseparably linked in this context. A common goal within the Three Rs scientific community is to develop predictive non-animal models and to better integrate all available data from *in vitro*, *in silico* and omics technologies into regulatory decision-making processes regarding, for example, the toxicity of chemicals, drugs or food ingredients. In addition, it is a general concern to implement (human) non-animal methods in basic research. Toward these efforts, there has been an ever-increasing number of Three Rs centres and platforms established over recent years — not only to develop novel methods, but also to disseminate knowledge and help to implement the Three Rs principles in policies and education. The adoption of Directive 2010/63/EU on the protection of animals used for scientific purposes gave a strong impetus to the creation of Three Rs initiatives, in the form of centres and platforms. As the first of a series of papers, this article gives an overview of the European Three Rs centres and platforms, and their historical development. The subsequent articles, to be published over the course of ATLA's 50th Anniversary year, will summarise the current focus and tasks as well as the future and the plans of the Three Rs centres and platforms. The Three Rs centres and platforms are very important points of contact and play an immense role in their respective countries as 'on the ground' facilitators of Directive 2010/63/EU. They are also invaluable for the widespread dissemination of information and for promoting implementation of the Three Rs in general.

Keywords

3R, 3Rs, EU3Rnet, NAM, NAMs, new approach methodologies, novel approach methodologies, non-animal methods

The Current Status and Work of Three Rs Centres and Platforms in Europe*

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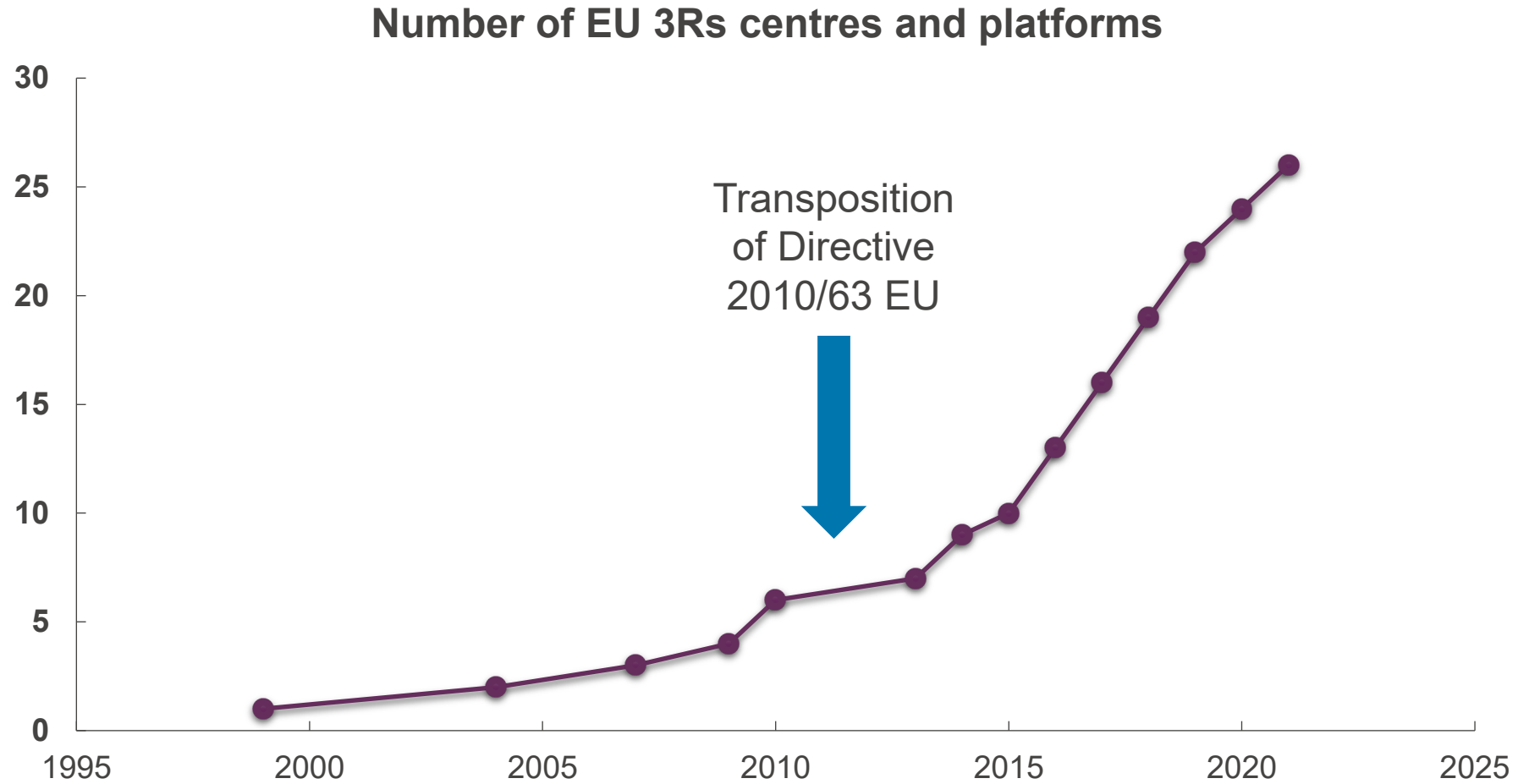
Abstract

