Gene Knock-in

Knock-in represents the introduction of specific mutations or exogenous genes, such as point mutations (mimicking human genetic disease) at the selected location or reporter genes (e.g., EGFP, RFP, mCherry, YFP, LacZ, Luciferase etc.) or functional cDNAs (such as Cre, Dre etc.) into a specific genomic locus through homologous recombination, thereby allowing the exogenous DNA fragment to be expressed. A simultaneous occurrence of knock-in and knock-out can be achieved by replacing a murine endogenous gene with a foreign DNA fragment.

Accelerate your research with customized gene knockin mouse models that provide thorough insight into key genetic mechanisms.

- Grant novel functions at genomic loci of interest
- Track gene expression
- Trace genetic lineage to define cell origin
- Create humanized mouse model to facilitate I/O research

Knock-in models include:

- Conventional gene knock-in
- Point mutation
- Conditional point mutation
- Humanization

It usually takes 6-9 months to generate a conditional gene knockin mouse model by CRISPR gene editing technology.

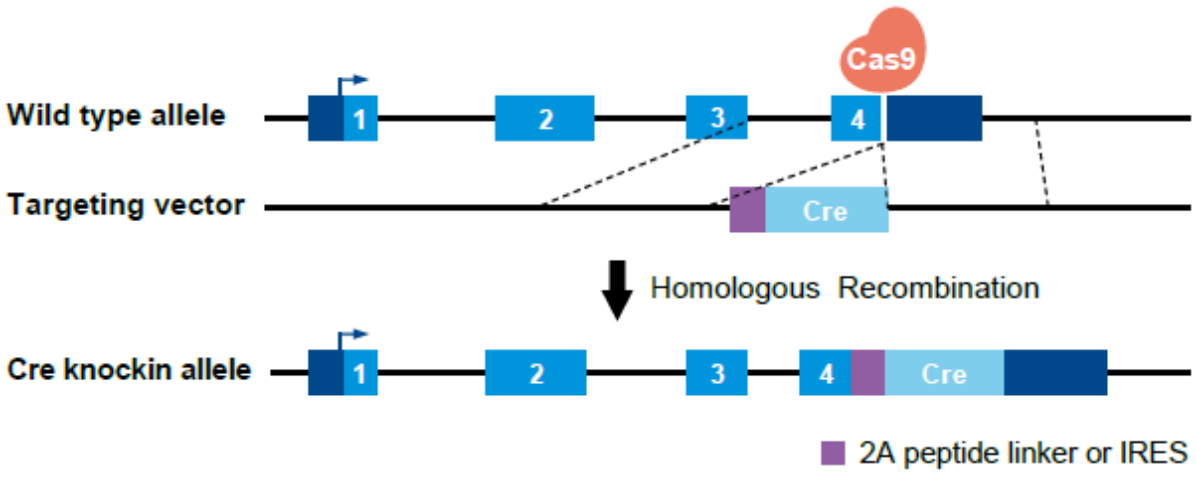
It usually takes 9-12 months to generate a conditional gene knockin mouse model by ES cell targeting technology.

Shanghai Model Organisms Center (SMOC) has more than 6000 research-ready GEM models. Check out our website to find out whether your model of interest is available for direct purchase.

