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Reducing animal numbers with an interactive 3Rs website of Michael Festing

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In the various courses in Laboratory Animal Science, given by the Utrecht's Department of Animals in Science and Society, I provide the module 'Some methodological and statistical issues in animal experimentation', as well as one on 'Genetic standardization'. As an instructor, I also provide the module on 'Designing animal experiments and genetic standardisation of laboratory animals' in the course Epidemiology & Breeding, within the bachelor's programme in Veterinary Medicine at Utrecht University.

Michael Festing: an inspiration

In preparing these modules, M.F.W. (Michael Francis Wogan) Festing (76) is a great source of inspiration for me ('great' for two reasons: he is an icon but he's also really tall!). Information about this laboratory animal geneticist/statistician can be found online at Linkedin and Wikipedia. Back in 2007 I had written about Festing: 'I hope that this man will let himself be heard as a scientist for quite some time!' and voila, seven years later he is, fortunately for us, still active in Laboratory Animal Science. Recently, Harry Blom (animal welfare officer of the animal welfare body of Utrecht University) sent me the URL to Michael Festing's website. Of course I tried out his website and came to the conclusion that it was compatible with my teaching. We still use the website, which is freely available, during the Epidemiology & Breeding tutorial as well as in the Laboratory Animal Science courses.

Reduction: a correct and efficient research design saves animal lives

Many biomedical and bio-veterinary researchers are competent, even brilliant, in their fields, but have never been taught the right way to design an animal experiment. And if they have already learned it, it was long ago and has faded away, or they didn't completely understood it at the time. In any case, as a consequence, many animal experiments, including the statistical analyses, are badly designed and are

incorrectly analysed[1]. This is a world-wide problem. It is estimated that more than 100 million laboratory animals are used in experiments every year, according to the last most reliable source of data from 2005[2].

A correct and more efficient research design can therefore contribute to achieving a considerable reduction in the number of animals. Of course, researchers want to become competent in setting up animal experiments (they want correct and reliable results too!), but often they are not able to take a course specifically about designing them, or there isn't one available. However, people usually do have time to go through modules on a website or CD at their own speed. Michael Festing also developed the useful CD "*A highly interactive computer assisted learning (CAL) program to teach better experimental design*"[3]. This programme is largely self-explanatory and gives lots of feedback.

3Rs website review

The welcome page of Michael Festing's website.

The website of Michael Festing is not only free, but also non-commercial. By surfing to the website you'll come to the welcome page. Click on 'enter site' and you'll see the home page and main menu. This screen has 17 different modules (in blue) and several other pages (in green). The first module is about the ethical backgrounds of the 3Rs. The following modules are about research strategy, experimental unity, the characteristics of a correctly designed experiment, avoiding systematic errors, and power analysis and sample size. There are also modules about understanding and controlling variability, and about the various laboratory mouse and rat populations. The module on setting up experiments explains how to randomise using an Excel spreadsheet, for both fully randomised and block designs. There are also pages about factorial experiments, regression and correlation, and some information about statistical analyses (since the emphasis is on designing experiments using animals, not the statistical analysis of them). There is also a module on displaying results, and one about the ARRIVE (Animal Research: Reporting In Vivo Experiments) guidelines of Britain's NC3Rs, read more here. Furthermore, there is a page with an overview of relevant books on the subject of design and statistical analysis of experiments. Most modules have a self-test page linked to mostly 'true/false' questions. There is even a separate self-test page. Once you have completed all the modules you can download a certificate, where you declare that you actually have done so.

Putting it to the test

Since correct and efficient experimental design can save many laboratory animals, I would invite anyone involved with designing experiments on animals to visit Michael Festing's website and work through all the modules. It is an excellent, free and time-saving way for non-statisticians to acquire or improve skills in designing animal experiments.

1. Kilkenny J, Parsons N, Kadyszewski E, Festing MFW, Cuthill JC, Fry D, Hutton J, Altman DG (2009). Survey of the quality of experimental design, statistical analysis and reporting of research using animals. PLoS one 4, e7824.
2. Taylor K, Gordon N, Langley G, Higgins W (2008). Estimates for worldwide laboratory animal use in 2005. ATLA 36, 327-342.
3. Festing MFW, Dewhurst DG, Broadhurst J (2002). A highly interactive computer assisted learning (CAL) program to teach better experimental design. British Journal of Pharmacology 135 (Supplement) 141P.