The adoption of Directive 2010/63/EU on the protection of animals used for scientific purposes has given a major push to the formation of Three Rs initiatives in the form of centres and platforms. These centres and platforms are dedicated to the so-called Three Rs, which are the Replacement, Reduction and Refinement of animal use in experiments. ATLA's 50th Anniversary year has seen the publication of two articles on European Three Rs centres and platforms. The first of these was about the progressive rise in their numbers and about their founding history; this second part focuses on their current status and activities. This article takes a closer look at their financial and organisational structures, describes their Three Rs focus and core activities (dissemination, education, implementation, scientific quality/translatability, ethics), and presents their areas of responsibility and projects in detail. This overview of the work and diverse structures of the Three Rs centres and platforms is not only intended to bring them closer to the reader, but also to provide role models and show examples of how such Three Rs centres and platforms could be made sustainable. The Three Rs centres and platforms are very important focal points and play an immense role as facilitators of Directive 2010/63/EU 'on the ground' in their respective countries. They are also invaluable for the wide dissemination of information and for promoting the implementation of the Three Rs in general.

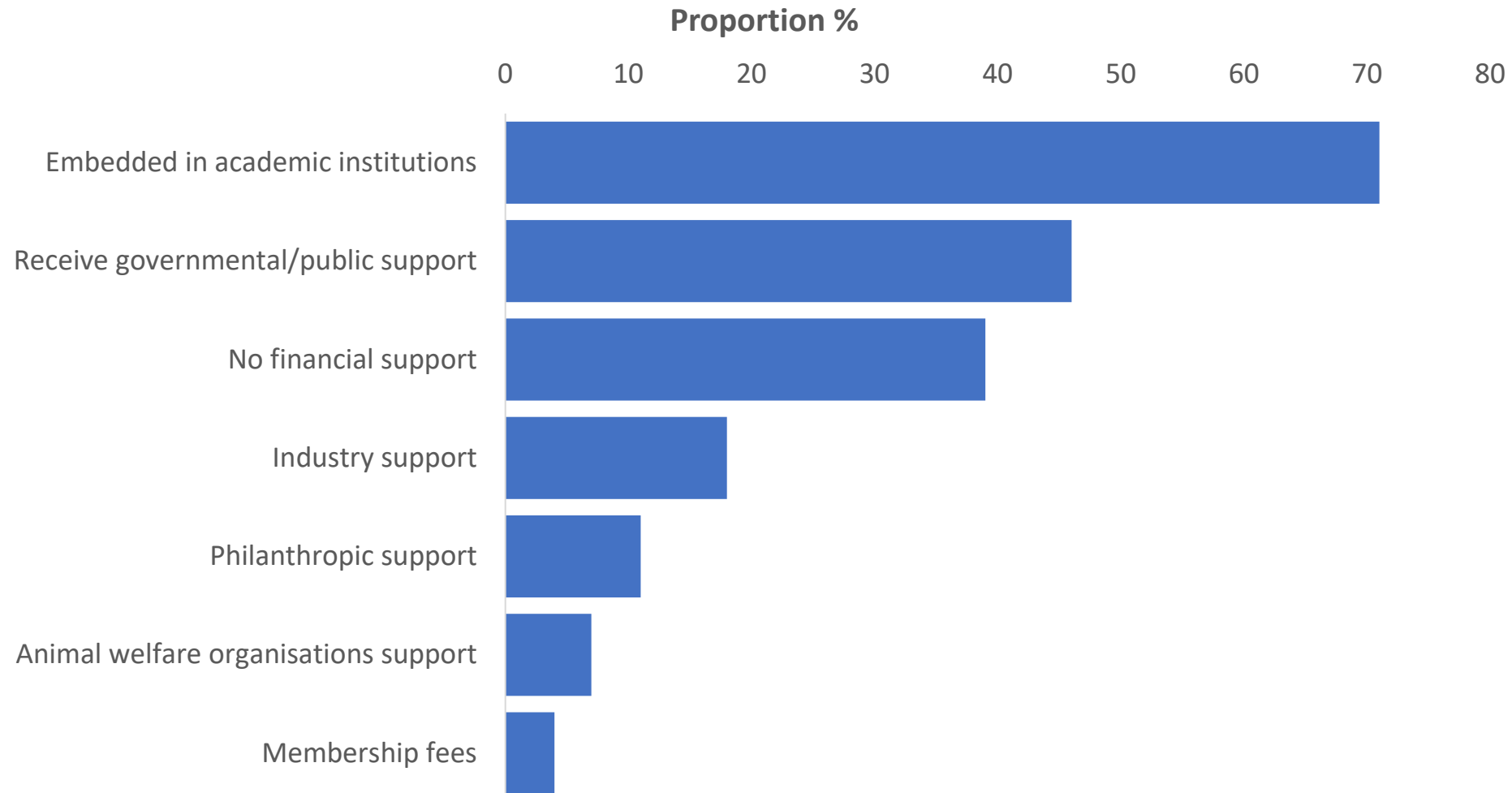
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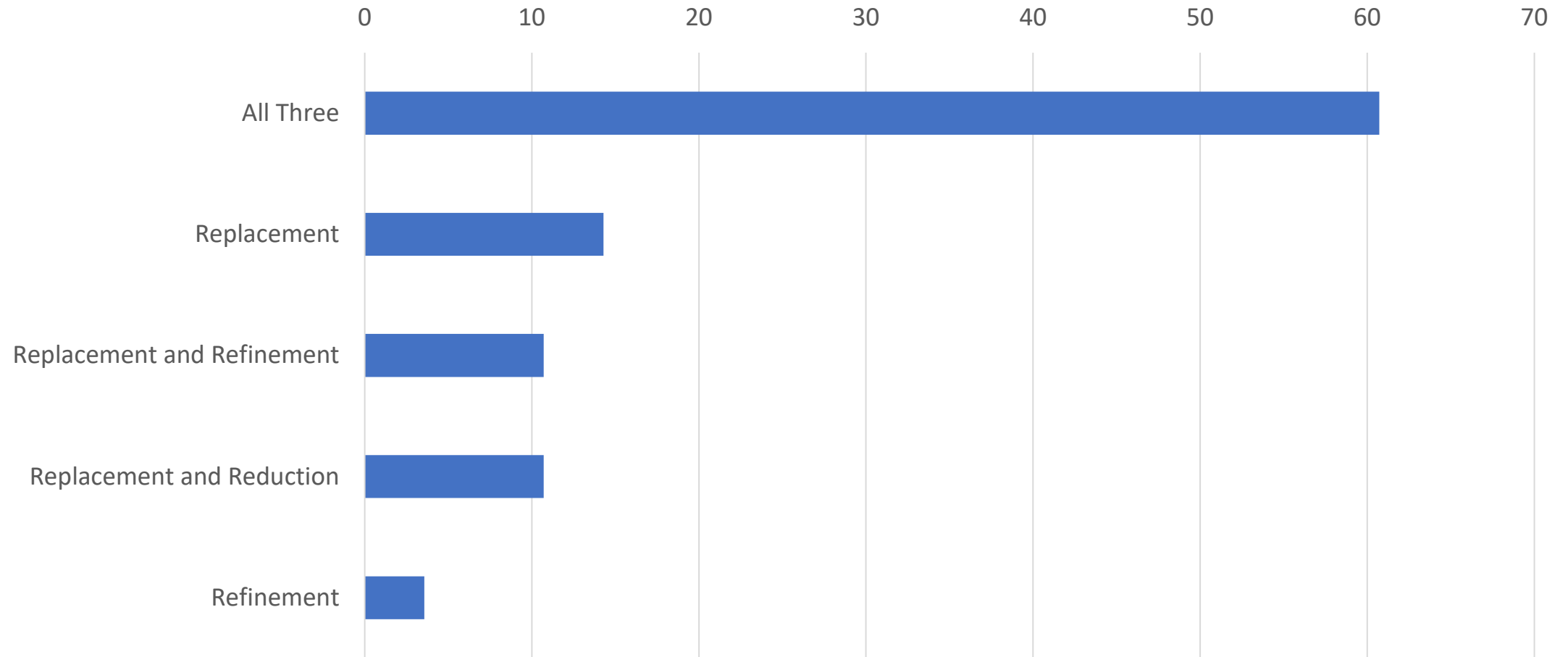
EU centres/platforms



