Refining the use of animals
in scientific research

Simple ingenuity!

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Scientists are busy developing some really exciting high-tech methods to replace the use of many animals in scientific research, like **organs-on-a-chip**. But for those scientists who don't yet have an alternative, the principle of refinement is crucial. And sometimes clever thinking is all that's needed to improve animal welfare.

refinement: *minimising potential suffering and improving animal welfare*

Some examples of refinement

Gentling

Handling of lab animals regularly gets them used to human contact so they become less stressed, which means better quality experiments.

Enrichment

Giving lab animals access to things so they can behave more like they would in their natural environment. This could be contact with other animals or humans or opportunities to forage and explore, or it could be putting nest boxes, exercise equipment, shelters and nesting material into their cage.

Training

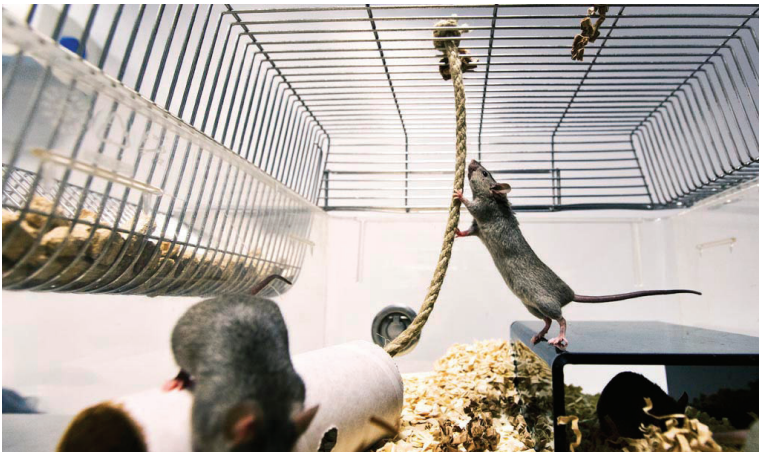
Lots of large animals, like dogs, pigs and sheep, can be trained to cooperate so that, in return for a treat, their handlers can take blood samples, collect urine or apply medication. Training is a great way to minimise fear and stress.

Case study 1

From couch potato to trim and fit

For scientists to study diseases of old age, like dementia and Alzheimers, they need to work with older animals. Rats are natural couch potatoes and will happily sleep all day, getting fat and unfit as they get older. Overweight rats can suffer from pressure sores and develop health problems like cancer and kidney failure.

To encourage older rats to exercise and explore, scientists designed a new housing system with a bigger floor area and structures for the animals to hide under. Putting the feeders and water bottles up high means the rats also have to do some climbing to get something to eat and drink. As expected, scientists have found that rats living in the new pens are less likely to develop health problems as they get older.



Above and right: Deep litter and enrichment devices encourage exploration and exercise. *Photo credit: Novo Nordisk.*

Case study 2

Keeping possums happy

Possums are a serious problem for New Zealand; they are munching their way through our forests. Possums are controlled by shooting, trapping and poisoning, but it would be better if we could cut down the number of possums born in the first place. To understand more about possum reproduction, scientists wanted to capture wild possums and study their behaviour. But first the scientists had to design a housing system that the possums could live in stress-free, as stressed possums don't reproduce well.

In the wild, possums spend a lot of time browsing for food, and they feel much more secure sitting high up in the trees. To mimic this in captivity, the scientists housed the possums in groups in large pens with hessian sacks or wooden houses for nesting. The scientists also fixed a runway near the ceiling that ran along the perimeter of the pen, linked to the floor by lots of ramps and tree-trunks to give the animals plenty of options if they need to escape from each other. The scientists also provided food and water at different places around the pen to avoid competition. Giving the possums extra tree branches every week gives the animals extra escape routes and hiding places and something to browse from.

Right: A possum in its hessian sack nest. Tree branches in the background are used for browsing and hiding. The wooden runway can be seen above the possum's head. *Photograph credit: Otago Daily Times.*

Case study 3

Swinging together

Do you enjoy a game of rugby, tennis or cricket? Many of us do! Unfortunately, some of us walk away from a great game with an injury, like tearing the capsule of the shoulder joint, the part that keeps the bones together. Torn, partly torn or poorly healed injuries lead to a joint that easily dislocates. Before, this kind of injury was surgically repaired by re-attaching the capsule to the bone with metal staples to keep the tissue in place while the tear healed. The problem with this though is that staples can come loose.

Scientists have developed a new kind of implant which works better than staples because it breaks down and disappears over time. Before doctors could use the new implant in humans, it had to first be tested on animals. The scientists needed to know if the implants would last long enough for the tissue to heal and whether the tissue would react badly to the material the implant is made of.

One study carried out in anaesthetised sheep involved surgically detaching a tendon from its bone, then re-attaching it using the implant. Just like in people who have this kind of surgery, it was important for the sheep to stay off their feet for 3 weeks after surgery to let the tissue heal. Unlike humans though, sheep can't be told to stay in bed and rest! Instead the scientists designed canvas slings that kept the sheep upright and off their feet. The sheep were also given pain-relief medicines after the surgery and kept together instead of in individual pens.

Right: Sheep suspended in canvas slings to prevent loadbearing after surgery. They are housed together allowing social interactions to reduce stress.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Case studies generously provided by Dr John Schofield, Dr Mark Walton and Dr Mark Fisher.

For further information

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