

# Repository of Research-Ready Genetically Engineered Mouse Models



**2018–2019**  
**MOUSE MODELS CATALOG**

Knockout • Knockin • Transgene • Point Mutation  
Humanized • Recombinase Tool Models

Our vision is to provide researchers all over the world with comprehensive, convenient and professional animal model services to facilitate a simplified and highly-efficient approach towards uncovering the mysteries of life.

**300,000**

**300,000 SPF mice in  
barrier facilities**

**3000<sup>+</sup>**

**More than 3,000 GEM  
models**

**380<sup>+</sup>**

**More than 380 Research-  
Ready GEM models**

Founded in September 2000, Shanghai Model Organisms Center, Inc. (SMOC) specializes in model organisms and is dedicated to gene editing and life decoding.

We provide customized solutions such as genetically engineered animal models, phenotype analysis and high-throughput screenings to advance life science research and drug discovery. SMOC owns a rapidly-growing repository of Research-Ready models , including immunodeficient and humanized mouse models to advance R&D for cancer immunotherapy.

Our breeding facility is equipped with 60,000 specific pathogen-free (SPF) cages which can hold up to 300,000 rodents. Health and safety procedures for animal handling are strictly complied. Animal welfare is highly prioritized by SMOC and which has earned us the AAALAC accreditation.

Since the establishment of Shanghai Model Organisms, more than 3,000 genetically engineered mouse models have been developed, including nearly 400 Research-Ready models with independent intellectual property rights. Our Research-Ready mouse model repository is rapidly expanding at nearly 100 new strains per year, helping you to effectively shorten your experimental period.

Please visit [www.modelorg.com](http://www.modelorg.com) for the latest strain information.

## Mouse strains index

### O P04

4-1BB  
4-1BBL

### A P04

Adipoq  
Apoe  
Atg5

### B P05

Bpifa1

### C P05

Cbx7  
Cd27  
Cd274  
Cd276  
Cd40  
Cd80  
Cth

### D P06

Dppa3

### E P06

Egfr  
Ern1  
Esrra

### F P07

F8  
Fcgrt  
Foxn1

### G P07

Ghsr  
Gitr  
Gpr26

### H P07

Hdac10  
Hdac11  
Hdac5

### I P08

Icos  
Il10  
Il11  
Il17a

### J P09

Jmy

### K P09

kif18A  
Krt14

### L P10

Lag3  
Ldlr  
Lep

### M P10

Map2  
Mycn

### N P11

Nipbl  
Nlrc5

### O P11

OX40  
OX40L

### P P11

PD-1  
Pdc10  
PD-L1  
Prkdc

### R P12

Rag1  
Rag2  
Rest

### S P13

Sema3g  
Sidt2  
Snap25

### T P14

Tespa1  
Tigit  
Tim3  
Tnf  
Tnfrsf11b  
Trp53

### U P16

Ucp2

### V P16

Vps53

### W P16

Wls

### Y P16

Yap1

### Z P16

Zfp24

## Mutation types index

### Knockout

P17

Adipoq  
Apoe  
Cd274  
F8  
Fcgrt  
Il13  
Ldlr  
Lep  
Rag1  
Rag2

### Humanized

P17

4-1BB  
Icos  
Il17a  
OX40  
PD-1  
PD-L1  
Tigit  
Tim3

### Conditional Knockout

P18

Ar  
Atg5  
Egfr  
Hdac10  
Il10  
Il2  
Pdc10  
Reg3b  
Rest

### Transgene

P18

Tg(MMTV-PLAG1)

### Recombinase Tool Models

P18

Alb-(CreERT2)  
Map2-(CreERT2)  
Myh6-(Cre)

### Knockin

P19

Cth-(Luc)  
Il11-(Luc-EGFP)  
Il12a-(Luc-EGFP)  
Il17a-(CreERT2)  
Isl1-(CreERT2)  
Myh6-(Cre)  
Tnf-(Luc-EGFP)

### Point Mutation

P19

Ldlr-(T541C)

## Sort by gene symbol

|   | Gene Symbol      | Type | knockin elements | Research Application  |  |
|---|------------------|------|------------------|---|--|
| O | 1190002N15Rik    | CKO  |                  |   |  |
|   | 1700074P13Rik    | KO   |                  |   |  |
|   | 4-1bb (Tnfrsf9)  | HU   |                  | Immunotherapy, Cancer research, Drug screening                          |  |
|   | 4-1bbl (Tnfrsf9) | HU   |                  | Immunotherapy, Cancer research, Drug screening                          |  |
|   | 4930578C19Rik    | CKO  |                  |   |  |
| A | Abcb11           | KO   |                  |   |  |
|   | Abcc1            | KO   |                  |   |  |
|   | Abcg2            | KO   |                  |   |  |
|   | Abi3bp           | CKO  |                  | Cancer research, Stem cell research                                     |  |
|   | Abtb1            | KO   |                  | Cancer research, Immunology research                                    |  |
|   | Acot7            | CKO  |                  | Fatty acid synthesis and metabolism                                     |  |
|   | Adgra1           | CKO  |                  | Adhesion GPCR, Nervous system, Synaptic function research               |  |
|   | Adgra2           | CKO  |                  | Cardiovascular system, Nervous system related research, Cancer research |  |
|   | Adgrd1           | CKO  |                  | Adhesion GPCR, Glioblastoma study                                       |  |
|   | Adgrf1           | KO   |                  | Adhesion GPCR, Nervous system, Synaptic function research               |  |
|   | Adgrf4           | KO   |                  | Adhesion GPCR   |  |
|   | Adgrf5           | CKO  |                  | Metabolic and respiratory related research                              |  |
|   | Adgrg3           | KO   |                  | Adhesion GPCR, Immune system  |  |
|   | Adgrg6           | CKO  |                  | Cardiovascular system, Metabolism, Aging related research               |  |
|   | Adgrg7           | KO   |                  | Digestive system related research                                       |  |
|   | Adipoq           | KO   |                  | Lipid metabolism  |  |
|   | Agk              | CKO  |                  | Sengers syndrome, Mitochondria study                                    |  |
|   | Agrt1a           | KO   |                  | Cardiovascular system, Nervous system                                   |  |
|   | Ahi1             | CKO  |                  | Retinopathy, Renal depletion, Jubbert syndrome                          |  |
|   | Ahr              | KO   |                  |   |  |
|   | Aimp1            | CKO  |                  | Inflammation, Immune system   |  |
|   | Alb              | KI   | CreERT2          |   | Liver specific Cre recombination                   |
|   | Anp32b           | CKO  |                  |   | Chromatin modification, Apoptosis, Cancer research |

