

Site-Directed Endonuclease Mutagenesis: Naming Mutations

ABSTRACT

The Mouse Genome Informatics (MGI, www.informatics.jax.org) Database serves as the authoritative repository of official symbols and names for mouse genes, alleles, and strains, implementing the rules and guidelines established by the International Committee on Standardized Genetic Nomenclature for Mice. MGI hosts the website, <http://www.informatics.jax.org/nomen>, where the most current version of the guidelines for mouse and rat nomenclature for genes, alleles and strains can be found. The application of powerful new site-directed endonuclease mutagenesis systems, such as zinc finger nuclease (ZFN), transcription activator-like effector nuclease (TALEN) and clustered regularly interspaced short palindromic repeat, CRISPR associated protein 9 (CRISPR/Cas9), is resulting in a flood of publications reporting the creation of new mutant alleles and strains of mice. The current guidelines established by the International Committee to designate these endonuclease-mediated mutant alleles use the following format: *Gene*^{em#Labcode} where "Gene" is the gene symbol, "em" designates the allele as endonuclease-mediated, "#" is

a serial number from the laboratory of origin, and "Labcode" is the ILAR-registered laboratory code of the investigator or institution where the mutation was produced. For example, *Scn8a*^{em1Mm} is the first endonuclease-mediated mutation of the *Scn8a* gene produced in the laboratory of Miriam Meisler. Not every endonuclease-mediated mutation created requires official nomenclature. Similar to transgenes, many endonuclease-mutations are often made in an experiment, but only one or a few of the mutations are actually studied or maintained. Those that are published, phenotyped, and maintained are the most important for establishing official allele symbols and names. You can reserve nomenclature for your endonuclease-mediated mutations by submitting to MGI at http://www.informatics.jax.org/mgihome/submissions/amsp_submission.cgi. Nomenclature Guidelines are available at www.informatics.jax.org/nomen. Authors can email MGI nomenclature staff at nomen@jax.org to reserve new nomenclature pre-publication or for help with determining correct nomenclature. Supported by NIH grant HG000330.

NOMENCLATURE

When does an 'em' allele receive official nomenclature?

1. Unambiguously defined at the molecular level.
2. Germ line transmission is achieved.
3. A strain with a defined allele is actively maintained or cleanly cryopreserved.

Allele

New 'em' Allele

Name endonuclease-mediated mutation 1, Jackson

Symbol *Abca16*^{em1J}

1. Mutation type 2. number 3. lab code

1. Endonuclease-mediated mutation (em)
2. Serial number for all em alleles of this gene generated by a specific lab
3. Unique 1 to 5 letter ILAR-registered lab code for generating laboratory

Revertant Allele

Endonuclease-mediated mutations that revert an existing mutant phenotype receive revertant nomenclature.

