Replacement

Replacement means that animals should not be used at all if the same aim can be achieved in other ways. The word "animal" refers to "higher order" animals that are capable of suffering or feeling pain.

The first question scientists must ask themselves is:

"Do I need to use animals at all?"

Then there are three important questions:

1) What alternatives can be used instead of animals?
2) When is it appropriate to use alternatives?
3) When is it *not* appropriate to use alternatives?

What alternatives are available?

- Computer models
- Charts, diagrams, manikins and models
- Mathematical and statistical models
- Intact invertebrates and lower order vertebrates.
- Tissue culture using cells
- Videos of procedures for teaching

Reduction

Reduction means keeping the number of animals used to the minimum necessary to achieve the purposes of the work. This includes avoiding using unnecessarily large or small numbers of animals.

The important question is:

"How can the number of animals used be reduced to the minimum needed to achieve the aim(s) of the work?"

This can be done in several ways:

- If related but different work has been done before, it can be used to assess the number of animals that will need to be studied to produce a definite result.
- Science-based statisticians can advise on the minimum numbers required.
- Tissues from animals killed in abattoirs can also be retrieved immediately after death and used for research, teaching or testing, thereby avoiding the need to use extra animals.

Refinement

Refinement refers to keeping any pain, suffering or other harm which may be caused as low as possible for each and every animal used in the work. This means that every aspect of the work must be reviewed carefully and great care taken to minimise any noxious effects on the animals.

The important question is:
"How can the harm to the animal of each study be minimised?"

This can be done in several ways:
For example, studies can involve:

- Non-invasive behavioural observations of conscious animals; non-invasive methods such as ultrasound or X-ray examinations or other imaging techniques in conscious animals;
- Limiting the invasiveness by taking blood samples using a needle the minimum number of times required to achieve the desired goals;
- Anaesthetics, pain-killers (analgesics), sedatives and/or tranquillisers are used to relieve anxiety, fear, pain or distress in conscious animals;
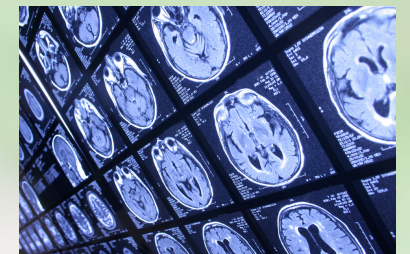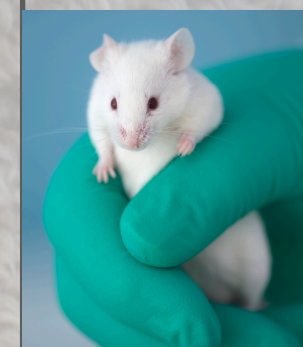
Also animals are handled gently throughout and, where possible, are given extra attention, including food treats and stroking, to enhance thier well-being.

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