Animals in research – the 3Rs

The 3Rs for protected animals used in research are:

* **Reduction** – methods which minimise the number of animals used per experiment
* **Refinement** – methods which improve animal welfare
* **Replacement** – methods which avoid or replace the use of animals altogether

The following table lists examples of changes and new initiatives the Babraham Institute animal facility have made in recent years. Read each one and decide whether it counts as an example of reduction, refinement or replacement.

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| **Example** | **Reduction, Replacement or Refinement?** |
| Computerised record keeping and reporting tools monitor colony size and usage. Low usage colonies are cryopreserved rather than maintaining live animals. |  |
| Mice are routinely handled using the ‘cupping’ technique, as opposed to picking up by the tail. |  |
| Use of publicly available data for re-analysis, to answer research questions without the need for repeating experiments. |  |
| The default method to collect tissue samples to confirm the genetic make-up of mice was changed from using the tail tip to the ear, which is less sensitive. |  |
| Our breeding process for importing new mice types now uses a sterile strain of mice, removing the requirement to perform vasectomy surgery. |  |
| Drosophila (fruit flies) are being used to explore how cellular signalling pathways operate and how changes in signalling pathways contribute to the loss of tissue health that occur with age. |  |
| Sentinel mice are used to confirm the high health status of the facility. To minimise the number of sentinel animals needed we’ve moved to a monitoring system that uses faecal pellets, blood samples, oral and pelt swabs, and air filter analysis. |  |
| Cages include environmental enrichment, such as: opaque tunnels and elevated rafts; treats such as seeds mixed in bedding; and materials to build nests. |  |
| Using donated human cells and tissues to: explore the factors important for human embryo implantation; learn more about human placental development; and analyse the immune response to vaccination. |  |
| We use the latest research technologies, such as multi-parameter flow cytometry and single-cell analysis techniques, allowing more data to be gained from fewer cells. |  |
| We promote opportunities for tissue sharing, coordinating mouse use across Institute groups. The Institute is a major contributor to an archive of tissues from aged mice. |  |
| Use of heat pads during embryo transfer surgery to avoid hypothermia. |  |

**Answers:**

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