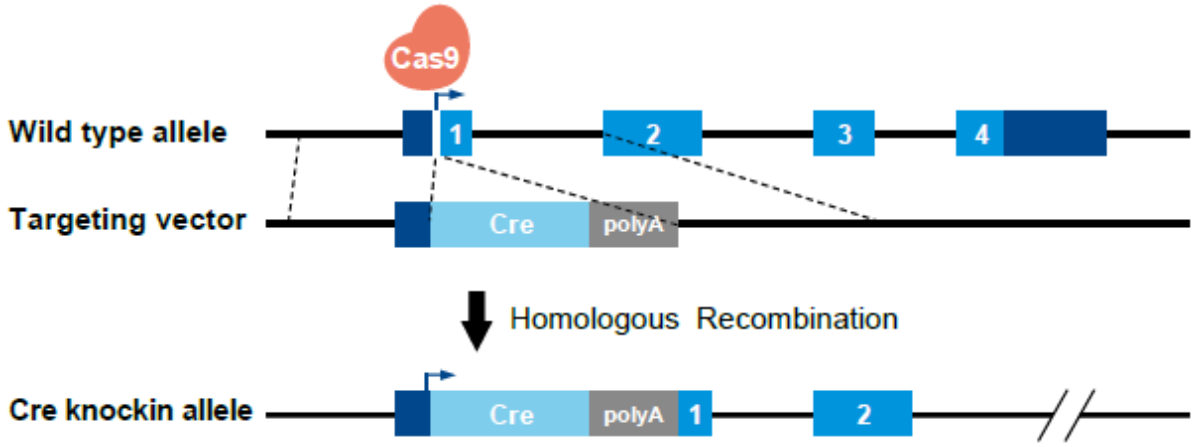
Alternatively, you may contact our technical support staff to design a customized, gene knock-out model that fits your need best.

Conventional gene knock-in

Schematic of co-expression of exogenous genes:

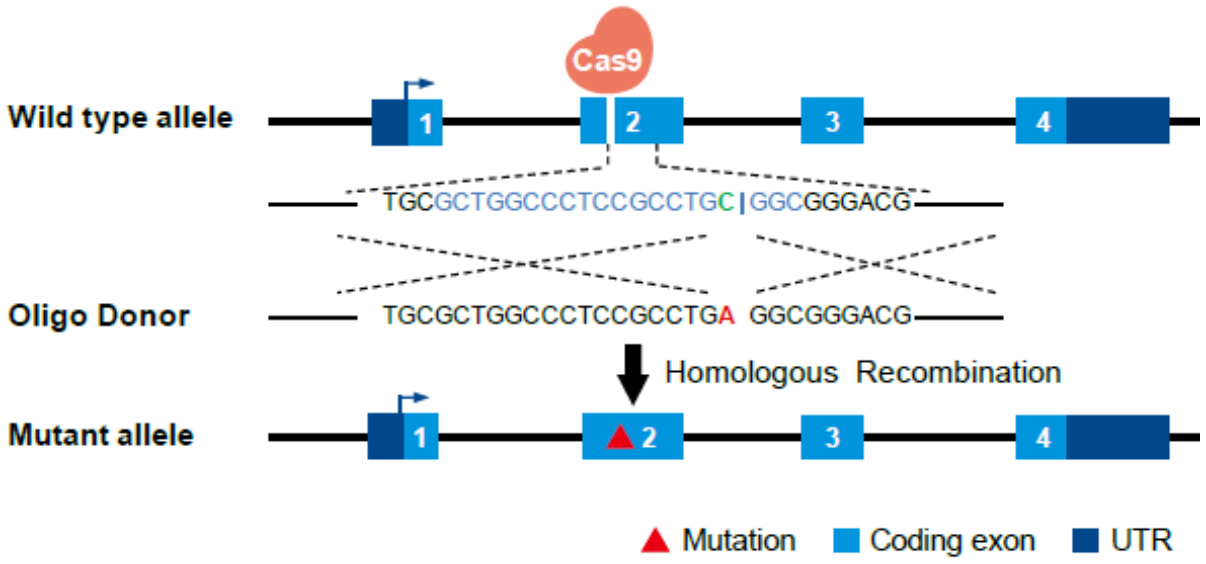


Schematic demonstration of replacing murine endogenous genes with exogenous DNA (i.e. knock-in and knockout simultaneously):



