

C001324

Strain Datasheet



Rag2 KO Mouse

Product ID: C001324

Common Name: Rag2 KO

Strain Name: C57BL/6JCya-Rag2^{em1}/Cya

Background: C57BL/6JCya

🔗 Strain Description

The RAG2 gene encodes a protein that, together with the RAG1 protein, forms the RAG complex, playing a crucial role in V(D)J recombination during the maturation of B and T cells. During V(D)J recombination, the RAG complex attaches to the recombination signal sequences (RSS) located adjacent to V, D, or J segments in the DNA. The RAG complex cuts the DNA between the signal sequences and the segments, allowing the segments to separate and move to different regions of the genome. This process occurs repeatedly in B and T cells, arranging the V, D, and J segments in various combinations. The resulting protein diversity provides a broader capability to recognize foreign invaders, allowing the body to combat infections effectively. RAG2 is essential in V(D)J recombination, not only catalyzing the reaction but also regulating it by controlling access to specific loci. A lack of functional RAG2 protein can also lead to severe combined immunodeficiency (SCID). In mice, deleting the Rag2 gene results in the absence of V(D)J recombination, blocking the differentiation, development, and maturation of T and B cells, which lose their normal functions, leading to a SCID-like phenotype.

Rag2 KO mice are Rag2 gene knockout (KO) models. Homozygous Rag2 KO mice develop normally and are fertile but do not produce mature T and B cells. They can be used in research on immune system deficiencies, cancer, toxicology, and xenotransplantation.

Strain Strategy

The mouse Rag2 gene is located on chromosome 2 and contains three exons. Both the start and stop codons are located on exon 3. The Rag2 gene knockout was achieved by targeting exon 3 using gene editing technology.

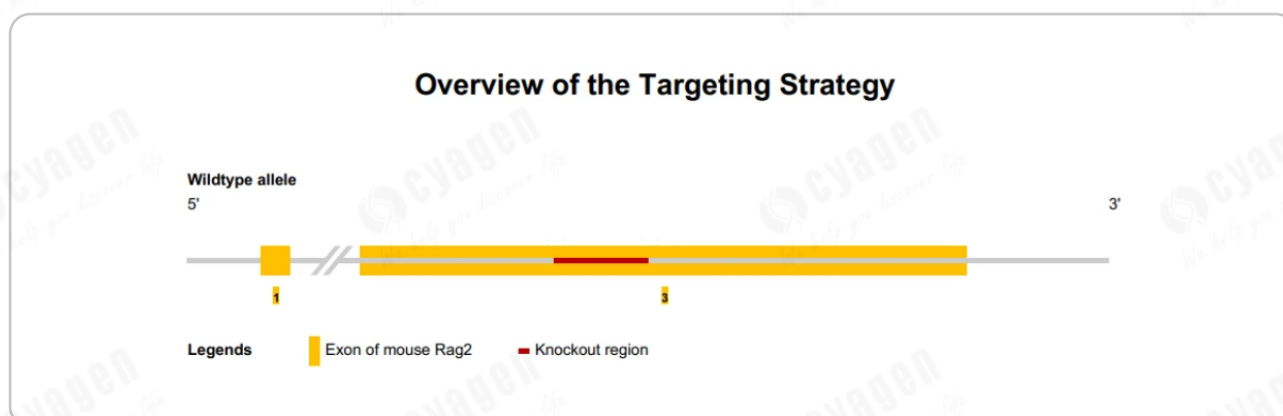


Figure 1. Diagram of the gene editing strategy for the generation of Rag2 KO mice.

Validation Data

1. Flow cytometry detection of T and B cells in peripheral blood, thymus, and spleen

Peripheral blood, thymus, and spleen from Rag2 KO mice were subjected to representative flow cytometry immunophenotyping analysis and statistical comparison of their T and B cell composition. The results indicate that Rag2 KO mice show almost complete absence of B cells (CD3-CD19+) and T cells (CD3+CD19-) in peripheral blood, thymus, and spleen.