| Gene Symbol       | Type | knockin elements | Research Application   |
|-------------------|------|------------------|--|
| Apln              | KI   | DreERT2          | Vascular endothelial cell specific Dre recombination   |
| Aplnr             | KI   | DreERT2          | Dre recombination  |
| Aplnr             | KI   | CreERT2          | Cre recombination  |
| Apob              | PM   | Q1388H           | Lipid metabolism, Cardiovascular disease   |
| Apoe              | KO   |                  | Atherosclerosis, Hyperlipidemia, Hypercholesterolemia, Cardiac dysfunction, Cerebral infarction, Alzheimer's disease and Chronic hepatitis B |
| Appl1             | CKO  |                  |  |
| Appl2             | CKO  |                  | Glucose uptake, Cell proliferation and apoptosis, Macrophages, Cancer research   |
| Ar                | CKO  |                  | Androgen insensitivity syndrome, Obesity, Diabetes, Prostate cancer, etc.  |
| Asap3             | CKO  |                  | Cell migration and invasion, Cancer research   |
| Atg5              | CKO  |                  | Autophagy, functional study of Atg5  |
| Atg5              | KO   |                  | Autophagy, functional study of Atg5  |
| Atg7              | CKO  |                  | Autophagy research   |
| Atp7b             | PM   | H1071Q           |  |
| AU021092          | CKO  |                  | Thyroid hormone synthesis  |
| <b>B</b> BC028528 | CKO  |                  |  |
| Becn1             | CKO  |                  |  |
| Bnip1             | CKO  |                  | Cell proliferation and apoptosis   |
| Bpifa1            | CKO  |                  | Immune system  |
| Brca1             | CKO  |                  | Breast cancer, Cancer research   |
| Brd7              | CKO  |                  | Cell cycle, Cell growth, Cancer research, Glucose metabolism, Insulin signaling  |
| Btbd10            | KO   |                  | Akt signaling pathway, Cell proliferation and apoptosis, ALS disease related research  |
| <b>C</b> Cbs      | CKO  |                  | Metabolic related research   |
| Cbx7              | CKO  |                  | Liver and lung adenomas and tumors   |
| Ccdc3             | CKO  |                  | Lipid metabolism   |
| Ccl28             | KO   |                  |  |
| Ccny              | CKO  |                  | Cell cycle, Energy metabolism, Lipogenesis   |
| Cd19              | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Cd19              | KO   |                  | Immunotherapy, Cancer research, Drug screening   |
| Cd27              | HU   |                  | Immunotherapy, Cancer research, Drug screening   |

| Gene Symbol | Type   | knockin elements      | Research Application   |  |
|-------------|--------|-----------------------|--|--|
| Cd274       | KO     |                       | Cancer research, Autoimmune disease related research                               |  |
| Cd276       | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd36        | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd3e        | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd4         | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd40        | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd47        | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd80        | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cd86        | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cdh5        | KI     | rtTa-tetO-Cre         | Cre recombination  |  |
| Cdk5rap2    | CKO    |                       | Microcephaly diseases  |  |
| Cdkn2a      | KI     | DTRGFP-2A-Luc         | Gene tracing   |  |
| Ceacam1     | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cers2       | CKO    |                       | Apoptosis, Immune system   |  |
| Chd3        | CKO    |                       | Chromatin remodeling, Nucleosome   |  |
| Chid1       | KO     |                       | Metabolism, Immune system  |  |
| Clec18a     | CKO    |                       |  |  |
| Clec3b      | KO     |                       |  |  |
| Col1a1      | KI     | TetO-Cas9-EGFP-M2rtTA | Cas9, Gene editing   |  |
| Col1a1      | KI     | TRE3G-dCas9-VPR-EGFP  | Gene regulation tool, CRISPRa  |  |
| Col1a1      | KI     | TetO-GFPCre-M2rtTA    | Cre recombination  |  |
| Cpt1a       | CKO    |                       | Physiological rhythm, Fatty acid metabolism, CPT deficiency, etc.                  |  |
| Cth         | KI     | Luc                   | Metabolism, Liver function, Renal function and other diseases such as cystathione. |  |
| Ctla4       | HU     |                       | Immunotherapy, Cancer research, Drug screening                                     |  |
| Cyp2e1      | KI     | DreERT2               | Lung tumor related research  |  |
| D           | Dhtkd1 | PM                    | Y485X  | Charcot-Marie-Tooth disease                                      |
|             | Dpp8   | CKO                   |  | Immune system, Cell proliferation and apoptosis, Cancer research |
|             | Dppa3  | KI                    | Cre  | Cre recombination  |
| E           | Ebf1   | CKO                   |  | Immune system, Hematopoietic system                              |
|             | Egfr   | CKO                   |  | Cancer research, EGFR function study                             |
|             | Emc10  | CKO                   |  |  |

