Australian Government
Department of Health and Ageing
Office of the Gene Technology Regulator

Guidance for IBCs assessing NLRDs involving retroviral (including lentiviral) vectors

As of 1 September 2011, the Gene Technology Amendment Regulations 2011 amend the Commonwealth Gene Technology Regulations 2001 (the Regulations). This has changed the way some dealings with viral vectors are classified under Schedule 3. Certain dealings with replication-defective retroviral vectors no longer require a licence, and are now Notifiable Low Risk Dealings (NLRDs) suitable for PC2 containment (see Schedule 3, Part 2.1 (l) and (m) of the amended Regulations). Further guidance on the changes to the classification of dealings with viral vectors is available on the OGTR website on the IBC & Accredited Organizations Information Page.

This guidance document has been prepared to assist Institutional Biosafety Committees (IBCs) in assessing NLRD proposals involving dealings with retroviral vectors able to transduce human cells, particularly in assessing whether: persons have the appropriate training and experience to undertake the dealings; and the facilities are appropriate for the dealings.

The IBC assessment should take into account:

- the properties of the GMO, including the relevant properties of the Retrovirus(es) from which it was derived;
- whether the proposed work practices are both appropriate and sufficient;
- whether the people conducting the dealings will have appropriate training and experience in work practices required for handling the viral vectors; and
- whether the proposed facility is an appropriate for dealings with the viral vectors.

The properties of the GMO

Retroviral vectors have been developed as tools for gene expression on the basis of certain properties of the parent Retroviruses, particularly their cell specificity, and host range. People working with retroviral vectors should be aware that the vectors may retain the ability to integrate into the host chromosome and events such as insertional mutagenesis may still be possible.

Appropriate training, experience and work practices

Viral vectors have become a staple tool in molecular and cellular biology, and are often used by researchers with little experience in virology. In addition to practical training in the appropriate PC2 work practices, it is important that researchers dealing with retroviral vectors are trained (or have experience) in the relevant areas of Retrovirus biology.

To meet the criteria for a PC2 NLRD, Retroviral vectors must have a number of safety features. Nonetheless, it is still important to have appropriate work practices in place to minimise exposure to the vectors.

Minimising exposure requires knowledge of how the virus is transmitted and its entry points into the body. These will be based on the properties of the parent retrovirus, along with the envelope protein in the case of pseudotyped vectors.

The minimum requirements for handling retroviral and lentiviral vectors are those included in the PC2 certification guidelines: wearing gloves and protective clothing that covers the front of the body, and the containment of aerosols. However, additional measures may be needed to prevent exposure of both people conducting the dealings, and others who share the same workspace.

Work practices designed to prevent exposure via different routes are summarised in the following table.

Route of exposure	**Laboratory hazards**	**Relevant work practices**
Mucous membranes	Exposure of mucous membranes (eyes/nose/mouth) via aerosols or splash	Wear safety glasses, face mask or full face shield.
Blood contact	Direct contact with broken skin	Cover broken skin with waterproof dressing
Blood contact	Cuts from sharp objects, needlestick injuries	Avoid the use of sharps, or glass equipment in direct association with the GM viral vectors. Where sharps are necessary, training must include the safe handling of sharps. Consider using safety needles or special injection apparatus to minimise potential for sharps injuries.

Appropriate facilities for the proposed dealings

With the exception of transport, storage and disposal of GMOs, NLRDs involving retroviral vectors must be conducted in a facility certified by the Gene Technology Regulator to at least PC2.

In assessing whether particular PC2 facilities are appropriate for the dealings, consideration should be given to whether a dedicated facility for viral vectors is required. Where shared PC2 facilities are proposed to be used, especially large facilities with common equipment, consideration should be given to the procedures that would be required to ensure that persons not dealing with retroviral vectors are not exposed to the vectors. This could involve procedures to:

- decontaminate shared work areas and equipment after use with retroviral vectors;
- restrict the dealings with retroviral vectors to certain areas or equipment (e.g. biosafety cabinets) within the facility;
- inform all staff working in the facility that dealings with retroviral vectors are taking place and the associated risks; or
- train all staff working in the facility in the work practices/procedures appropriate for dealings with retroviral vectors.

Opportunities for viral recombination should also be minimised by ensuring that dealings with retroviral/lentiviral vectors are not undertaken simultaneously with other viral vector systems or replication-competent viruses.