

Guidelines for specification of animals and husbandry methods when reporting the results of animal experiments

WORKING COMMITTEE FOR THE BIOLOGICAL CHARACTERIZATION OF LABORATORY ANIMALS/GV-SOLAS

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Summary

Any report on the results of animal studies must include sufficient information on the animals used and their conditions of husbandry to enable the reader to understand how the investigation was performed. Only then can he properly interpret the findings. These guide-lines provide a catalogue of the minimum information which should be included in such reports.

Research in the natural sciences is based upon a gradual accumulation of knowledge obtained by collating and comparing experimental data from various places and laboratories. Earlier experiments can only contribute effectively to our knowledge in this way if we know the conditions under which they were performed and the characteristics of the models used. Only then can we properly assess the results and utilize the knowledge gained when planning future studies. The basis of every biological experiment is the experimental animal, with its own special peculiarities and reaction patterns, regardless of whether the experiment is performed on the animal itself or on isolated organs or tissues.

Numerous reports and publications have appeared during the last 20 years concerning the profusion of biological, physical and chemical factors which may influence laboratory animals during experiments and thus modify the results of the investigations. The results obtained with a particular animal - the characteristics of the animal - are thus in principal only valid for the conditions under which they were obtained. The results may be used for purposes of comparison, but they cannot be looked upon as fixed 'normdata', not even where the animals are genetically defined and the experimental conditions well standardized. Furthermore, the results are only useful for comparison if all the relevant information concerning experimental conditions is made available. Having to repeat experiments simply because they were badly documented is annoying, time consuming and expensive. Far more important, it also means that animals must be killed unnecessarily,

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and this is completely unjustified for ethical reasons.

These guidelines for reporting the results of animal experiments provide a catalogue of the information which should be included concerning the animals used and the conditions of husbandry. These data are essential from the laboratory animal science point of view if the reader of a scientific paper or recipient of experimental data is to fully understand how the investigation was performed; without these data, the results cannot be properly interpreted. This list presents the minimum requirements and certainly does not exclude the possibility that additional information should be provided in certain fields of study. In exceptional cases, where there is too little space in a publication to include all this information under 'Methods', the data should be kept by the author and supplied on request.

We recommend that these guidelines be followed whenever reporting the results of animal experiments for the following reasons:

1. to enable and encourage the research scientist to identify the factors that influence his experiment and thus help to optimize the contents of his publication;
2. to help the reader understand more fully the conditions prevailing during the experiment and thus help him interpret the results better;
3. to make it easier for the authorities to accept experimental results documenting the safety of drugs and chemicals;
4. to help the laboratory animal breeder to recognize those factors which influence experiments, and to encourage him to take them into account while breeding and holding his animals;
5. to provide a basis for future data banks concerning laboratory animals.

Recommended minimal information

Scientific reports on the results of animal experiments should always include the following information on the animals and the conditions of husbandry.

Animals

Species
 Breed or designation of stock or strain (using international nomenclature; see References)
 Source
 Genetic status (if not obvious from stock/strain designation)
 Strain
 or Stock
 or Hybrid
 or Mutant
 Age and/or weight at start of experiment¹
 Sex
 Microbiological status
 Conventional (microbiological status not specified)
 or Specified pathogen-free (pathogens or groups of pathogens from which the animals are free must be specified)
 or Gnotobiotic (germ-free or associated with pure cultures; all micro-organisms present must be specified)
 Method of delivery/transport
 Quarantine or acclimatization period

Husbandry during experiment

Measures to protect microbiological status
 Open system (no special protective measures)
 Closed system (animals kept behind barriers or locks)
 Isolator system
 Housing equipment
 Type, material, dimensions, possibly cage type²
 Number of animals per cage or housing unit
 Bedding
 Type
 Quality
 Pretreatment
 Environmental temperature (°C ± range)
 Regulated
 Not regulated
 Relative humidity (% ± range)
 Regulated
 Not regulated

¹Both should be given if possible. Age defines the animal better, but weight is an indicator of the stage of development. Only giving weight and leaving the reader to try to work out the age is insufficient and may even be misleading, as weight can easily be manipulated.