|          | Gene Symbol     | Type | knockin elements | Research Application  |
|----------|-----------------|------|------------------|---|
|          | Enpp6           | KO   |                  | Ether lipid metabolism  |
|          | Epcam           | KI   | CreERT2          | Cre recombination   |
|          | Ern1            | CKO  |                  | Alzheimer's disease, Nonalcoholic fatty liver disease, etc.                             |
|          | Esrra           | CKO  |                  | Fat metabolism, Mitochondrial biogenesis, etc.  |
|          | Exoc6b          | CKO  |                  |   |
| <b>F</b> | F8              | KO   |                  | Hemorrhagic mechanism and drug test for hemophilia and F8 factor deficiency             |
|          | Fam19a2         | KO   |                  |   |
|          | Fau             | CKO  |                  |   |
|          | Fbln7           | CKO  |                  | Cell adhesion   |
|          | Fcgr2b          | KO   |                  | Immune system   |
|          | Fcgrt           | KO   |                  | Immunotherapy, Cancer research, Drug screening  |
|          | FcRn (Fcgrt)    | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|          | Fgf21           | CKO  |                  |   |
|          | Foxl1           | KI   | CreERT2          | Cre recombination   |
|          | Foxn1           | KO   |                  | Immune system   |
| <b>G</b> | Garnl3          | CKO  |                  |   |
|          | Ghsr            | KO   |                  | Digestive system, Metabolism, Diabetes and other related research                       |
|          | Gitr (Tnfrsf18) | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|          | Gkn2            | CKO  |                  | Gastric cancer related research   |
|          | Gpr1            | KO   |                  | Obesity, Metabolism, Chemokine signaling pathway  |
|          | Gpr142          | KO   |                  | Glucose metabolism, Insulin and incretin regulation                                     |
|          | Gpr156          | CKO  |                  | Nervous system  |
|          | Gpr160          | KO   |                  | Nervous system  |
|          | Gpr26           | KO   |                  | Immune system   |
|          | Gpr61           | KO   |                  | Obesity, Overeating   |
|          | Gprc6a          | CKO  |                  | Metabolic syndrome, Insulin regulation, Osteocalcin activation, Testosterone activation |
| <b>H</b> | H11             | KI   | ACHE             | Cholinesterase related drug research  |
|          | H11             | KI   | ddCre            |   |
|          | H11             | KI   | EGFP             | Gene tracing  |
|          | H11             | KI   | Myc              | Tumor model establishment, Cancer research  |
|          | H11             | KI   | CAG-RSR-tdTomato | Gene tracing  |

For more detailed data, please visit [www.modelorg.com](http://www.modelorg.com)

| Gene Symbol | Type | knockin elements | Research Application   |
|-------------|------|------------------|--|
| Hbb-bt      | KO   |                  | Thalassemia  |
| Hdac10      | CKO  |                  | Anti-Cancer research, HDAC gene function research, Epigenetic research, etc. |
| Hdac11      | KO   |                  | Immune system  |
| Hdac2       | CKO  |                  | Anti-Cancer research, HDAC gene function research, etc.                      |
| Hdac4       | KO   |                  | Anti-Cancer research, HDAC gene function research, Epigenetic research, etc. |
| Hdac5       | CKO  |                  | Hdac5 gene function research   |
| Hdac6       | KO   |                  |  |
| Hdac7       | CKO  |                  | Anti-Cancer research, HDAC gene function research, Epigenetic research, etc. |
| Hdac9       | CKO  |                  | Anti-Cancer research, HDAC gene function research, Epigenetic research, etc. |
| Hebp1       | CKO  |                  |  |
| Hey2        | KI   | CreERT2          | Cre recombination  |
| Hint2       | CKO  |                  | Lipid metabolism, Glucose homeostasis, Mitochondrial respiration             |
| Hspa13      | CKO  |                  | Prion disease  |
| Icos        | HU   |                  | Immunotherapy, Cancer research, Drug screening                               |
| Icosl       | HU   |                  | Immunotherapy, Cancer research, Drug screening                               |
| Ido1        | HU   |                  | Immunotherapy, Cancer research, Drug screening                               |
| Il10        | CKO  |                  | Metabolism, Immune system, Hematopoietic system, etc.                        |
| Il11        | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |
| Il12a       | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |
| Il12b       | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |
| Il13        | KO   |                  | Immune system  |
| Il15        | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |
| Il16        | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |
| Il17a       | HU   |                  | Immunotherapy, Cancer research, Drug screening                               |
| Il17a       | KI   | CreERT2          | Cre recombination  |
| Il17a       | KO   |                  | Immune system  |
| Il17b       | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |
| Il17c       | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                      |



| Gene Symbol     | Type | knockin elements | Research Application   |
|-----------------|------|------------------|--|
| Il17f           | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il18            | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il19            | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il1a            | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il1b            | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il1f10          | KI   | Luc-EGFP         | Immune system  |
| Il1f10          | KO   |                  | Immune system  |
| Il1f6           | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il1f6           | KO   |                  | Immune system  |
| Il1f9           | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il2             | CKO  |                  | Metabolism, Immune system, Hematopoietic system, etc.                    |
| Il20            | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il23a           | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il25            | KO   |                  | Immune system  |
| Il2rg           | KO   |                  | Immune system, Hematopoietic system, Tumor or cell transplantation, etc. |
| Il3             | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il33            | KO   |                  | Immune system  |
| Il34            | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il4             | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il5             | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il6             | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Il6ra           | HU   |                  | Immunotherapy, Cancer research, Drug screening                           |
| Il7             | KI   | Luc-EGFP         | Immune system  |
| Il7             | KO   |                  | Immune system  |
| Il9             | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                                  |
| Isl1            | KI   | CreERT2          | Cre recombination (heart)  |
| <b>J</b> Jmy    | CKO  |                  | Cardiovascular disease   |
| <b>K</b> kif18A | KO   |                  | Male infertility   |
| Kit             | KI   | CreERT2          | Cre recombination, Genetic lineage tracing                               |
| Klb             | CKO  |                  |  |
| Krt14           | KO   |                  | Skin   |
| Kynu            | CKO  |                  | Atopic dermatitis  |