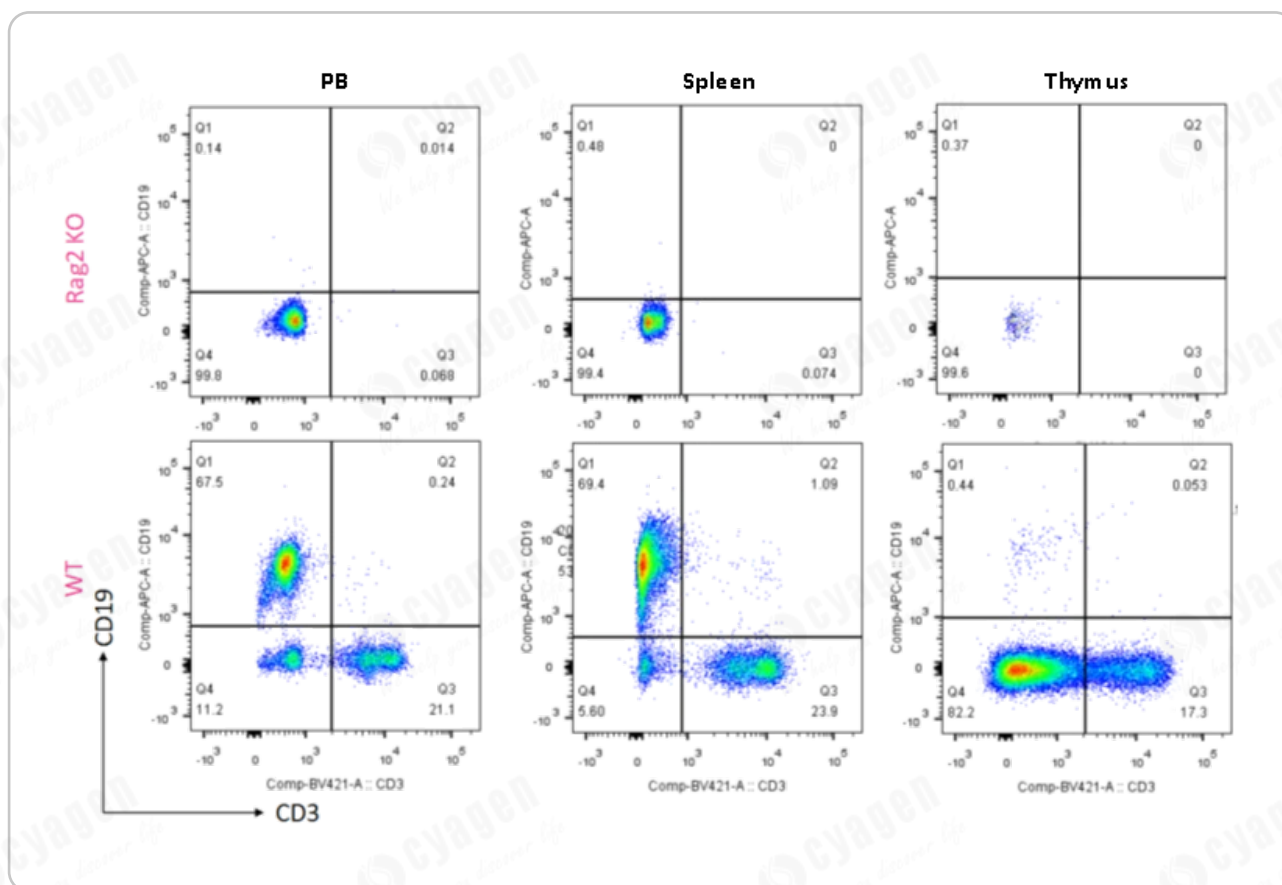


Figure 2. Detection of T and B cells in peripheral blood (PB), thymus, and spleen of Rag2 KO mice.

2. Flow cytometry detection of myeloid cells in peripheral blood and spleen

(1) Detection of monocytes, macrophages, neutrophils, and dendritic cells (DC) in peripheral blood

The results show a significant increase in Lin⁻ cells (excluding T, B, and NK cells) in the peripheral blood of Rag2 KO mice compared to wild-type mice. There is no significant difference in the proportions of monocytes, macrophages, and dendritic cells (DC), but an increase in the proportion of neutrophils.

