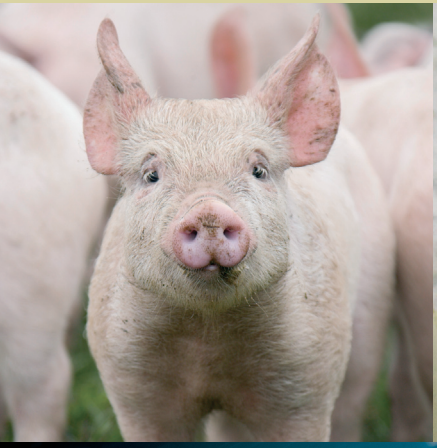
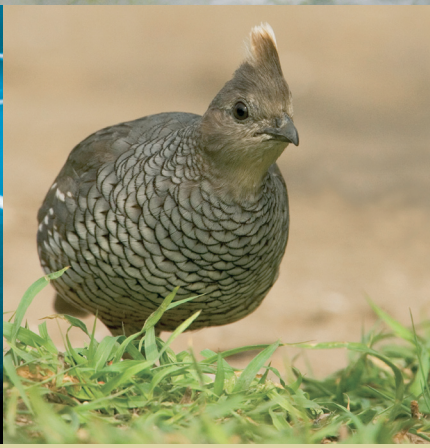
GA passports:

The key to consistent animal care





A report of the RSPCA GA Passport Working Group (GAPWG)

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Introduction

The number of genetically altered (GA) animals used in scientific procedures within the UK and internationally has risen significantly over the last 15 years and continues to do so. As more GA animals are produced, and their use becomes increasingly common, the movement of such animals between establishments is becoming more widespread. This raises the issue of how to ensure that specific animal care information that can be used to improve welfare and minimise the potential for pain, suffering or distress, is accessible to whoever cares for them throughout their lifetime.

With this in mind, the 'mouse passport' (Wells et al, 2006) was proposed as a record to provide husbandry and welfare information for establishments sending and receiving GA mice. Since 2006 there have also been advances in the routine 'welfare assessment' [1] of animals (Hawkins et al., In prep), and in the development of 'welfare/phenotypic databases' [2]. To advance the idea of 'passports' for all GA animals, and improve their uptake, the RSPCA convened the Genetically Altered Passport Working Group (GAPWG) comprising a range of practitioners in the GA animal field.

The aim of the working group was to consolidate progress made in routine welfare assessment and the development of welfare/phenotypic databases, with the principles of the mouse passport. The GAPWG has produced a set of recommendations that reflect contemporary good practice, for all establishments to apply, when transferring any GA animal between any two locations. This will ensure that essential information relating to the animals' welfare and consistent standards of care are quick and easy for animal care staff to send and receive.

1. Welfare assessment – the practise used to identify phenotypic characteristics with welfare implications
2. Welfare database – a centralised source of phenotypic information on different GA animals

1. What is a GA passport?

A GA passport is a record that contains information that staff caring for animals can use to improve their welfare and minimise the potential for pain, suffering or distress. It needs to be readily accessible to any person caring for any GA animal, at any location so that each animal (or batch of animals) receives a consistent standard of care throughout their lifetime.

The GA passport can take a variety of forms, such as a paper document, an electronic file, an email attachment, or a freely available and easily identifiable entry within a spreadsheet or welfare database.

The recommendations within this report define what information should be recorded and used to create a GA passport that is intuitive to use, and quick and easy to complete. It is important that all establishments make it routine practice to record and disseminate the recommended information. This will accumulate over time, as and when new data becomes available or new assessments are made.

2. Why use a GA passport?

The GA passport, when used correctly, is a quick and simple way of ensuring that whoever is responsible for the care and welfare of a GA animal has all the information that they require. This will enhance both the science and animal welfare.

The benefits of using a passport include:

1. **improving the dissemination of information** within the scientific and animal care community (including refinements relating to housing, husbandry, enrichment and current good practice procedures/protocols);
2. **reducing the need to duplicate, or replicate research,** by ensuring that details of all known screening and phenotypic data are readily accessible;
3. **providing a comprehensive record** that can be kept with archived embryos and gametes, facilitating the cryopreservation of GA animals, and contributing to a reduction in the number of live animals that are transported
4. **reducing the incidence of adverse events** such as welfare problems, breeding failure, or disease outbreaks in immunocompromised animals, by ensuring that any information relating to phenotypic abnormalities or observable traits and their remedial actions remains with each animal throughout their lifetime.

3. When to use a GA passport

The GA passport should be used when transporting any GA animal of any species to, or from, any location where their journey ends with a new set of carers. This includes animals that are imported or exported internationally, as well as those moved shorter distances within a country, or between sites. It should be sent to the receiving establishment in advance of the animals – in preparation for their arrival – with an additional copy accompanying the live animals, fresh, or frozen embryos, or gametes.

4. What should a GA passport contain?

The 'passport' should contain the following information, extracted from local records, files or databases.