|                             | Gene Symbol | Type | knockin elements | Research Application  |
|-----------------------------|-------------|------|------------------|---|
| L                           | Lag3        | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|                             | Lag3 & Tim3 | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|                             | Lcn2        | CKO  |                  |   |
|                             | Lcn6        | CKO  |                  | Sperm maturity  |
|                             | Ldlr        | PM   | T541C            | Cardiovascular, Lipid metabolism  |
|                             | Ldlr        | KO   |                  | Cardiovascular, Lipid metabolism  |
|                             | Lep         | KO   |                  | Insulin resistance, Obesity, Type 2 diabetes, etc.  |
|                             | Lepr        | PM   | 109052G>T        | Leptin resistance, Insulin resistance, Obesity, Type 2 diabetes, etc.   |
|                             | Lgmn        | CKO  |                  | Hematopoietic system, Immune system, Metabolism related research  |
|                             | Ltf         | CKO  |                  | Iron homeostasis, Inflammation, Immune research, Metabolic syndrome, Colonic dysplasia, Senile dementia, etc. |
|                             | Lyar        | CKO  |                  | Cancer research, Cell phagocytosis  |
|                             | Lyg1        | KO   |                  |   |
|                             | Lyzl4       | KO   |                  | Reproductive system   |
|                             | M           | Mal  | KO               |   |
| Map2                        |             | KI   | CreERT2          | Mature neuron specific Cre recombination  |
| Mbd5                        |             | CKO  |                  | Glucose metabolism, Iron metabolism, Nervous system research  |
| Mdm4                        |             | PM   | C462A            |   |
| Mecp2                       |             | KO   |                  | Rett syndrome, autism   |
| Mir125a                     |             | KO   |                  | MicroRNA, Mir125a gene function   |
| Mir126                      |             | CKO  |                  | MicroRNA, Mir126 gene function  |
| Mir21a                      |             | CKO  |                  | MicroRNA, Mir21a gene function  |
| Mir21a                      |             | KO   |                  | MicroRNA, Mir21a gene function  |
| Mir29a & Mir29b-1           |             | KO   |                  |   |
| Mir29b-2 & Mir29c           |             | KO   |                  |   |
| Mir449a & Mir449b & Mir449c |             | KO   |                  | MicroRNA  |
| Mrgprf                      |             | KO   |                  | Intestinal inflammation, Injury sensory neuron research   |
| Mt1                         |             | KO   |                  | Antioxidation, Intracellular metal homeostasis, Oxidative stress  |

|   | Gene Symbol         | Type | knockin elements | Research Application  |
|---|---------------------|------|------------------|---|
|   | Muc1                | CKO  |                  | Breast cancer development process, Digestive system function  |
|   | Mycn                | KI   | TRE-EGFP         | Cancer research, Nervous system   |
|   | Mydgf               | CKO  |                  | Cardiovascular disease, etc.  |
|   | Myh6                | KI   | Cre              | Cre recombination (heart)   |
| N | Naalad2             | KO   |                  |   |
|   | Nipbl               | CKO  |                  | Cornelia de Lange Syndrome  |
|   | Nlrc5               | KO   |                  | Immune system   |
|   | Nphs2               | KI   | CreERT2          | Cre recombination   |
|   | Nppa                | KI   | rtTA             | Tetracycline-controlled regulation  |
|   | Nr2e1               | KO   |                  |   |
|   | Nr6a1               | CKO  |                  | Prostate cancer therapeutic target, vascular smooth muscle cell (VSMC) migration, embryonic stem cell differentiation, neuronal differentiation |
| O | Oosp1               | KO   |                  |   |
|   | Ox40 & Ctla4        | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Ox40 (Tnfrsf4)      | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Ox40l (Tnfsf4)      | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
| P | Palld               | KO   |                  | Embryonic development, Nervous system, Hematopoietic system, etc.   |
|   | Paqr4               | CKO  |                  | Cell proliferation and tumorigenesis, Steady state regulation of CDK4   |
|   | Paqr4               | KO   |                  | Cell proliferation and tumorigenesis, Steady state regulation of CDK4   |
|   | Paqr9               | KO   |                  | Non-classical anti-apoptotic effects of neurosteroids in the central nervous system   |
|   | Pd-1 & 4-1bb        | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Ctla4        | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Lag3         | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Ox40         | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Pd-l1        | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Pd-l1 & Ido1 | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Pd-l1 & Ox40 | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Tigit        | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
|   | Pd-1 & Tim3         | HU   |                  | Immunotherapy, Cancer research, Drug screening  |

