GUIDELINES ON CONTAINMENT MEASURES FOR GENETICALLY MODIFIED ANIMALS

Background:

Under the Genetically Modified Organisms (Contained use) Regulations, 2001, S.I. No. 73 of 2001, there is a statutory requirement for users of Genetically Modified animals to apply the principles of Good Animal House Practice. Herewith find guidelines for GMO users who plan to work with GM animals in animal houses.

Definition of GM animal

A Genetically Modified (GM) or transgenic animal (vertebrate, e.g. GM mouse and/or invertebrate, e.g., GM fruit fly) may be defined as one in which the genetic material has been altered in a way that does not occur naturally by mating or natural recombination or by a combination of both. Such genetic modification may be brought about through the use of techniques listed in Part I of the First Schedule of S.I. No. 73 of 2001.

Consequently a GM or transgenic animal is one where a segment of DNA taken from the genome of another species has been incorporated into the animal's genome utilising genetic engineering techniques. This gene, thus acquired, may be passed onto progeny through replication. It should be noted that the progeny resulting from the breeding of GM animals with non-GM animals would also be considered genetically modified. Transient expression of a gene in animal cells would not constitute a GM animal.

Legislative requirements for GM animals under the GMO (Contained Use) Regulations - S. I. No 73 of 2001

For users of GM animals, contained use, is defined under article 2 of the Genetically Modified Organisms (Contained Use) Regulations, S.I. No. 73 of 2001 as:

> *any activity in which organisms other than micro-organisms are genetically modified or in which such organisms are cultured, stored, transported, destroyed, disposed of or used in any other way and for which specific containment and other protective measures are used to limit their contact with the general public and the environment*

In accordance with article 5 of the GMO (Contained Use) Regulations S.I. No 73 of 2001, the onus is on the user carrying out a contained use activity, to ensure that all appropriate measures are taken to avoid adverse effects on human health or the environment.

It should be noted that containment measures for the use of genetically modified micro-organisms (GMMs) in animals in animal units is not covered by these guidelines but is regulated in accordance with the Fourth Schedule of S.I. No. 73 of 2001, in particular, Table 1C thereof. The use of GMMs requires a separate notification to the Agency for the contained use of genetically modified micro-organisms in accordance with under Part II of the aforementioned Regulations.

GM animals that are placed on the market (no examples to date) under Directive 90/220/EEC as amended by Directive 2001/18 on the deliberate release of GMOs into

the environment or similar product based Community legislation are exempt from the provisions of the GMO (Contained Use) Regulations, S.I. No. 73 of 2001.

Examples of GM animal contained use facilities

- GM animals (e.g., GM mice), retained in cages in animal units/rooms;
- GM farm animals (e.g. sheep) retained in pens/fenced fields;
- GM fish retained in tanks in laboratories;
- GM Insects retained in cages in insect control rooms otherwise known as insectories.

To date the GM animals notified to the EPA, under S. I. No. 73 of 2001, include GM mice, GM rats, GM zebra-fish and GM fruit flies. However, a number of other animals, for example, sheep, cats and pigs, have been genetically modified and are being used by scientists for research purposes in other countries.

Animal Welfare Legislative requirements

The Department of Health and Children is the Competent Authority in Ireland for the protection of animals used for experimental and other scientific purposes in accordance with S. I. No. 17 of 1994 - European Communities (Amendment of Cruelty to Animals Act 1876) Regulations.

In Ireland, the Department of Agriculture, Food and Rural Development regulate the importation of Genetically Modified Animals.

General requirements for work with GM animals:

The environmental risk assessment (ERA) carried out on a case by case basis in accordance with article 36 and Part II of Seventh Schedule of S.I. No. 73 of 2001 will identify the containment and control measures that must be put in place to manage any identified risk.

When working with animals in contained use facilities we recommend that the following procedures be adopted as Good Animal House Practices.

Note: The term GM animal in the course of the following takes account of both vertebrate and invertebrate species that have undergone genetic modification while the terms animal facility/unit/housing encompass insectories, pens, tanks or any other form of animal enclosure as appropriate.

Animal facility

1. Access to the animal facility must be restricted to authorised persons. When the animal house is unattended it must be kept locked.
2. Protective clothing must be worn within the facility.
3. A water supply and a sink must be available within the animal facility.
4. Hands must be disinfected or washed after handling animals or animal/laboratory waste
5. Eating, drinking, smoking, storing of food for human consumption and applying cosmetics is not permitted
6. Mouth pipetting must not take place
7. SOPs must be drawn up for
   - the training of new staff

- all routine operations that are carried out in the facility, for example, measures for limiting access to the unit, transport of GMOs within and outside of the unit, administration of drugs and where applicable the taking of blood, cleaning of equipment, operation, testing and maintenance of containment equipment, disposal of waste.