Financial backing and support of the Three Rs centres and platforms

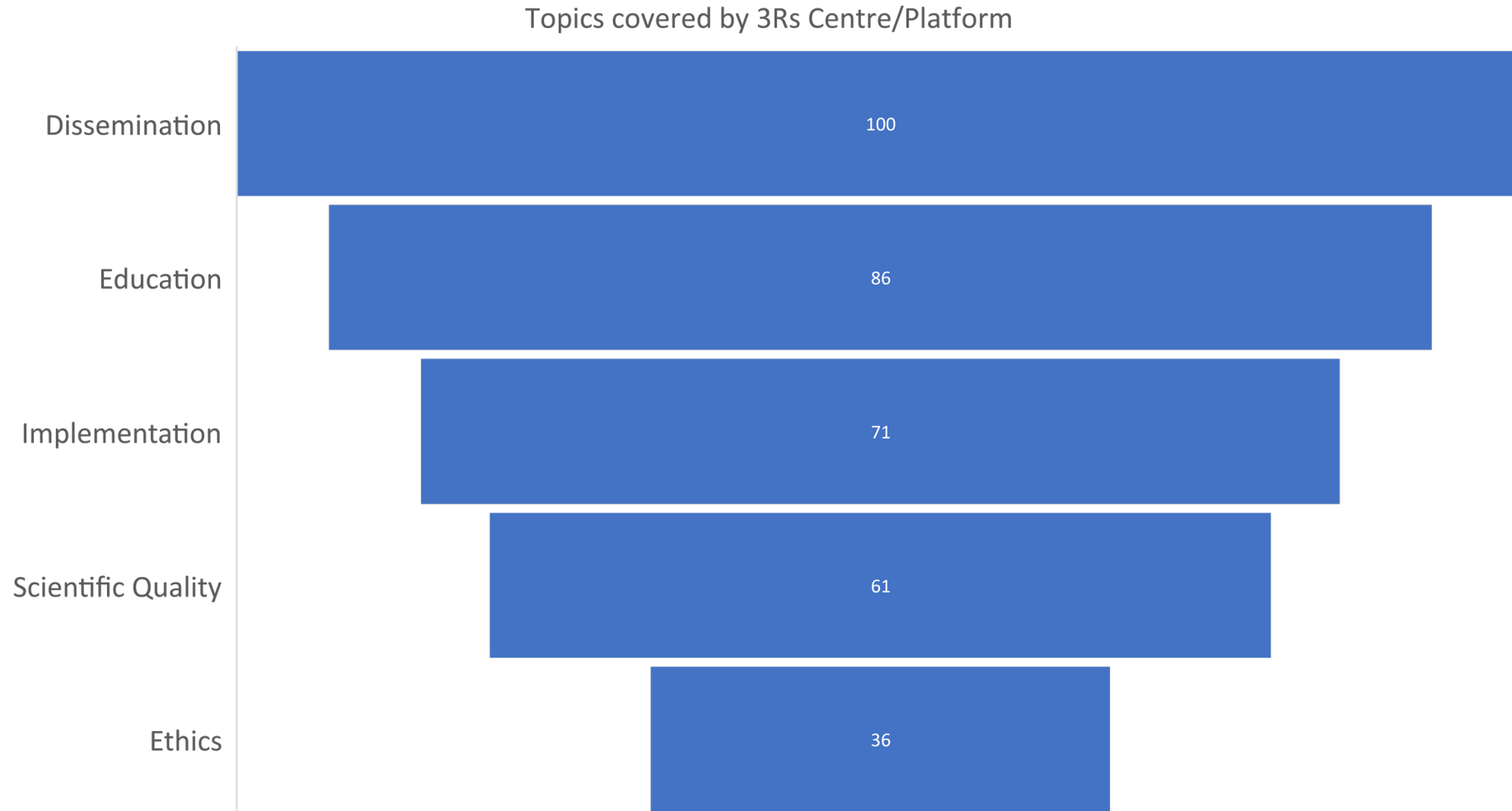


Core 3Rs covered by centres and platforms



EU3Rnet (European Network of 3RCentres)

Topics for urgent action



What 3Rs centres do – NC3Rs

“We work with the scientific community to replace the use of animals through the development of new approaches and technologies. Where the use of animals is unavoidable, we work to reduce the number of animals used in each experiment and to minimise any pain, suffering or distress that the animals may experience.”

Deliver advances in the 3Rs in six main ways:

- Funding 3Rs research, provide a dedicated publishing platform – the NC3Rs gateway in collaboration with F1000 Research – to enable those that we fund to describe their methodologies in sufficient detail to allow others to critique or repeat the work.
- Supporting innovation in the 3Rs through our CRACK IT Challenges funding competition.
- Training early career researchers and provide a range of e-learning resources
- Employing staff to undertake desk-based research projects to identify new opportunities to put the 3Rs into practice.
- Offering services to other organisations. Including peer review and advice service
- Providing online information to help put the 3Rs into practice. Includes the Experimental Design Assistant.