For more detailed data, please visit [www.modelorg.com](http://www.modelorg.com)

| Gene Symbol     | Type | knockin elements | Research Application   |
|-----------------|------|------------------|--|
| Pd-1 (Pdccl1)   | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pdccl10         | CKO  |                  | Brain cavernous hemangioma, Cardiovascular system, Embryogenesis, Immune system, Nervous system, Aging, etc. |
| Pd-l1 & 4-1bb   | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pd-l1 & Ctla4   | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pd-l1 & Lag3    | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pd-l1 & Ox40    | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pd-l1 & Tigit   | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pd-l1 (Cd274)   | HU   |                  | Cancer research, Autoimmune disease related research   |
| Pnliprp1        | KO   |                  | Lipid metabolism, Obesity, Diabetes  |
| Pnpla3          | KO   |                  | Fatty liver, Liver fibrosis, Cirrhosis and other diseases  |
| Ppp6c           | CKO  |                  | Melanoma, Skin cancer, Oocyte meiosis, T cell development and homeostasis                                    |
| Prkdc           | KO   |                  | Immune system, Hematopoietic system, Tumor or cell transplantation, etc.                                     |
| Prkdc & Il2rg   | KO   |                  |  |
| Prom1           | KI   | GFP              | Cancer research  |
| Prrt2           | CKO  |                  |  |
| Prrx1           | KO   |                  |  |
| Prss29          | CKO  |                  | Female infertility   |
| Prss37          | KO   |                  | Reproductive system  |
| Prss54          | KO   |                  | Reproductive system  |
| Prss55          | KO   |                  | Reproductive system  |
| Psgl-1 (Selplg) | HU   |                  | Immunotherapy, Cancer research, Drug screening   |
| Pten            | CKO  |                  | Cancer research  |
| Pten            | KO   |                  | Cancer research  |
| <b>R</b> R3hcc1 | CKO  |                  |  |
| Rag1            | KO   |                  | Immune system, Tumor or cell transplantation   |
| Rag2            | KO   |                  | Immune system, Tumor or cell transplantation   |
| Rdh13           | KO   |                  | Metabolism, Nervous system   |
| Reg3b           | CKO  |                  | Metabolism   |

| Gene Symbol | Type   | knockin elements         | Research Application  |
|-------------|--------|--------------------------|---|
| Reg4        | CKO    |                          | Gastric cancer, Colorectal neoplasms, Pancreatic ductal adenocarcinoma (PDAC), Mucinous ovarian cancer, Tumor markers |
| Resp18      | CKO    |                          | Aging, Nervous system   |
| Resp18      | KO     |                          | Aging, Nervous system   |
| Rest        | CKO    |                          | Neurodegenerative diseases (such as Huntington's disease), sudden infant death syndrome, etc.                         |
| Rhbdf2      | CKO    |                          | Abnormal secretion of tumor necrosis factor TNF and abnormal immune function.   |
| Robo3       | CKO    |                          | Nervous system, Neurology, Hearing, Aging, etc.   |
| Rosa26      | KI     | BirA                     |   |
| Rosa26      | KI     | Cas9                     | Gene editing  |
| Rosa26      | KI     | LNL-Cas9-IRES-Luciferase | Gene editing  |
| Rosa26      | KI     | LSL-dCas9-VPR-IRES-EGFP  | Gene regulation tool, CRISPRa   |
| Rosa26      | KI     | LSL-KRAB-dCas9-IRES-EGFP | Gene regulation tool, CRISPRi   |
| Rosa26      | KI     | ddCas9                   | Gene regulation tool  |
| Rosa26      | KI     | hFcRn                    | Immunotherapy, Cancer research, Drug screening  |
| Rosa26      | KI     | Fen1                     |   |
| Rosa26      | KI     | RNR-GFPDTR-FWF           |   |
| Rosa26      | KI     | PB-V5                    | Gene editing  |
| Rosa26      | KI     | Luc-EGFP                 | Gene tracing  |
| Rosa26      | KI     | PhiC31                   |   |
| Rosa26      | KI     | CaMPARI                  | Nervous system  |
| Rosa26      | KI     | Renilla-Luc              |   |
| Rosa26      | KI     | LSL-NgAgo-IRES-EGFP      | Gene editing  |
| Rosa26      | KI     | U6-gRNA-Apoe-Ldlr        |   |
| Rosa26      | KI     | LSL-mCherry-EGFP-LC3     | Autophagy research  |
| Rps5        | CKO    |                          |   |
| S           | Samd12 | KO                       |   |
|             | Sema3g | CKO                      | Angiogenesis, Tumorogenesis, etc.   |
|             | Sema4d | HU                       | Immunotherapy, Cancer research, Drug screening  |

| Gene Symbol       | Type | knockin elements | Research Application  |
|-------------------|------|------------------|---|
| Setd2             | CKO  |                  | Renal clear cell carcinoma (ccRCC), Myoblast proliferation and differentiation, Lung adenocarcinoma, Enteropathy-associated T-cell lymphoma (EATL), Gastrointestinal stromal tumor (GIST) |
| Sidt2             | CKO  |                  | Blood sugar, Insulin secretion, Diabetes, etc.  |
| Sirpa             | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
| Slc22a1 & Slc22a2 | KO   |                  |   |
| Slc47a1           | KO   |                  |   |
| Slc6a1            | KO   |                  | Nervous system, Immune system   |
| Slc6a11           | KO   |                  | Nervous system  |
| Slc6A12           | KO   |                  | Immune system   |
| Slc6a13           | KO   |                  | Immune system   |
| Slc9a5            | KO   |                  |   |
| Snap25            | CKO  |                  | Nervous system, Insulin secretion   |
| Snx10             | KO   |                  | Liver cancer, Colitis, Osteoporosis, Malignant bone sclerosis, Rheumatoid arthritis   |
| Snx16             | CKO  |                  |   |
| Snx16             | KO   |                  |   |
| Soat2             | CKO  |                  |   |
| Sox9              | KI   | Flp              | Flp recombination   |
| Spag11a           | KI   | Luc-EGFP         | Gene tracing  |
| Spata19           | KO   |                  | Basal cell carcinoma (BCC), Prostate cancer, Male infertility   |
| Srsf10            | CKO  |                  | Selective shear regulation  |
| Stk38l            | CKO  |                  | Nervous system, Retina  |
| Sumf2             | CKO  |                  | Lipid metabolism  |
| Tacr2             | KO   |                  | Tachykinin receptor   |
| Tbcb              | CKO  |                  | Protein metabolism, Nervous system  |
| Tbx15             | CKO  |                  |   |
| Tdrp              | KO   |                  | Reproductive system   |
| Tespa1            | KO   |                  | Hematopoietic system, Immune system   |
| Tet1              | CKO  |                  | Epigenetic research, Nervous system   |
| Tet2              | KO   |                  | Hematopoietic system  |
| Tet3              | CKO  |                  | Epigenetic modification   |