²It is permissible to give just the cage type, but a reference should be included to inform readers (e.g. those in other countries) where they can find further details.

Lighting

Natural
 and/or Artificial (time of day and intensity)
 Air changes per hour
 Proportion of fresh and recirculated air³
 Period of conditioning to husbandry conditions and procedures used during experiment

Feeding

Feed
 Type and composition, possibly brand name and identification number⁴
 Pretreatment
 Feeding schedule (quantity, frequency)

Water

Type
 Quality
 Pretreatment
 Water schedule (quantity, frequency)

Experimental procedure

The description of the experimental procedure depends upon the purpose of the experiment, but the following information must always be provided:

Number of animals and any pretreatment;
 Time schedule of experiment (e.g. time of day investigation; time interval between sampling and processing);
 Statistical procedures.

Examples

1. Mice, Afm: NMRI from Animal Breeding Ltd, Anytown (GB)
 Age 24-28 days, weight 20-22 g.
 Microbiological status: free from ecto-and endoparasites, mycoplasmas and pasteurellae.

³There is some controversy as to the usefulness of such data. Other more relevant information such as air flow speeds over cages or gas or particle concentrations in the air could be given instead.

⁴Composition according to *Journal of Nutrition* (1977) **107** (7), 1340-1348 and *Journal of Nutrition* (1984) **114** (1), 15-16. It is permissible to give just the feed brand name and number, but a reference should be included to inform an international readership where they can find further details. Any other factors which could play a role in determining the results of the

experiment (e.g. protein composition in growth studies) should be described in detail.

Supplied by van in filter boxes and acclimatized for 1 week in the Central Animal Laboratory of the Institute.

Housed during the experiment in air-flow racks in Makrolon Type 2 cages (3 mice per cage) on sterilized softwood granules as bedding.

Room temperature and humidity regulated ($22 \pm 2^\circ\text{C}$; $55 \pm 10\%$).

Fluorescent lighting *c.* 300 Lux at 1 m above floor from 07.00 to 19.00. Conditioned to experimental conditions for 1 week.

Air flow rate 0.5 m/s above cages. Feeding: 8 mm pelleted diet R 0000 manufactured by Feeds Ltd (reference) heated for 20 min at 110°C *ad libitum*. Drinking water: mains water, untreated, *ad libitum*.

Experiment performed from August 31 to September 25, 1983 using 30 mice. Behavioural parameters measured between 09.00 and 11.00 using method described below. Results expressed as frequency distributions for each parameter.

2. Rhesus monkeys, *c.* 2 years old, supplied from open-air colony of Monkeys Ltd., Anothertown (USA). Delivered by air and quarantined for 12 weeks as described in (reference).

Housing during experiment: individual galvanized wire cages (60 x 80 x 120 cm) without bedding. Rooms equipped with locks. Room temperature and humidity regulated ($24 \pm$

2°C ; $55 \pm 10\%$). Fluorescent lighting *c.* 300 Lux at 1 m above floor

from 06.30 to 18.30. 18 air changes/h, maximum ammonia concentration... ppm.

Conditioned for 1 week before initial training for experiment. Feeding: untreated 4 mm pelleted diet P 3000 manufactured by Feeds Ltd (reference), 100 g/day, supplemented with _ orange, apple or banana per day. Drinking water: mains water, untreated, *ad libitum* via automatic valves. Experiment performed in March and April 1984 using 10 monkeys. The animals were accustomed to the restraint chair and the measuring methods repeatedly over 3 weeks. Sedation at 08.00 with Ketamine (x mg/kg i.v.) for placement in restraint chair before measuring blood pressure, pulse rate and ECG 1 h later using methods described below. Results expressed as means with ranges of measurements performed on each of the 10 animals on 3 different days.

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