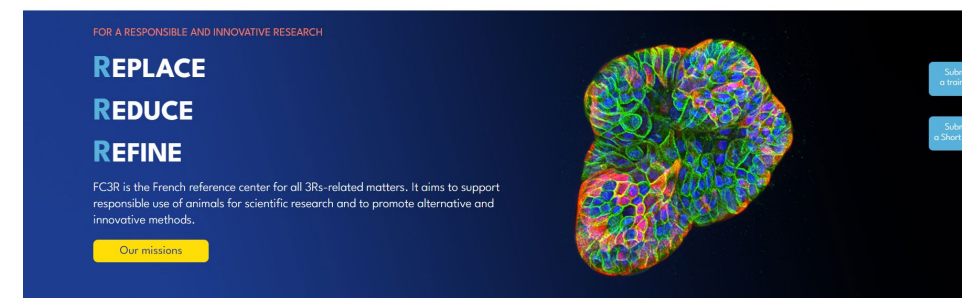
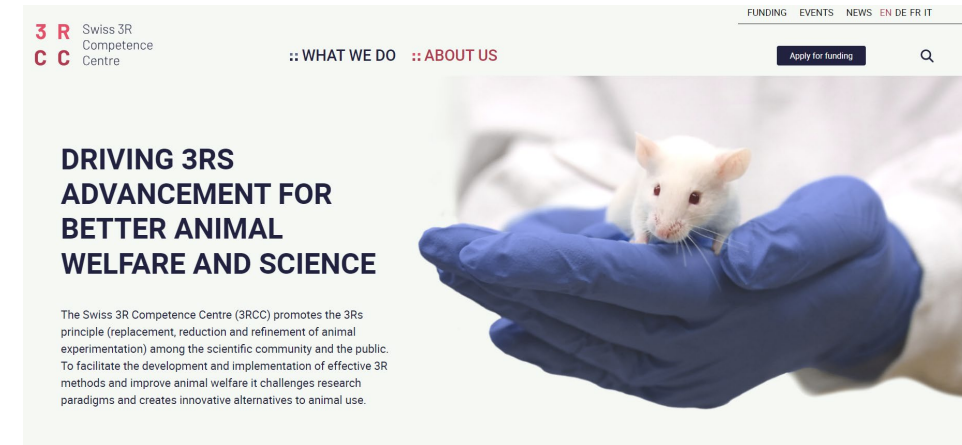
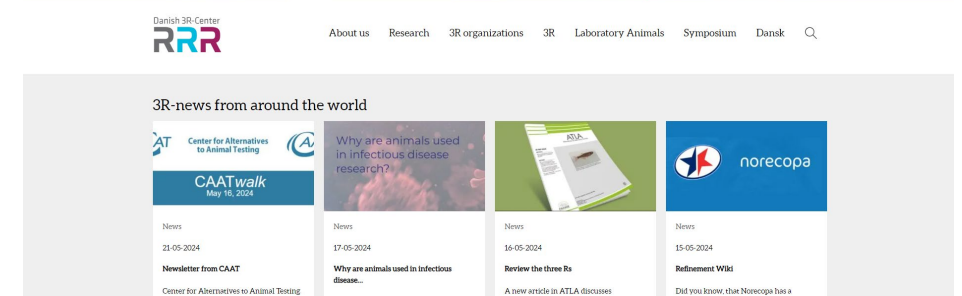
What *should* biomedical science policy look like?

- Work with all* stakeholders (Researchers, Industry, Funders, Journals, NGOs, politicians)
- Focus on *demonstrably* better science
- Support *all* 3Rs but *emphasise & prioritise* Replacement
- Promote culture change to *embed* 3Rs in biomedical science
 - Education
 - Training resources
 - Publication policies
 - Rigour
- Fund/encourage funding 3Rs research
- Disseminate 3Rs technologies

How?

3Rs centres are one way to facilitate this

- Provide focal point for scientific community and public
- Well placed to influence policy
 - Education
 - Training
 - Funding
 - Sharing of best practice
 - Provide scientific case for change
- Must be reviewed regularly to ensure value



In Norway?

Proposal:

- Rebrand NORECOPA as a 3Rs centre
- Review remit
 - Consensus platform vs 3Rs centre?
- Built on good work
 - Keep supporting the database and website!
- Identify gaps and work (collaboratively) to plug these