| Gene Symbol            | Type | knockin elements | Research Application  |
|------------------------|------|------------------|---|
| Tet3                   | KO   |                  | Epigenetic modification   |
| Tex101                 | CKO  |                  | Fertility disorder  |
| Tfpi                   | CKO  |                  | Blood related research  |
| Tfpi2                  | CKO  |                  | Cancer research   |
| Tg (Afp-CreERT2)       | TG   |                  | Liver specific Cre recombination  |
| Tg (CAG-Dre)           | TG   |                  | Dre recombination   |
| Tg (CAG-GFP)           | TG   |                  | Gene tracing  |
| Tg (CAG-LSL-dCas9-SPH) | TG   |                  | Gene Regulation, CRISPRa  |
| Tg (CAG-rtTRKRAB)      | TG   |                  | Reversible regulation of genes  |
| Tg (CAG-tTRKRAB)       | TG   |                  | Reversible regulation of genes  |
| Tg (CMV-GFP)           | TG   |                  | Gene tracing  |
| Tg (HBV)               | TG   |                  | Hepatitis B   |
| Tg (Il1b-Luc)          | TG   |                  | Inflammation and immune system  |
| Tg(MMTV-PLAG1)         | TG   |                  | Salivary gland tumor  |
| Tgfb1                  | CKO  |                  | Digestive system, Endocrine system, Hematopoietic system, Immune system, respiratory system |
| Tigit                  | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
| Tim3 (Havcr2)          | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
| Tmed4                  | CKO  |                  | Endoplasmic reticulum stress  |
| Tmem173                | CKO  |                  | Immune system   |
| Tmem184a               | CKO  |                  |   |
| Tnf                    | KI   | Luc-EGFP         | Immune system, Cancer research  |
| Tnf                    | KO   |                  | Immune system, Cancer research  |
| Tnfrsf11b              | KO   |                  | Osteoporosis  |
| Tnfrsf25               | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
| Tnfrsf9                | KO   |                  | Hematopoietic system, Immune system   |
| Tnfsf15                | HU   |                  | Immunotherapy, Cancer research, Drug screening  |
| Tppp3                  | CKO  |                  | Nervous system, Cancer research   |
| Tra2b                  | CKO  |                  | Cardiovascular related research   |
| Trp53                  | CKO  |                  | Cancer research, aging, anticancer drug evaluatio   |
| Trp53                  | KO   |                  | Cancer research, aging, anticancer drug evaluatio   |
| Trpc6                  | CKO  |                  | Cardiovascular system, Nervous system, Developmental biology                                |
| Trpv2                  | CKO  |                  | Cardiovascular research   |

For more detailed data, please visit [www.modelorg.com](http://www.modelorg.com)

|   | Gene Symbol  | Type | knockin elements | Research Application  |
|---|--------------|------|------------------|---|
|   | Trpv6        | KO   |                  |   |
|   | Ttk          | CKO  |                  |   |
|   | Ttr          | PM   | G103R            |   |
|   | Txlna        | KI   | Luc-EGFP         | Inflammation and immunity, Gene tracing                             |
|   | Txlna        | KO   |                  | Immune system   |
|   | Tyr          | KO   |                  | Albinism, pigment-related diseases                                  |
| U | Ube2s        | CKO  |                  |   |
|   | Ucp2         | KO   |                  | Nervous system, Immune system, Hematopoietic system                 |
|   | Uhrf1        | CKO  |                  | Cancer research   |
|   | Upk3b        | KO   |                  | Mesothelial cell research   |
| V | Vista (Vsir) | HU   |                  | Immunotherapy, Cancer research, Drug screening                      |
|   | Vps53        | CKO  |                  | Nervous system disease, progressive cerebellar brain atrophy type 2 |
|   | Vstm2a       | CKO  |                  | Adipocyte secretion related research                                |
|   | Vwc2l        | CKO  |                  |   |
| W | Wdr47        | CKO  |                  | Metabolism, Nervous system  |
|   | Wls          | CKO  |                  | Wnt signaling pathway   |
|   | Wwp2         | CKO  |                  | Immunization and ubiquitination related research                    |
| Y | Yap1         | KI   | GFP              |   |
| Z | Zfp24        | KO   |                  | Nervous system, Aging, etc.   |
|   | Zfp42        | CKO  |                  | Reproductive system   |
|   | Zfp91        | CKO  |                  | Acute myeloid leukemia and tumor related research                   |
|   | Zic2         | KO   |                  | Neural tube, forebrain development                                  |
|   | Zmpste24     | KO   |                  |   |



