Alternatives and the Three Rs (1)

'Alternatives' generally refers to ways of replacing the use of living animals in experiments with humane alternatives. This is the first of the 'Three Rs'. The remaining two are **reducing** the number of animals used and **refining** animal housing and all procedures carried out on them to reduce suffering and improve welfare.

The Three Rs are also known as the principles of humane experimental technique and were first published in 1959 by two scientists, William Russell and Rex Burch.

Since then, the Three Rs have become enshrined in legislation controlling animal experiments in many countries, and are widely recognised as important principles by scientists, industry and animal welfarists worldwide. For example, the RSPCA includes promotion of the Three Rs as a key part of its strategy on animal experiments.

Some countries, including the UK, now have national centres to promote the Three Rs, disseminate information and fund research on each 'R'. The UK National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) was set up by the government in 2004.

There are also many international activities relating to the Three Rs, including conferences, research projects and the publication of authoritative guidelines on many different aspects.

Replacement

Examples of replacement are given in some of the factsheets and teachers' notes on medical and veterinary research, safety testing and the use of dogs and primates in experiments.

Reduction

Examples of reduction include:

- avoiding duplication of tests to satisfy test regulations in different countries
- ensuring the minimum number of animals are used through good experimental design
- reducing the number of potential new medicines tested on animals by using non-animal methods to select the most promising candidate drugs.

Refinement

Refinement is about reducing suffering and improving animal welfare. This applies to all aspects of the animals' lifetime experience including transport, housing, handling and identification, as well as the scientific procedures and their effects.

As a first stage, it is important to be able to recognise and assess animal suffering and identify the cause(s). This requires a good knowledge of animals and their behavioural and physical needs. For example, social animals such as rats, dogs and primates need company of their own kind, so they should not be housed on their own. All animals need a stimulating environment with something for them to do so they do not become bored. They need **environmental enrichment**, for example, mice are strongly motivated to build nests so should be given nesting material.



Alternatives and the Three Rs (2)

Once recognised, suffering needs to be reduced or preferably avoided altogether. For most experimental procedures, it is usually possible to take steps that will help in some way to reduce the suffering experienced by animals. For example, by providing appropriate anaesthesia and pain relief, using methods of administering test substances that cause the least pain or distress, and by stopping the experiment when animals reach a certain level of suffering.

All licensed experiments have the potential to cause animals pain, suffering, distress or lasting harm, otherwise they would not need to have a Home Office licence.

Procedures fall into three main categories – mild, moderate and substantial. A significant number of animals of many different species will fall into the latter two categories due to the objectives and nature of the research.

Is enough being done to implement all Three Rs?

Progress, particularly with regard to replacing animals with humane alternatives, is far slower than animal welfare organisations such as the RSPCA would like to see.

There are a number of reasons for this, and identifying the barriers to replacement and how to overcome these is critically important. Barriers include scientific issues, the difficulty of changing regulatory requirements for animal tests, lack of information and resources, and a conservative approach where the default approach is to turn to animal models.

Many people have concerns that:

- scientists are not spending enough time exploring the scientific literature to see if an alternative method is available and could be applied to their area of research, or considering all of the possibilities for using a different approach
- researchers are very often reluctant to move away from traditional animal methods, particularly if they have a lot of data collected over many years from animal experiments
- in safety testing, there can be a delay of a number of years before an alternative method is formally accepted by the relevant national and international regulatory bodies
- a great deal more commitment, collaboration and resources are needed to be focused on the development of new methods.



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