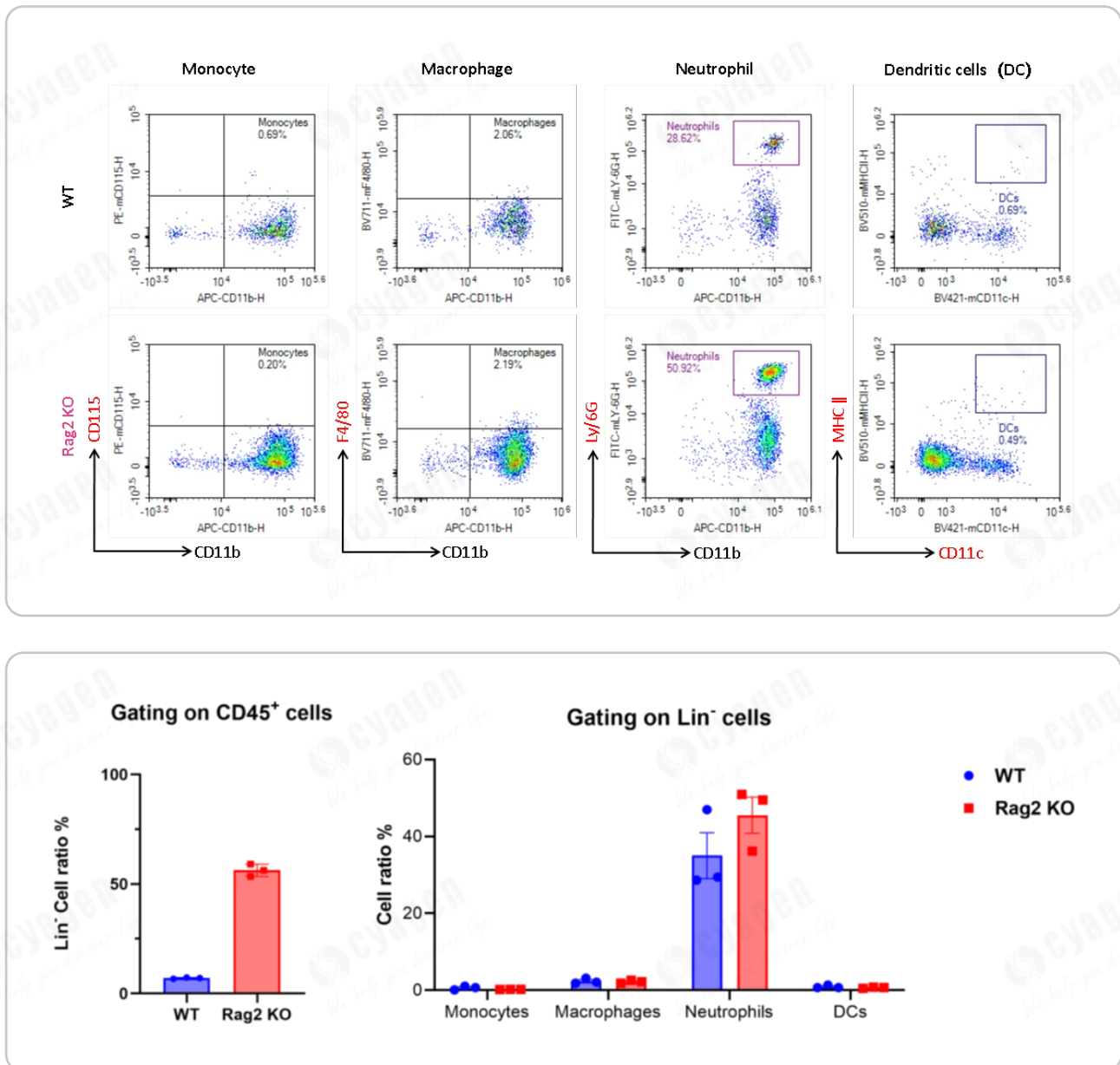


Figure 3. Flow cytometry results of myeloid cells in the peripheral blood of 6-week-old female wild-type (WT) and Rag2 KO mice (n=3).

(2) Detection of monocytes, macrophages, neutrophils, and dendritic cells (DC) in the spleen

The results show a significant increase in Lin⁻ cells (excluding T, B, and NK cells) in the spleens of Rag2 KO mice compared to wild-type mice. There is no significant difference in the proportion of

monocytes, whereas the proportions of macrophages, neutrophils, and dendritic cells (DC) are significantly increased.