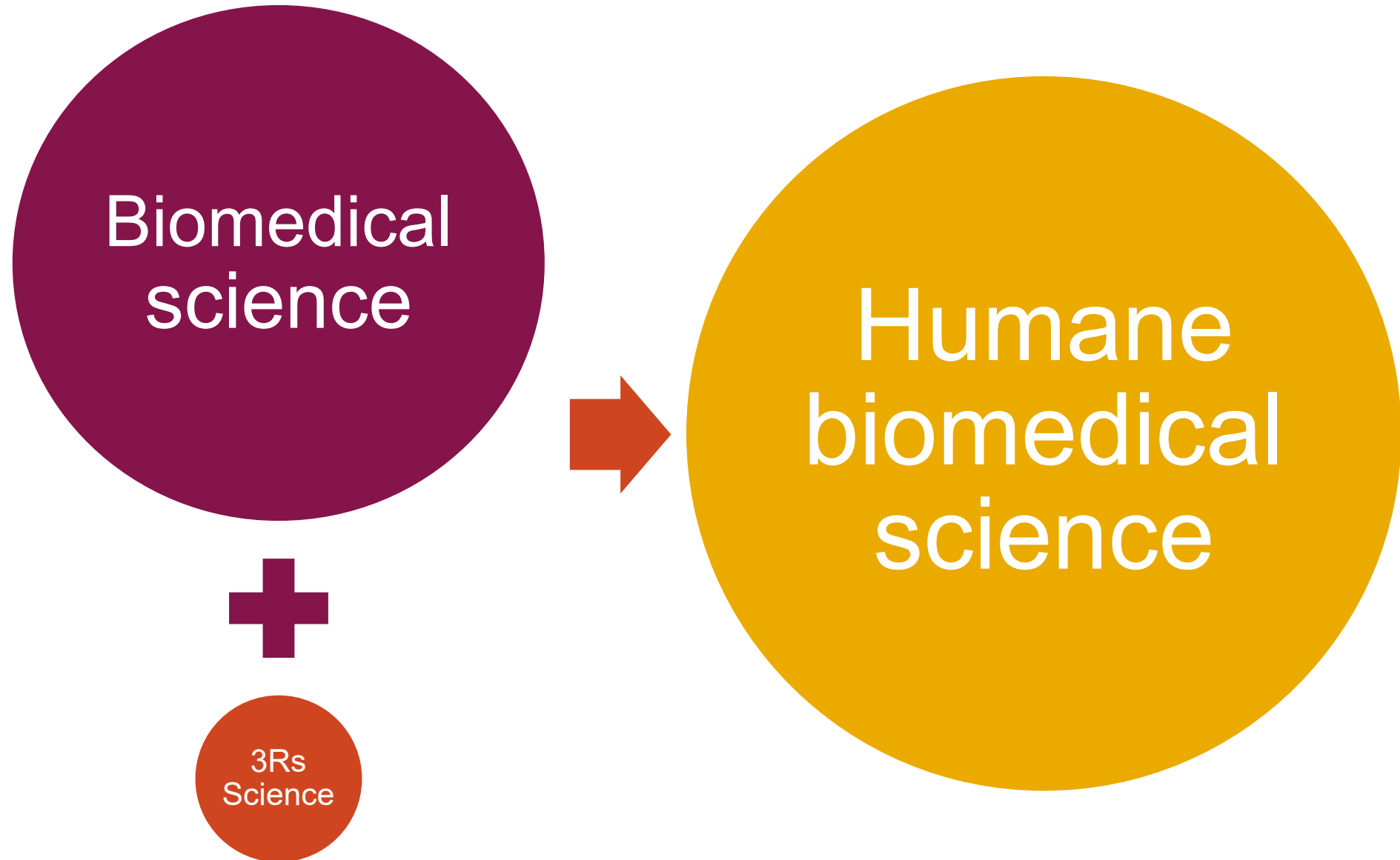


The NORINA database

NORINA (*A Norwegian Inventory of Alternatives*) is an English-language database containing information on approximately 3,000 audiovisual aids that may be used as alternatives or supplements to the use of animals in education and training, including dissection alternatives, at all levels from Junior School to University. The information in the database has been collected from 1991 onwards.

The database is [built into this website](#) and the search engine at the top of all the pages performs searches in it automatically - use the filters in the right hand margin to adjust your search.

What is the *ultimate* goal?





All right...all right...but apart from better animal welfare, animal replacement science, pain faces, score sheets, ethical review, improved experimental design, initiatives to improve reporting, better facilities and improved training and competency....

what have 3Rs Centres ever done for us?



Pioneering Better Science

Thank you!

For more information

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