Safety Manual

Supplement 2.
Safe Handling of Life Science Experiment

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Supplement 2-2.

Safe Handling of Recombinant DNA Experiment

1. Safe Handling of Genetic Recombination

(1) Enactment of a new legislation

→**[Edict Data Supply System]** Refer to the website of the Administrative Management Bureau, Ministry of Internal Affairs and Communications.

a. We have been exercising self-imposed restrictions to ensure the safety relying on the [Guidelines for recombinant DNA Experiments at Research Organizations such as Universities] which was announced by the Education Ministry in March, 1979. In February, 2004, however, the **[Legislation for biodiversity with use restrictions of genetically-modified living organism (see Appendix2-1)]** came into force and the **[Notification by Ministry of Education, Culture, Sports, Science and Technology regarding the enforcement of the legislation for biodiversity with use restrictions of genetically-modified living organism]** was passed to make the new legislation effective. This legislation was established in order to ensure appropriate and smooth enforcement of the [Treaty about Biological Diversity, 'Cartagena Protocol on Bio-safety'].

b. The key change compared to the former Guidelines is the fact that proper measures are to be taken only after sorting out the types of usage into two: Usage Type 1 (Usage that allows the spreading of genetically-modified living organisms) and Usage Type 2 (Usage that does not allow the spreading of genetically-modified living organisms). That is to say, experiments by closed system & experiments in open compartments (which is defined by law as [Specific Isolation Chamber]) based on the Guidelines will be subject to Usage Type 2 and experiments in specific outdoor compartments will be subject to Usage Type 1.

c. Practical rules must comply with the **[Legislation for biodiversity with use restrictions of genetically-modified living organism]** which came into force on February 19, 2004.

(2) Physical Containment

Physical Containment is aimed at preventing recombinants' [propagation to experimenters and others] and [spreading to outside laboratory areas] by caging the recombinants in facilities and equipment. The experiments conducted below the 20L scale are composed of 3 elements; [containment facilities], [layout of laboratories] and [experiment implementation guidance]. Depending on the degree of containment, they are classified into 4 levels; P1, P2, P3 and P4. The

physical containments of P1 and P2 are indicated in **[Appendix 2-2. Classification of Physical Containment]**.

However, it must be noted that the nonproliferation measures on Usage Type 2 by the new Legislation and the physical containment measures by the Guidelines are not always the same. Also, concerning some experiments, it must be noted that the level of the nonproliferation measures to be taken and the level of the physical containment measures by the Guidelines are not the same.

(3) Biologic Containment

a. Biologic Containment by the Guidelines

Concerning the experiments that handle viruses, there are 2 ways as mentioned below based on the aspect of contagiosity.

i. Prevent the recombinants from propagating and spreading by using the [hosts that survive only under special culture conditions] and [hosts combined with vectors that do not have contagiosity to non-laboratory animals - Vector system].

ii. Maintain the high biologic safety of the recombinants and ensure the experimental safety by using [hosts that have been approved to have low possibility of causing biologic disaster – Vector System]. Also, concerning the experiments for which cultured cells are used, ensure the safety by taking the below-mentioned measures.

iii. Study the biologic quality of the [DNA donors] used in the process of making the recombinants.

iv. In addition to iii, study the biologic quality of the [hosts – vector system]. Biologic containment is classified into B1 or B2 level depending on its level. The overview of the details is as in **[Appendix 2-3. Authorized Host – Vector System]**.

b. Interpretation by the New Legislation

The virus and viroid treated as vectors according to the Guidelines will be treated as living organisms and hosts. Among the cultured cells treated as hosts by the Guidelines, human cells and cells with differentiation capability or differentiated cells (excluding individual pieces and gametes) that do not grow into individual pieces under natural conditions will not be treated as living organisms and hosts.

Most of the experiments using recombinant cultured cells (only the experiments for which recombinant viruses are not used), which are considered as [Recombinant DNA Experiment] according to the Guidelines, therefore, will not be considered as objects of the Legislation. Among these experiments, however, it must be noted that rules and regulations such as Industrial Safety and Health Law intended for protecting human health should be adapted for experiments that have an

influence on the health of the experimenters.

Also, in addition to the so-called gene-recombination technology, living organisms that have nucleic acid or cloned copies acquired by cell fusion technology of an organism that belongs to a different family (only the technologies other than the existing ones such as hybridization) will be considered as Genetically-Modified Organisms according to the Legislation.