Name endonuclease-mediated reversion 1, Jinsong Li

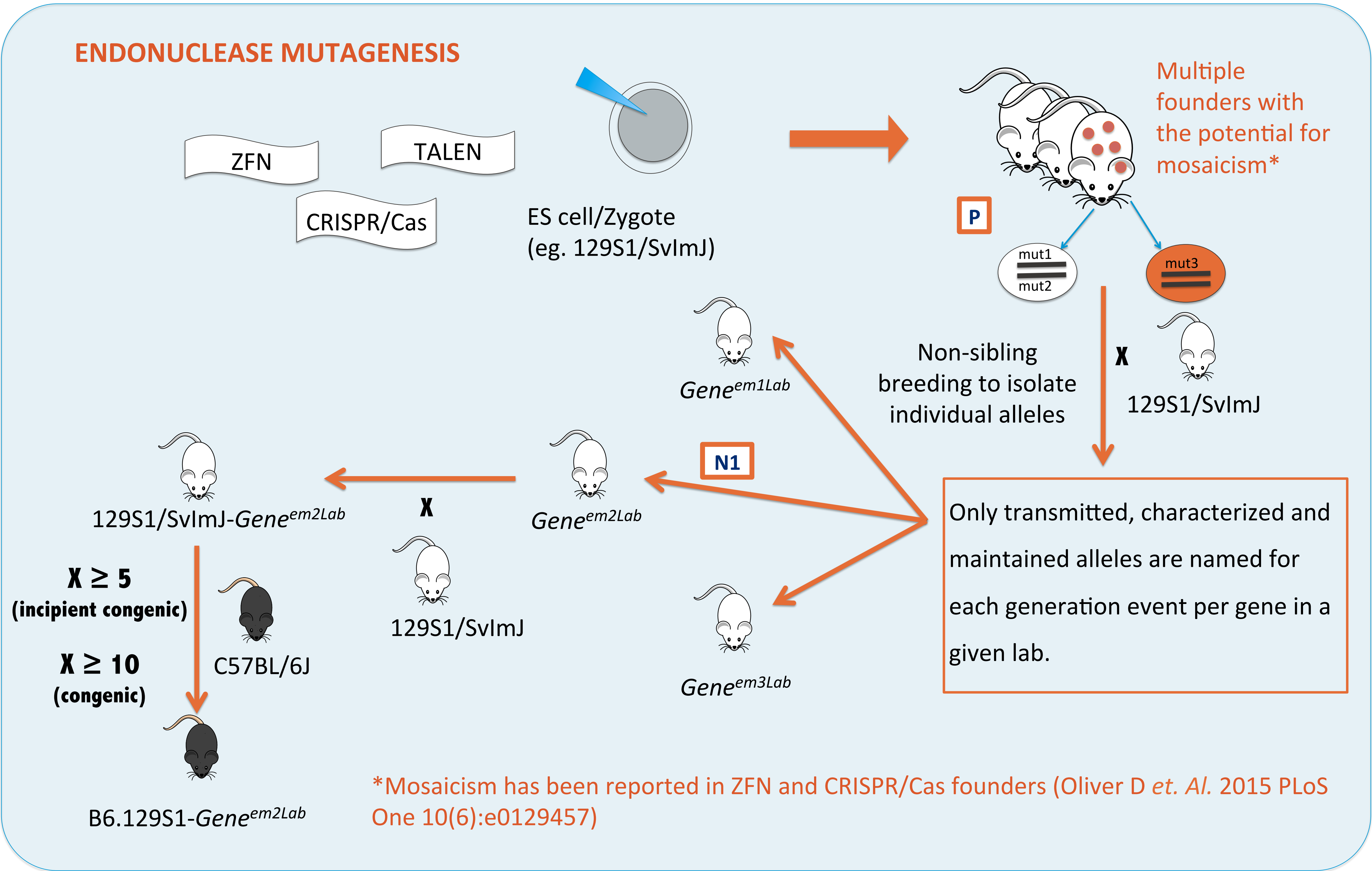
Symbol *Crygc*^{M1Sbao+em1Jsl}

Mutation being reverted

Targeting Existing Alleles

Endonuclease-mediated mutations of existing alleles and mutations that do not revert the phenotype receive standard 'em' nomenclature with the next serial number for 'em' mutations in a gene for a lab.

ENDONUCLEASE MUTAGENESIS



Strain

Generation Definitions

- Parental mouse in which mutation occurs (not included in the generation definition of subsequent generations)
- **p** (lower case) indicates cryopreservation generation
- **N** backcross generation number
- Filial or inbreeding generation number (sister X brother)
- + generation numbers before the "+" took place prior to mutation; after the "+" are generation numbers after mutation (e.g. F12+F6)

Coisogenic

C57BL/6J-Alb^{em8Mvw}/*MvwJ*

Strain generated and maintained on Strain lab code

Congenic

B6.Cg-Alb^{em12Mvw} *Fcgrt*^{tm1Dcr}/*MvwJ*

Backcross strain Strain of origin (Cg for unknown, complex, or not inbred strain of origin)