- **Name of GA line**
- **General information**
- **Phenotypic abnormalities and observable traits with welfare implications**
- **Remedial actions**
- **Breeding**
- **Method of supply**
- **Origin**
- **Background**
- **Contact details**

Where appropriate, the following supplementary information should also be recorded with the GA passport.

1. **References/websites**
2. **Additional contact details**
3. **Extra scientific information**
4. **List of phenotypic screening undertaken to date**

4.1 Recommended information

- **Name of GA line.** State both the technical scientific name of the GA line, according to current nomenclature rules (see *Useful resources*), and the local in-house name should be provided:
- **General information.** Provide details such as: the expected colour of offspring; current diet regime (breeding, high protein) and housing system/environmental conditions (open/IVC, light/dark cycle, temperature, humidity, frequency of cage changes); environmental enrichments (those provided as standard in-house e.g. litter, nesting material, gnaw blocks); behavioural characteristics (poor/good maternal behaviour, nest building, aggression).
- **Phenotypic abnormalities and observable traits with welfare implications.** List all adverse effects and observable traits/abnormalities that have potential welfare implications, together with welfare assessment advice (if appropriate) and a time scale of when these effects can be observed. Examples include developmental and behavioural defects; physical abnormalities; homozygous lethality, or incidence of unexpected death and immune status (if immunocompromised, or susceptible to specific parasites, bacteria etc).
- **Remedial actions.** List remedial actions for all adverse effects and observable traits/abnormalities described above.
- **Breeding.** State current breeding strategy and performance (fertility), including frequency of litters, average litter size, pre/post weaning mortality, breeding life span, growth rate, genotype (homozygous /heterozygous), whether genotyping is required and, if appropriate, supply a method or details of who to contact regarding this.

- **Method of supply.** State whether sending living breeding animals, fresh or frozen embryos, or gametes. If supplying embryos or gametes provide details of how they were prepared for transportation, as well as an optimised protocol for achieving live births.
- **Origin.** State where, when and by whom the GA animal was originally created.
- **Background.** Provide details of the background strain, or stock and the backcross/intercross generation (F1, N1) of the animal(s) supplied if appropriate.
- **Contact details.** Provide details (phone number, email/postal address) of the person at the supplying establishment to contact regarding the GA animal(s).

4.2 Supplementary information

1. **References/websites.** Provide citations, and/or web links to any published information that is relevant to managing the GA animals' welfare.
2. **Additional contact details.** Contact details should be provided for at least one more person at the sending establishment to ensure that rapid contact can be made even if staff have changed, or are on holiday e.g. the NVS, NACWO, creator of the GA animal, and/or colony manager.
3. **Extra scientific information:** Examples include: stem cell information, PCR protocol, genetic expression pattern, type of genetic alteration.
4. **List of phenotypic screening undertaken to date.** Include information on the protocols and any results obtained at all establishments (as applicable).

Useful resources

Nomenclature and welfare terms

- **FELASA** (2007). *Guidelines for the production and nomenclature of transgenic rodents* Laboratory Animals 41, 301-311 www.felasa.eu/docs/301.pdf
- *Mouse Welfare Terms* – www.mousewelfareterms.org/doku.php
- *Rules and guidelines* – www.informatics.jax.org/mgihome/nomen/index.shtml

Passports

- **Wells et al.** (2006). *Assessing the welfare of genetically altered mice.* Laboratory Animals 40 (2) 111-114.

Protocols

- **Robinson et al** (2003). *Refinement and reduction in production of genetically modified mice* – sixth report of the BVAAWF/FRAME/RSPCA/UFAW Joint Working Group on Refinement Laboratory Animals 37, Suppl 1.

Welfare assessment

- **Hawkins P, Burman O, Honess P, Lane S, Middleton V, Morton DB, Roughan J, Wells S & Westwood K** (in prep) *Defining and implementing protocols for the welfare assessment of laboratory animals* – report of the BVAAWF/FRAME/RSPCA/UFAW Joint Working Group on Refinement.
- **ILAR** (2008) *Recognition and Alleviation of Distress in Laboratory Animals.* National Academies Press: Washington, DC www.ahwla.org.uk/index.html
- **Jegstrup I, Thon R, Hansen AK & Ritskes Hoitinga M** (2003) *Characterization of transgenic mice – a comparison of protocols for welfare evaluation and phenotype characterization of mice with a suggestion on a future certificate of instruction.* Laboratory Animals 37: 1-9.
- **Mertens C & Rülicke T** (2000) *Phenotype characterization and welfare assessment of transgenic rodents (mice).* JAAWS 3: 127-139.
- **UFAW (2010) UFAW handbook on the care and management of laboratory and other research animals 8th edition** (Eds. R Hubrecht and J Kirkwood) Oxford, Wiley-Blackwell.
- **van der Meer M, Rolls A, Baumans V, Olivier B & van Zutphen LFM** (2001) *Use of score sheets for welfare assessment of transgenic mice.* Laboratory Animals 35: 379-389.

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