

## NCG-X-hIL15

Strain Name: NCG-X-*Il15<sup>em1Cin(hIL15)</sup>/Gpt*

Strain Type: Knock-in

Strain ID: T037155

Background: NOD/ShiLtJGpt

### Description

Severe immune-deficient strain NCG is established by CRISPR/Cas9 technology. *Prkdc* (Protein kinase, DNA activated, catalytic polypeptide) and *Il2rg* (Common gamma chain receptor) genes are knocked out on NOD/ShiLtJGpt background. The genetic background of NOD/ShiLtJGpt makes this line have natural immunodeficiency, such as complement system and macrophage defects<sup>[1]</sup>. NCG has a simple background and a long life span. It lacks mature T cells, B cells and NK cells, and lacks complement activity<sup>[2]</sup>.

Proto-oncogene *c-KIT*, also known as tyrosine-protein kinase KIT, CD117 (cluster of differentiation 117) or mast/stem cell growth factor receptor (SCFR), is a receptor tyrosine kinase protein that in humans is encoded by the *KIT* gene. GemPharmatech introduced W41 point mutation in NCG immunodeficient mice to produce NCG-kit-Cas9-TM mice using Crispr/cas9 technology. The NCG-kit-Cas9-TM mice has T/B/NK cell immunodeficiency and hematopoietic stem cell function inhibition. This strain can receive human hematopoietic stem cell transplantation without receiving radiation, which is a good model of human hematopoietic stem cell transplantation<sup>[3-5]</sup>.

IL15 (interleukin-15) is a pleiotropic cytokine produced by activated monocytes-macrophages, epidermal cells, fibroblasts and many other cells, exhibiting biological activity similar to IL2. IL15 can activate T cells, B cells and NK cells, and mediate the proliferation and survival of these cells<sup>[6,7]</sup>. NCG-hIL15 strain, knocked in the humanized IL15 gene on an NCG strain, can support the colonization and activity of human NK cells.

GemPharmatech bred NCG-X and NCG-hIL15 mice to obtain a new strain of mouse model NCG-X-hIL15. The mouse has the characteristic of supporting human NK cell colonization, similar to NCG-hIL15. Meanwhile, due to the mutation of *c-kit* gene, the mouse can receive human hematopoietic stem cell transplantation without irradiation, which further provides convenience for scientific research.

### Application

1. Humanized immune system reconstitution mouse model (huPBMC or CD34+ hematopoietic stem cell engraftment).

2. Immune-oncology therapy.

3. Human hematopoietic and immune system research

## Data support

## References

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6. Ali, A. K., Nandagopal, N. & Lee, S. H. (2015). "IL-15-PI3K-AKT-mTOR: A Critical Pathway in the Life Journey of Natural Killer Cells". *Frontiers in immunology.* 6, 355.
7. Fehniger, T. A. et al. (2001). "Fatal leukemia in interleukin 15 transgenic mice follows early expansions in natural killer and memory phenotype CD8<sup>+</sup> T cells". *The Journal of experimental medicine.* 193, 219-231,.