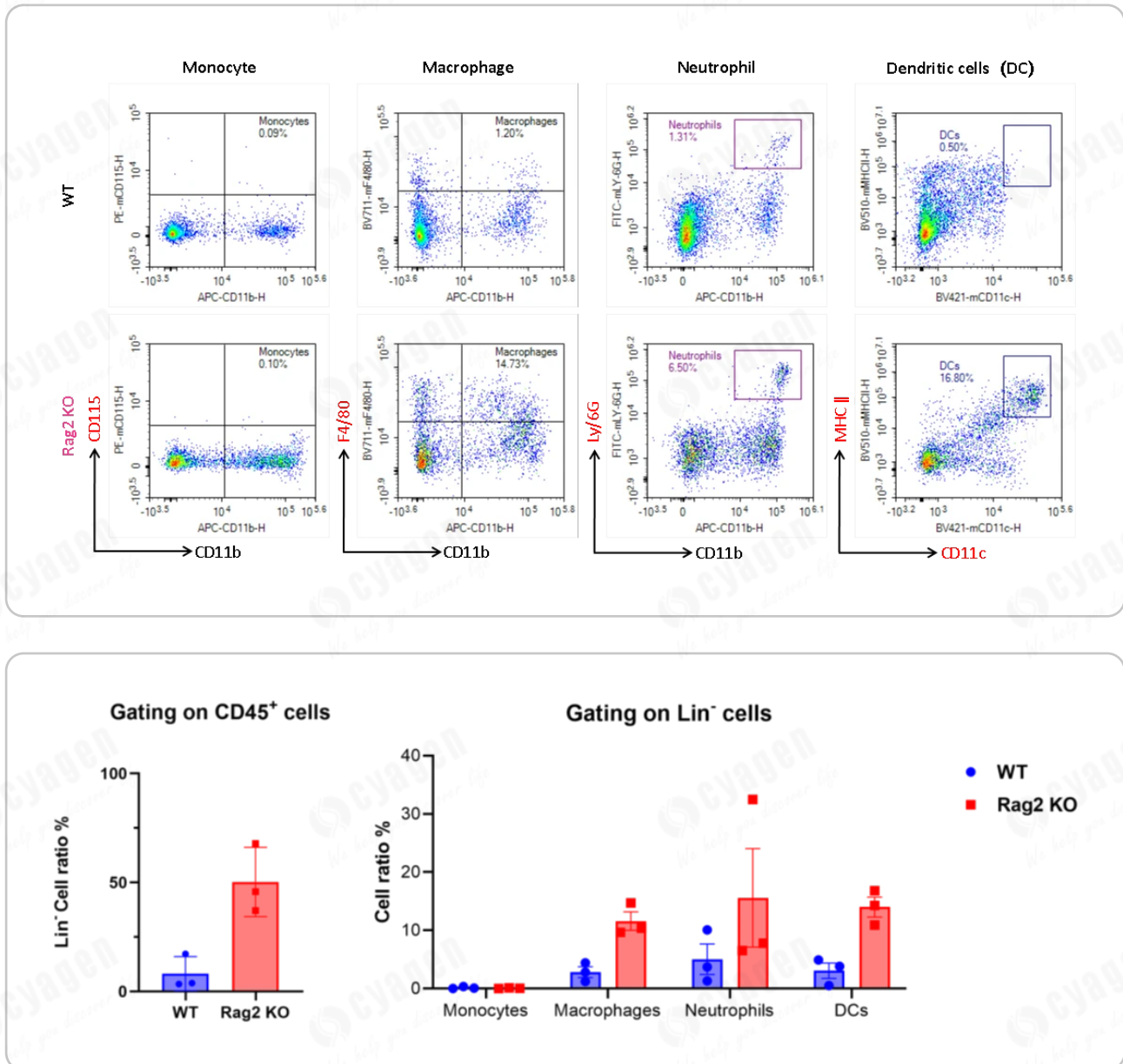


Figure 4. Flow cytometry results of myeloid cells in the spleens of 6-week-old female wild-type (WT) and Rag2 KO mice (n=3).

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