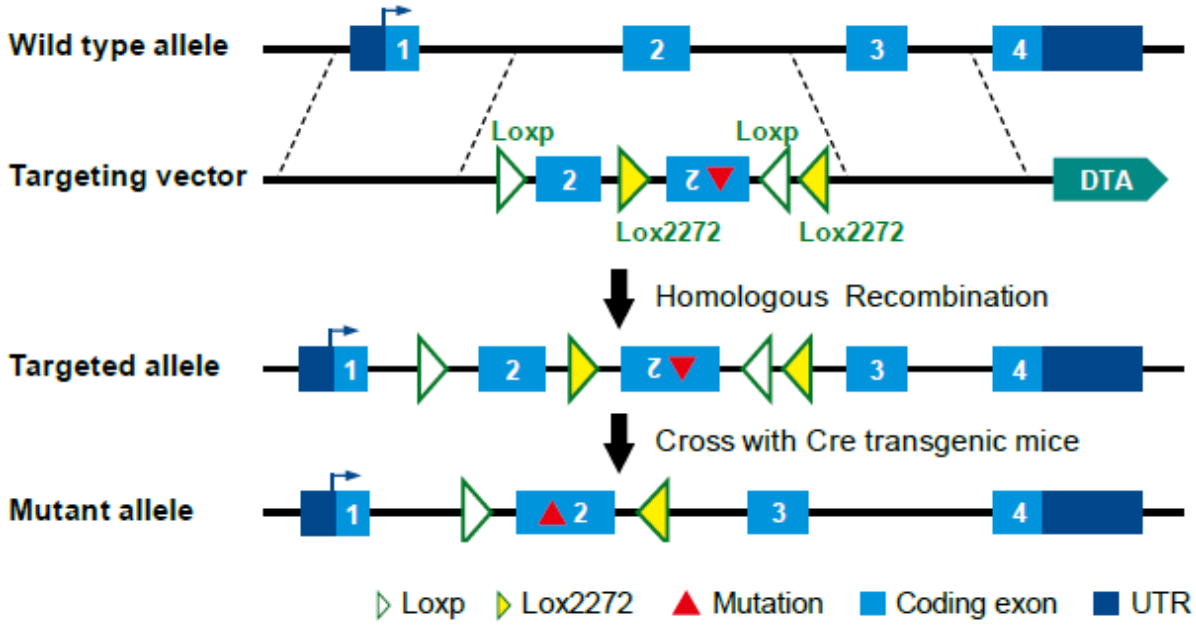
Point mutation

Introduction of point mutations into the corresponding positions of murine orthologous gene.

