

## What are the 3Rs?

The 3Rs – Replacement, Reduction and Refinement – are the scientific and ethical principles that guide the use of animals in research and testing. Scientists should **replace** the use of animals with alternatives wherever possible, **reduce** the number of animals involved to the minimum required, and **refine** procedures and animal care to minimise pain, distress and suffering. Using 3Rs approaches, scientists can maximise animal welfare and improve the quality and reliability of their research. The National Centre for the 3Rs (NC3Rs) was established in 2004 to support the scientific community develop and implement 3Rs approaches, advance the 3Rs in policy and practice around the world, and pioneer better science.

## Refinement

Refinement means minimising the pain, suffering, distress or lasting harm caused to animals. Those working with research animals can refine many aspects of their lives, including how animals are housed and handled as well scientific procedures such as injections, blood sampling or surgeries. As well as ethical reasons to maximise animal welfare, refinement is essential for robust and meaningful experiments as poor welfare changes an animal's behaviour and physiology which can affect the results.

For more information, please visit:

[nc3rs.org.uk/3rs-public](http://nc3rs.org.uk/3rs-public)

[lms.mrc.ac.uk/about/animals-in-research](http://lms.mrc.ac.uk/about/animals-in-research)

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# 3Rs

Replacement  
Reduction  
Refinement



## Enriched housing

Enriched housing allows animals to express a full range of their natural behaviours and supports their physical, social and mental stimulation. For mice, this includes providing material for digging, building nests and gnawing items, as well as platforms, hide-a-ways and tunnels. Enrichment should be tailored to the needs of each species and individual. For example, a mouse recovering from a recent surgery would be given special soft bedding material to help wound healing.



*A laboratory mouse cage with a wooden hide-away (top) and bedding material (bottom).*

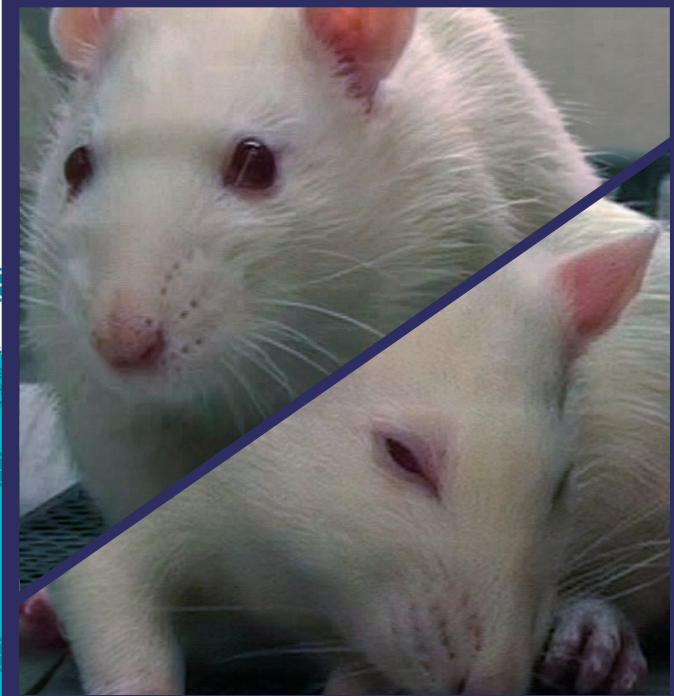
## Refined handling

Traditionally, laboratory mice have been picked up by the tail, but research funded by the NC3Rs and others has shown this causes stress and anxiety that can make scientific findings less reliable and reproducible. The simple change of using a plastic tunnel or cupped hands to pick up mice makes a big difference to mouse welfare and scientific results. For example, tunnel-handled mice do better in behavioural tests compared with tail-handled mice, being more willing to explore mazes and investigate new objects. Many institutions worldwide are switching to refined handling methods, improving the welfare of millions of mice used in scientific research and testing and improving the quality of the data scientists collect from these animals.



*A mouse held in a plastic tunnel.*

Images kindly provided by Dr Jeffrey Mogil, McGill University



*Squinted eyes are one part of the 'grimace scale' to check for pain in rats.*

## Improving pain management

Giving animals appropriate pain relief is essential. Species such as mice, rats and rabbits that are predominantly used in research are prey animals in the wild and instinctively hide signs of suffering to avoid predation. Laboratory animal technicians are highly trained to spot pain-related facial expressions in laboratory animals, for example changes in whisker, nose and ear position. Squinting of the eyes is one of the most universal signs of pain across different species – including in humans! So-called 'grimace scales' show examples of these distinctive signs of pain to help identify animals that need pain relief as soon as possible.