Staff should be given appropriate training and instruction on the procedures to be carried out, and written records of training should be kept.

8. When an animal facility requires special provisions for entry (e.g., vaccination), a warning sign detailing the entry requirements must be posted on all access doors.
9. All accidents including animal bites, scratches and stings must be recorded and reported to the Director of the facility
10. Insect and rodent control measures (barriers) must be in place to prevent the escape of GM animals and the entry of wild species.
11. Animals must be transported to and from the facility in appropriate animal containers.

Animal Housing

12. All animals must be contained within an enclosed cage/room/pen/tank to avoid the possibility of unintentional release or theft.
13. Effective disinfectants must be available and their use should be alternated.
14. Animal housing must be well ventilated, easy to clean and disinfect
15. Animal rooms/cages/tanks/pens must be disinfected after each use.
16. Male and female animals should be separated to avoid reproductive transmission, unless reproductive studies are part of the experiment.
17. All genetically modified neonates must be permanently marked within 72 hours after birth to facilitate identification. If their size does not permit marking, their containers should be marked.
18. All cages/pens/tanks must be appropriately labelled to reflect the content of each - in particular the number and sex of GM animals contained therein, and the nature of the genetic modification should be recorded.
19. Full records of the receipt, breeding, movement, release and /or disposal of all transgenic animals must be kept.
20. The escape of a GM animal from the animal facility must be reported to the EPA within 24 hours of discovery

Waste

21. A GM animal presents no greater risk to human health or the environment than a non-GM animal, however in the interest of public perception GM animal carcasses should be decontaminated prior to disposal to landfill.
22. An autoclave for the decontamination of waste must be available on site. The off-site decontamination of GM animal carcasses prior to disposal complies with the requirements of the GMO Legislation. However, the acceptance of animal (GM or non-GM) remains by waste disposal contractors may be in contravention of their respective Waste Licences issued under the Waste Management Act. The assurance of the waste disposal contractor that the acceptance of animal remains is permissible under the conditions of his respective waste licence should therefore be sought.

23. Waste being removed from the animal house for the purposes of decontamination must be removed in closed, durable, leakproof containers[1].
24. Waste material such as bedding faeces and urine are not considered to be GM waste and require no additional measures over and above those normally undertaken for such waste.
25. Needles and syringes must be placed in a puncture resistant container and must be autoclaved prior to disposal to landfill.

Annex 1

Additional procedures for the containment of different GM animals

1. Small animals - for example, GM mice

- Animals must be kept in cages appropriate to their size. Cage sizes and minimum space requirements should be in accordance with the Animal Welfare legislative requirements.
- Floor drains (if present) must be made escape proof by the use of wire mesh or other material.
- Appropriate rodent traps should be used at potential escape routes to prevent the escape of GM animals or the entry of wild species.
- Security measures must be put in place in order to prevent theft or vandalism.

2. Large mammals - for example, GM sheep

- Animals must be kept in pens or in fenced areas. Fencing must be adequate to prevent escape of the GM animals or entry by wild species - where this poses a high level of risk, double fencing may be required.
- With respect to burrowing animals, burrowing must be prevented by setting barriers deep into the soil to prevent the GM animals from escaping and wild species from entering.
- Security measures must be put in place in order to prevent theft or vandalism.

3. Aquatic animals - for example, GM fish

- The escape of GM fish and/or their gametes (developing fertilised eggs) from the tank must be prevented by placing appropriately sized filters over water entry/exit routes or drains. The top of the aquarium must also be securely covered to prevent the escape of GMOs.
- In the event of the tank leaking, rupturing or overflowing, the tank should be bunded so as to contain spillage.
- Experimental GMOs should be rendered biologically inactive by appropriate methods before disposal.
- Security measures must be put in place in order to prevent theft or vandalism.

[1] Where onsite decontamination of animal remains is not feasible the user may resort to off-site decontamination

a. in the Republic of Ireland, where decontamination facilities:
   - have the appropriate licences/ permits required by the Waste Management Act; and,
   - are registered/regulated in accordance with the GMO Regulations.

b. abroad, where decontamination facilities:
   - comply with the provisions of the appropriate National & European legislation and protocols.

4. Invertebrates - for example, GM fruit flies

- Appropriate cages must be used in the insectory.
- In order to prevent entry by non-GM insects or the escape of GM insects the use of secondary containment measures around the cages and the insectory must be implemented, for example, the use of gauze or mesh.
- Security measures must be put in place in order to prevent theft or vandalism.