

GENETICS, PHILOSOPHY

3 RS

31.12.2006

The 3 Rs of regulating animal research are *Refinement* (to minimize suffering), *Reduction* and *Replacement* (to minimize the number of animals used). A [Nature news feature](#) now has a critical appraisal of current knockout projects where each of the 25,000 genes will be knocked out in the next future. Although current technology represent an advantage over recent undirected mutagenesis projects

... the number of mice needed to establish a line stretches from 50 to several 100. On top of this, another couple of 100 animals are needed for basic analysis of genetic make-up and phenotype...

Many genes cannot be knocked out – some knockouts may even be lethal.

We are also not so much interested in permanent destruction of genes in all tissues but in conditional and temporal shutdown of gene function.

And many researchers are not so much interested in the current 129 background than in BL6 (at least in immunology and allergology).

Finally (in human genetics) we are not dealing with knockouts but with multiple genomic variants of a gene. The question therefore is

Is the spirit of the knockout projects in line with [3R] principle[s]?

although I acknowledge that these industrial projects may generate many “nice to know” facts.