## Classified by mutation types

### Knockout

|               |         |                            |                  |           |
|---------------|---------|----------------------------|------------------|-----------|
| 1700074P13Rik | Fam19a2 | kif18A                     | Pnliprp1         | Snx16     |
| Abcb11        | Fcgr2b  | Krt14                      | Pnpla3           | Spata19   |
| Abcc1         | Fcgrt   | Ldlr                       | Prkdc            | Tacr2     |
| Abcg2         | Foxn1   | Lep                        | Prkdc & Il2rg    | Tdrp      |
| Abtb1         | Ghsr    | Lyg1                       | Prrx1            | Tespa1    |
| Adgrf1        | Gpr1    | Lyzl4                      | Prss37           | Tet2      |
| Adgrf4        | Gpr142  | Mal                        | Prss54           | Tet3      |
| Adgrg3        | Gpr160  | Mecp2                      | Prss55           | Tnf       |
| Adgrg7        | Gpr26   | Mir125a                    | Pten             | Tnfrsf11b |
| Adipoq        | Gpr61   | Mir21a                     | Rag1             | Tnfrsf9   |
| Agrt1a        | Hbb-bt  | Mir29a & ir29b-1           | Rag2             | Trp53     |
| Ahr           | Hdac11  | Mir29b-2 & ir29c           | Rdh13            | Trpv6     |
| Apoe          | Hdac4   | Mir449a & ir449b & Mir449c | Resp18           | Txlna     |
| Atg5          | Hdac6   | Mrgprf                     | Samd12           | Tyr       |
| Btbd10        | Il13    | Mt1                        | Slc22a1 & lc22a2 | Ucp2      |
| Ccl28         | Il17a   | Naalad2                    | Slc47a1          | Upk3b     |
| Cd19          | Il1f10  | Nlrc5                      | Slc6a1           | Zfp24     |
| Cd274         | Il1f6   | Nr2e1                      | Slc6a11          | Zic2      |
| Chid1         | Il25    | Oosp1                      | Slc6A12          | Zmpste24  |
| Clec3b        | Il2rg   | Palld                      | Slc6a13          |           |
| Enpp6         | Il33    | Paqr4                      | Slc9a5           |           |
| F8            | Il7     | Paqr9                      | Snx10            |           |

### Humanized

A humanized mouse model refers to the expression of a human gene in a mouse model using a promoter and a regulatory region of the wildtype mouse gene, which is achieved by replacing part or all of the mouse gene with its human counterpart.

|                  |                 |                |                     |                 |
|------------------|-----------------|----------------|---------------------|-----------------|
| 4-1bb (Tnfrsf9)  | Cd80            | Il6ra          | Pd-1 & Pd-l1        | Pd-l1 & Tigit   |
| 4-1bb1 (Tnfrsf9) | Cd86            | Lag3           | Pd-1 & Pd-l1 & Ido1 | Pd-l1 (Cd274)   |
| Cd19             | Ceacam1         | Lag3 & Tim3    | Pd-1 & Pd-l1 & Ox40 | Psgl-1 (Selp1g) |
| Cd27             | Ctla4           | Ox40 & Ctla4   | Pd-1 & Tigit        | Sema4d          |
| Cd276            | FcRn (Fcgrt)    | Ox40 (Tnfrsf4) | Pd-1 & Tim3         | Sirpa           |
| Cd36             | Gitr (Tnfrsf18) | Ox40l (Tnfsf4) | Pd-1 (Pdcd1)        | Tigit           |
| Cd3e             | Icos            | Pd-1 & 4-1bb   | Pd-l1 & 4-1bb       | Tim3 (Havcr2)   |
| Cd4              | Icosl           | Pd-1 & Ctla4   | Pd-l1 & Ctla4       | Tnfrsf25        |
| Cd40             | Ido1            | Pd-1 & Lag3    | Pd-l1 & Lag3        | Tnfsf15         |
| Cd47             | Il17a           | Pd-1 & Ox40    | Pd-l1 & Ox40        | Vista (Vsir)    |

## Conditional Knockout

Conditional Knockout strategy is based on site-specific recombinase technology, such as Cre-LoxP (or FLP-Frt, or Dre-Rox) recombination systems. Conditional knockout mice, also called flox mice, contain target exon(s) which are flanked by recognition sequences (LoxPs). By breeding the flox mice with Cre (or Flp, or Dre) tissue-specific expressing mice, the flanked sequence will be tissue-specifically removed from the offsprings' genome, while in other tissues, the target gene remains unmodified.

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|               |          |        |        |        |          |
|---------------|----------|--------|--------|--------|----------|
| 1190002N15Rik | Becn1    | Fau    | Lcn6   | Rest   | Tmed4    |
| 4930578C19Rik | Bnipl    | Fbln7  | Lgmn   | Rhbdf2 | Tmem173  |
| Abi3bp        | Bpifa1   | Fgf21  | Ltf    | Robo3  | Tmem184a |
| Acot7         | Brca1    | Garnl3 | Lyar   | Rps5   | Tppp3    |
| Adgra1        | Brd7     | Gkn2   | Mbd5   | Sema3g | Tra2b    |
| Adgra2        | Cbs      | Gpr156 | Mir126 | Setd2  | Trp53    |
| Adgrd1        | Cbx7     | Gprc6a | Mir21a | Sidt2  | Trpc6    |
| Adgrf5        | Ccdc3    | Hdac10 | Muc1   | Snap25 | Trpv2    |
| Adgrg6        | Ccny     | Hdac2  | Mydgf  | Snx16  | Ttk      |
| Agk           | Cdk5rap2 | Hdac5  | Nipbl  | Soat2  | Ube2s    |
| Ahi1          | Cers2    | Hdac7  | Nr6a1  | Srsf10 | Uhrf1    |
| Aimp1         | Chd3     | Hdac9  | Paqr4  | Stk38l | Vps53    |
| Anp32b        | Clec18a  | Hebp1  | Pdcd10 | Sumf2  | Vstm2a   |
| Appl1         | Cpt1a    | Hint2  | Ppp6c  | Tbcb   | Vwc2l    |
| Appl2         | Dpp8     | Hspa13 | Prrt2  | Tbx15  | Wdr47    |
| Ar            | Ebf1     | Il10   | Prss29 | Tet1   | Wls      |
| Asap3         | Egfr     | Il2    | Pten   | Tet3   | Wwp2     |
| Atg5          | Emc10    | Jmy    | R3hcc1 | Tex101 | Zfp42    |
| Atg7          | Ern1     | Klb    | Reg3b  | Tfpi   | Zfp91    |
| AU021092      | Esrra    | Kynu   | Reg4   | Tfpi2  |          |
| BC028528      | Exoc6b   | Lcn2   | Resp18 | Tgfb1  |          |

