

Ross Laboratory Mouse Colony Nomenclature

We use the following convention when designating generations:

locusactiongene.generation
└──────────────────┘
strain.generation

Strain

Single-locus alterations

The first part, called the strain, describes the genetics of the mouse. We include in the strain description the locus involved, the action we performed at that locus, and the specific gene affected at that locus.

Ex. 1: Our original Hip1 KO mouse had the Hip1 gene knocked-out of the Hip1 locus.

Locus: Hip1	The proper name for a mouse of this type is:
Action: KO	Hip1KOHip1.generation
Gene: Hip1	

In this case, it is redundant to name the gene that has been deleted, so we have named this particular mouse Hip1KO.generation

Practice Problem #1

What is the proper name for the p53 Knock-out mice that we purchased from Jackson?

Locus: _____ Strain name: _____ .generation
Action: _____
Gene: _____

Multi-loci alterations

When a mouse has alterations at multiple loci, a semi-colon is placed between a description of each loci altered. The loci are listed in alphabetical order:

locusactiongene;locusactiongene.generation	2 loci
locusactiongene;locusactiongene;locusactiongene.generation	3 loci

Ex. 2: If we mated a Hip1KO.F2 (-/-) with a p53KO.F (-/-) we would produce a mouse that has the Hip1 gene knocked-out of the Hip1 locus (partially) and also the p53 gene knocked-out of the p53 locus (partially).

Locus1: Hip1	Locus2: p53	The proper name for a mouse of this type is:
Action1: KO	Action2: KO	Hip1KOHip1;p53Kop53.generation
Gene1: Hip1	Gene2: p53	

In this case, it is redundant to name the gene that has been deleted, so we have named this particular mouse Hip1KO;p53KO.generation

Practice Problem #2

If we mate a Hip1KO.F2 (-/-) with a Hip1rKO.F2 (-/-) we would produce a mouse that has the Hip1 gene knocked-out of the Hip1 locus (partially) and also the Hip1r gene knocked-out of the Hip1r locus (partially). What is the proper name for this mouse?

Locus1: _____ Locus2: _____ Strain name: _____
Action1: _____ Action2: _____ _____generation
Gene1: _____ Gene2: _____

Strain Names for our current mouse populations

Hip1 Knock-out Colony:	Hip1KO.generation
Hip1 Conditional Knock-out Colony	Hip1CKO.generation
Hip1/PDGR β R Knock-in Colony	Hip1dKIH/P.generation
p53 Knock-out Colony	p53KO.generation
Cre Transgenic [TgN(hCMV-Cre)]	hCMV-Cre.generation
Cre balancer1 [TgN(balancer1)1Cgn]	bal1.generation
C57BL/6 wild-types	C57.F
129X1/Sv wild-types	129.F
BALB/c wild-types	BALBc.F
BA (Thy1.1/Thy1.1 homozygotes)	BA.F
Hip1KO x Hip1dKIH/P	Hip1KIH/P;Hip1KO.generation
Hip1KO x p53KO	Hip1KO;p53KO.generation
hCMV-Cre x Hip1dKIH/P	hCMV-Cre;Hip1dKIH/P.generation

Generation

The second part of the strain.generation convention describes the number of generations each mouse is from the original founders of that strain.

Founders (.F)

These are chimeric mice, inbred mice, or mice that are purebred for the specific gene of interest. A 129X1/Sv mouse purchased from Jackson would be called 129.F

First Generation Mice (.F1)

These are produced when founders are mated. They are the first generation within a new strain and carry one copy of the affected gene from the founder parent. A Hip1KO.F mated with a C57.F would produce a Hip1KO.F1 mouse.

Second Generation Mice (.F2) and subsequent generations (.FX)

These are produced when F1 mice are crossed with each other. They are two generations away from the original founders. Thus, they can carry no copies of the affected gene, only one copy of the affected gene, or two copies of the affected gene. Because this is the first generation within a new strain that can carry two copies of the affected gene, it is advisable to use mice that are homozygous for the affected gene from this generation (or from subsequent generations) in order to introduce the affected gene into other strains. A Hip1KO.F1 mated with another Hip1KO.F1 would produce a Hip1KO.F2 mouse. A Hip1KO.F2 mated with another Hip1KO.F2 would produce a Hip1KO.F3, and so on.

Hybrid Crossings

A hybrid is produced by mating a mouse with an affected gene on one locus to a mouse with an affected gene on a separate locus. The progeny of such a mating are a new strain of mouse and should be named according to the above naming conventions.

First Generation Hybrid Mice (.H1)

These are produced by mating mice with alterations on two different loci. A Hip1KO.F2 mated with a Hip1dKIH/P.F2 would produce a Hip1dKIH/P;Hip1KO.H1 mouse.

Second Generation Hybrid Mice (.H2) and subsequent generations (.HX)

These are produced when H1 mice are crossed with each other. They are two generations away from the original non-hybrid parents. As with F2 mice, these are the first generation of hybrid mice that can carry two copies of the affected gene at BOTH loci. Only mice homozygous for the affected gene at both loci from this generation (or from subsequent generations) should be used in further mating experiments. A Hip1dKIH/P;Hip1KO.H1 mated with another Hip1dKIH/P;Hip1KO.H1 would produce a Hip1dKIH/P;Hip1KO.H2 mouse, and so on.

Ex. 3: If we mated a Hip1KO.F2 (-/-) with a p53KO.F (-/-) we would produce a Hip1KO;p53KO mouse. Because the gene alterations occur at different loci, we have produced a hybrid mouse whose strain differs from either of its parents. Thus, it would be an H1 mouse.

The proper strain.generation for this mouse is: Hip1KO;p53KO.H1

Practice Problem #3

If we mate a Hip1KO.F2 (-/-) with a Hip1rKO.F2 (-/-) we would produce a Hip1KO;Hip1rKO mouse of what generation?

Hip1KO;Hip1rKO._____

Back-crossing

A back-cross occurs when a mouse that has been produced under one background is mated with a wild-type of a new background. The progeny of such a mating is a back-cross generation, possessing roughly 50% of the characteristics from the backgrounds of each of its parents. It is possible for some progeny to be closer to one background or the other. If these back-crossed mice are mated with a wild-type of the new background, then the resulting progeny will be further back-crossed and should possess >50% of the characteristics from the new background. After 5-10 back-crossings, the progeny are considered completely of the new background.

First Back-cross Generation (.N1)

These are produced when a mouse of one background is mated with a wild type of a new background. A Hip1KO.F2 (produced on the C57BL/6 background) mated with a 129.F (wild-type of the 129X1/Sv background) would produce a Hip1KO.129N1 mouse.

Second Back-cross Generation (.N2) and subsequent generations (.NX)

These are produced when an N1 mouse is mated with a wild type of the background onto which the N1 was mated. A Hip1KO.129N1 mated with a 129.F would produce a Hip1KO.129N2 mouse. A Hip1KO.129N2 mated with a 129.F would produce a Hip1KO.129N3 mouse, and so on.

Ex. 4: If we mated a Hip1KO.F2 (-/-) with a BALBc.F (+/+) we would produce a back-crossed mouse. The Hip1KO.F2 mouse was produced on the C57BL/6 background. The BALBc.F is a wild-type of the BALB/c background.

The proper strain.generation for this mouse is: Hip1KO.BALBcN1

Answers to Practice Problems

#1: p53, KO, p53, p53KO.generation

#2: Hip1, KO, Hip1, Hip1r, KO, Hip1r, Hip1KO;Hip1r.KO.generation

#3: Hip1KO;Hip1rKO.H1