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Proposal for Numbering Mutants of Avian Leukosis and Sarcoma Viruses

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A system for the numbering of mutants of avian sarcoma and leukosis viruses is proposed.

Several laboratories have isolated and characterized conditional and nonconditional mutants of avian leukosis and sarcoma viruses (1-15, 17-28, 30-35). Such mutants have proven useful in identifying some viral genetic functions, but for an adequate definition of all viral genes several hundred mutants may be required. Thus, the numbers of avian tumor virus mutants which will be described in the literature are likely to rise rapidly over the next few years. Genetic work with avian RNA tumor viruses has been further stimulated by the discovery of recombination in this viral group (16, 28). Recombination experiments will also greatly increase the number of genetically distinct viruses. In order to ward off impending confusion, this communication proposes a convention for designating and numbering mutants of avian leukosis and sarcoma viruses.

Laboratory code letter. Each laboratory isolating conditional or nonconditional mutants of avian leukosis and sarcoma viruses selects two capital letters which will be listed, preferably in italic type, before the mutant number. The current laboratory code is as follows; *BE* = Bethesda, John P. Bader; *BN* = Berlin, Robert R. Friis; *LA* = Los Angeles, Peter K. Vogt; *LO* = London, G. Steven Martin, Robin A. Weiss, and John A. Wyke; *MA* = Madison, Howard M. Temin; *NE* = New York, Allan Goldberg; *NY* = New York, Hidesaburo Hanafusa, Teruko Hanafusa, and Sadaaki Kawai; *OS* = Osaka, Kumao Toyoshima; *PA* = Paris, Philippe Vigier and Jean-Michel Biquard; *PH* = Philadelphia, William S. Mason; *ST* = Stanford, William Robinson and Harriette Robinson; *TU* = Tübingen, Thomas Graf. New laboratory code letters should be registered with Peter K. Vogt to avoid duplication.

Mutant number. Investigators may assign any number to a new mutant isolated in their laboratory. Mutant numbers may include lower-case Greek, but not Roman, letters. However, a given mutant number or number-letter combination may be issued only once by the same laboratory. This restriction should apply to all avian RNA tumor viruses encompassing conditional and nonconditional mutants and sarcoma, as well as leukosis, virus mutants.

Mutant category. Several categories of mutants have been recognized. These include temperature-sensitive (*ts*) conditional mutants, and nonconditional mutants such as transformation-defective (*td*) derivatives of avian sarcoma viruses, replication defectives (*rd*), coordinately defective (*cd*) viruses, which neither transform nor replicate, and mutants in focus morphology (fusiform, *morph^f*, or *ff*). In general, it will be sufficient to give a definition of the mutant category in the Materials and Methods section of a paper; however, if mutants of several categories are used, a suitable abbreviation of the mutant category should be incorporated in the designation of each mutant. This abbreviation should consist of lower-case italic letters (preferably two) to be placed

TABLE 1. *Avian sarcoma virus strain designations*[a]

Designation	Definition
B77	Avian sarcoma virus strain Bratislava 77
BH	Bryan high titer of RSV
BS	Bryan standard strain of RSV
CZ	Carr-Zilber strain of RSV
EH	Engelbreth-Holm strain of RSV
FU	Fujinami sarcoma virus
HA	Harris strain of RSV
PR	Prague strain of RSV
SR	Schmidt-Ruppin strain of RSV

[a] RSV, Rous sarcoma virus.

without a hyphen before the laboratory code letter (e.g., *tsLA*335 = temperature-sensitive mutant 335 isolated in laboratory *LA*).

Wild-type strain. In most cases it would suffice to note the wild-type strain from which a mutant is derived in the Materials and Methods section. However, if mutants of several wild-type strains are described, it may be desirable to include an abbreviation of the strain in the mutant designation. This abbreviation should follow the mutant number. A list of suitable abbreviations of avian sarcoma virus strains is given in Table 1. Abbreviations for leukosis viruses may be obtained from the literature (e.g., *tsLA*337PR = *ts* mutant 337 isolated from Praque strain of Rous sarcoma virus in laboratory *LA*).

Mutant subgroup. The envelope subgroup of a mutant should also be given in the Materials and Methods section. Alternatively, this information may be included in the designation of individual mutants. It should then be appended, by using a hyphen, as a capital letter (Roman type) to mutant number or wild-type strain designation, e.g., *LA*335-C or *LA*335PR-C).

Double mutants. If a second mutation is introduced in a mutant virus, a supplementary number should be attached to the first mutant number by using a hyphen. This supplementary number is subject to the same restrictions stipulated for the mutant number (see above); i.e., it cannot be a mutant number already used by the same laboratory. Thus, ambiguity is avoided if the two mutations are separated by recombination. The second number may also include information on the category of the new mutant (e.g., *LA*335-*td*121 = a transformation defective derivative of *LA*335 isolated in laboratory *LA*). If the secondary mutation is isolated in a different laboratory, the appropriate laboratory code letter should precede the secondary mutant number (e.g., *LA*335-*NY*4 = a transformation-defective derivative isolated from *LA*335 in laboratory *NY*). Mutant viruses which are isolated as bona fide single mutations but are later found to carry multiple mutations should be marked by a lower-case Roman "m" (for multiple) after the mutant number [e.g., *LA*334m (21)]. If the two mutations of a double mutant are separated, e.g., by recombination, they should each be assigned a separate number. This could be done simply by adding a digit to the old mutant number, bearing in mind that the newly created numbers must not coincide with one previously used by the same laboratory (e.g., *LA*334m → *LA*3341 and 3342).

Table 2 summarizes the elements of the proposed mutant abbreviations with the aid of specific examples. The designations listed in the right-hand column contain the minimal

TABLE 2. *Elements of mutant designations*

Extended information		Minimal information
*tdLA*100B77-C	=	*LA*100[a]
*cdNY*αBH	=	*NY*α[b]
*tsLA*335PR-C	=	*LA*335

Envelope subgroup
Wild type strain
Mutant number
Laboratory code
Mutant category

[a] Previous designation: NTB77 (26).

[b] Previous designation: RSVα (10,11,12)

information which is necessary to identify a mutant, i.e., laboratory code letter and mutant number; both should always be used to refer to a mutant. The designations in the left-hand column of the table contain additional information, such as mutant category, wild-type strain, and subgroup, which may be important in the context of a particular experiment. The inclusion of this additional information in the mutant designation is optional; however, this information should be given in the Materials and Methods section.

The following investigators have agreed to these conventions: John P. Bader, Jean-Michel Biquard, J. Michael Bishop, David Boettiger, Peter H. Duesberg, Robert R. Friis, Donald Fujita, Allan R. Goldberg, Thomas Graf, Teruko Hanafusa, Sadaaki Kawai, Maxine Linial, G. Steven Martin, William S. Mason, Harriette Robinson, William Robinson, Howard M. Temin, Kumao Toyoshima, Harold Varmus, Philippe Vigier, and John A. Wyke.

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