## Transgene

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|                 |                       |              |                |
|-----------------|-----------------------|--------------|----------------|
| Tg(Afp-CreERT2) | Tg(CAG-LSL-dCas9-SPH) | Tg(CMV-GFP)  | Tg(MMTV-PLAG1) |
| Tg(CAG-Dre)     | Tg(CAG-rtTRKRAB)      | Tg(HBV)      |                |
| Tg(CAG-GFP)     | Tg(CAG-tTRKRAB)       | Tg(II1b-Luc) |                |

## Recombinase Tool Models

These mice that tissue or cell type specifically express Cre or Dre recombinase can be mated with conditional knockout (Flox) mice to obtain offspring that knock out the target gene in specific tissue or cells of interest.

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|                 |                  |                 |                 |             |
|-----------------|------------------|-----------------|-----------------|-------------|
| Alb-(CreERT2)   | Cyp2e1-(DreERT2) | Hey2-(CreERT2)  | Map2-(CreERT2)  | Tg(CAG-Dre) |
| Apln-(DreERT2)  | Dppa3-(Cre)      | Il17a-(CreERT2) | Myh6-(Cre)      |             |
| Aplnr-(CreERT2) | Epcam-(CreERT2)  | Isl1-(CreERT2)  | Nphs2-(CreERT2) |             |
| Aplnr-(DreERT2) | Foxl1-(CreERT2)  | Kit-(CreERT2)   | Tg(Afp-CreERT2) |             |

## Point Mutation

In the table below, a symbol of targeted gene is followed by the mutation site shown in round brackets.

---

|                |                  |             |
|----------------|------------------|-------------|
| Apob-(Q1388H)  | Ldlr-(T541C)     | Ttr-(G103R) |
| Atp7b-(H1071Q) | Lepr-(109052G>T) |             |
| Dhtkd1-(Y485X) | Mdm4-(C462A)     |             |

## Knockin

In the table below, a symbol of targeted gene is followed by the knockin elements shown in round brackets.

---

|                                  |                   |                                     |
|----------------------------------|-------------------|-------------------------------------|
| Alb-(CreERT2)                    | Il17a-(CreERT2)   | Nphs2-(CreERT2)                     |
| Apln-(DreERT2)                   | Il17b-(Luc-EGFP)  | Nppa-(rtTA)                         |
| Aplnr-(CreERT2)                  | Il17c-(Luc-EGFP)  | Prom1-(GFP)                         |
| Aplnr-(DreERT2)                  | Il17f-(Luc-EGFP)  | R26-(BirA)                          |
| Cdh5-(rtTa-tetO-Cre)             | Il18-(Luc-EGFP)   | R26-(CAG-LNL-Cas9-IRES-Luciferase)  |
| Cdkn2a-(DTRGFP-2A-Luc)           | Il19-(Luc-EGFP)   | R26-(CAG-LSL-dCas9-VPR-IRES-EGFP)   |
| Col1a1-(TRE3G-dCas9-VPR-eGFP-pA) | Il1a-(Luc-EGFP)   | R26-(CAG-LSL-mCherry-EGFP-LC3)      |
| Col1a1-e(TetO-Cas9-EGFP-M2rtTA)  | Il1b-(Luc-EGFP)   | R26-(CAG-LSL-NgAgo-IRES-EGFP)       |
| Col1a1-e(TetO-GFP-Cre-M2rtTA)    | Il1f10-(Luc-EGFP) | R26-(CaMPARI)                       |
| Cth-(Luc)                        | Il1f6-(Luc-EGFP)  | R26-(Cas9)                          |
| Cyp2e1-(DreERT2)                 | Il1f9-(Luc-EGFP)  | R26-(ddCas9)                        |
| Dppa3-(Cre)                      | Il20-(Luc-EGFP)   | R26-(Fen1)                          |
| Epcam-(CreERT2)                  | Il23a-(Luc-EGFP)  | R26-(hFcRn)                         |
| Foxl1-(CreERT2)                  | Il3-(Luc-EGFP)    | R26-(Luc-EGFP)                      |
| H11-(ACHE)                       | Il34-(Luc-EGFP)   | R26-(PB-V5)                         |
| H11-(CAG-RSR-tdTomato)           | Il4-(Luc-EGFP)    | R26-(PhiC31)                        |
| H11-(ddCre)                      | Il5-(Luc-EGFP)    | R26-(Renilla-Luc)                   |
| H11-(EGFP)                       | Il6-(Luc-EGFP)    | R26-(SA-RNR-GFPDTR-FWF)             |
| H11-(Myc)                        | Il7-(Luc-EGFP)    | R26-(U6-gRNA-Apoe-Ldlr)             |
| Hey2-(CreERT2)                   | Il9-(Luc-EGFP)    | R26-e(CAG-LSL-KRAB-dCas9-IRES-EGFP) |
| Il11-(Luc-EGFP)                  | Isl1-(CreERT2)    | Sox9-(Flp)                          |
| Il12a-(Luc-EGFP)                 | Kit-(CreERT2)     | Spag11a-(Luc-EGFP)                  |
| Il12b-(Luc-EGFP)                 | Map2-(CreERT2)    | Tnf-(Luc-EGFP)                      |
| Il15-(Luc-EGFP)                  | Mycn-(TRE-EGFP)   | Txlna-(Luc-EGFP)                    |
| Il16-(Luc-EGFP)                  | Myh6-(Cre)        | Yap1-(linker-GFP)                   |

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