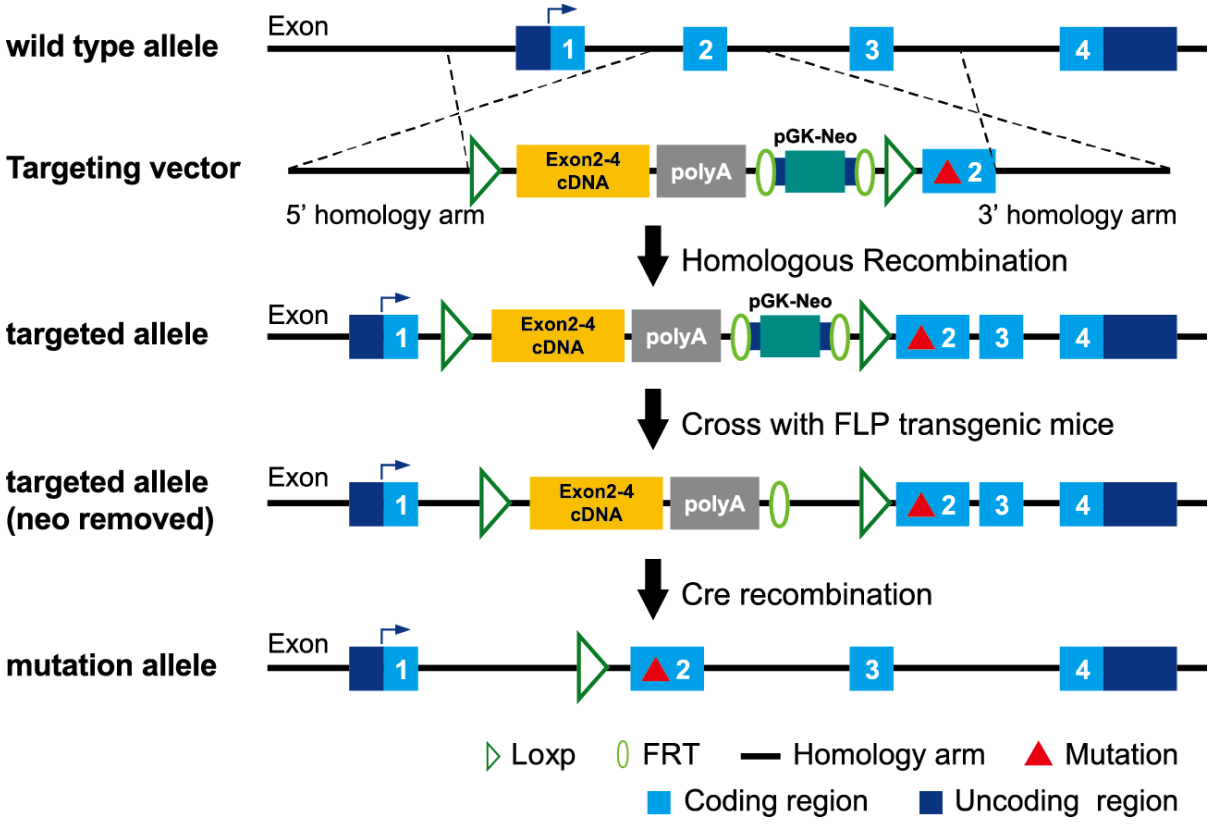


Conditional point mutation

Tissue-specific point mutations can be achieved by inserting an expression cassette carrying the desired point mutation, which is flanked by the Cre-loxP element, into the corresponding positions of mouse orthologous gene.



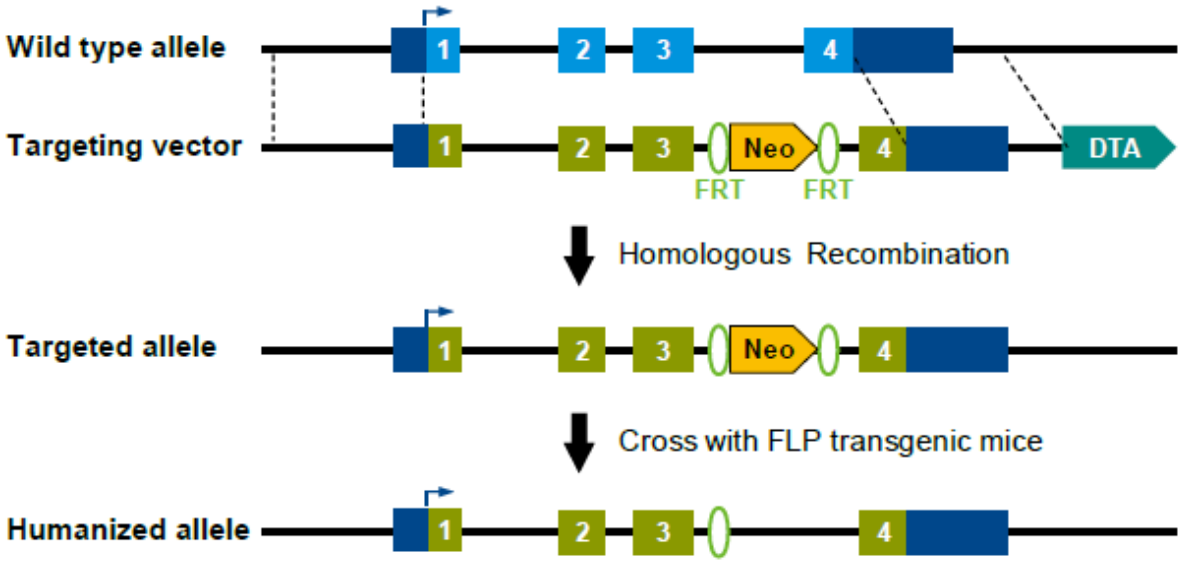
Conditional point mutations can also be achieved by inserting two loxp sites and the exon with mutations.



Humanization

The mouse endogenous gene was replaced with a human ortholog to generate a humanized genetically engineered mouse model. Humanized mouse models are widely used in disease modeling, immunology-oncology research and pre-clinical efficacy evaluation.

Complete replacement:



Incorporation of full-length human cDNA at the start codon of the mouse endogenous gene, followed by a poly(A) site. This guarantees an exclusive expression of the human gene.