B6;129-Hbb<sup>tm2(HBG1,HBB<sup>*Tow</sup>)</sup>/<sup>Hbb<sup>tm3(HBG1,HBB)Tow</sup></sup> Hba<sup>tm1(HBA)Tow</sup>/J

Stock No: 013071 | Townes model

Targeted Mutation

PLACE ORDER

0–2 week average lead time for 10 or more mice with age range
Overview

Also Known As: h/h::^{A/S}, h/h::-383 -^{A/-1400} -^{S}, Townes model

These mice carry several human hemoglobin knock-in genes replacing the endogenous mouse genes and may be useful in studying sickle cell disease.
GENETIC OVERVIEW

**Gene Symbol:** Hbb
**Gene Name:** hemoglobin beta chain complex

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**Gene Symbol:** Hba
**Gene Name:** hemoglobin alpha chain complex

RESEARCH APPLICATIONS

- Internal/Organ Research
- Hematological Research
- Developmental Biology Research

BASE PRICE

Starting at:

- $240.00 Domestic price for female 4-week
- $480.00 Domestic price for breeder pair
Details

Detailed Description

These mice may harbor several knockin mutations:

1) the Hba \(^{\text{tm1(HBA)Tow}}\) mutation (also called h : designed with the human hemoglobin gene replacing the endogenous mouse -globin), as well as

2) the Hbb \(^{\text{tm2(HBG1,HBB)Tow}}\) mutation (also called -1400 - S : designed with the human hemoglobin gamma (\(^{\Delta}\)) gene and the human sickle hemoglobin beta (\(^{\Delta}\)) gene replacing the endogenous mouse major and minor -globin), and/or

3) the Hbb \(^{\text{tm3(HBG1,HBB)Tow}}\) mutation (also called -383 - A : designed with the human hemoglobin gamma (\(^{\Delta}\)) gene and the human wildtype hemoglobin beta (\(^{\Delta}\)) gene replacing the endogenous mouse major and minor -globin).

--Of note, these mice should not harbor any wildtype allele at the Hbb locus.--

Mice homozygous at the Hba locus for the h mutation and harboring the -1400 - S mutation at the Hbb locus on one chromosome and the -383 - A mutation at the Hbb locus on the other homologous chromosome are referred to as h / h :: A / S.

Similarly, mice homozygous at the Hba locus for the h mutation and homozygous at the Hbb locus for either the -1400 - S mutation or the -383 - A mutation are referred to as h / h :: S / S or h / h :: A / A, respectively.

The h / h :: A / S, h / h :: S / S, and h / h :: A / A mice are viable and fertile. When carrying two copies of the S allele (i.e., h / h :: S / S), mice develop a human sickle cell disease phenotype. Many rigid, elongated, sickle-shaped red blood cells (RBCs) are seen in blood smears from S / S mice. The spleens of S / S mice exhibit expansion of red pulp, pooling of sinusoidal erythrocytes, vasocclusion, and a complete loss of lymphoid follicular structure. Focal areas of necrosis, hemosiderin deposition, and congestion of the vasculature with aggregates of sickled RBCs is evident in the liver. Erythroid progenitors are visible in the sinusoids and is indicative of severe anemia. Occlusion of blood vessels with sickled erythrocytes results in vascular, tubular, and glomerular changes in the kidneys. Reduced medullary blood flow causes tubular damage resulting in hyposthenuria. In mice carrying at least one copy of the A allele (i.e., h / h :: A / S and h / h :: A / A), the sickle cell disease phenotype is corrected and the mice show no physical or behavioral abnormalities. The blood smears of corrected animals lack the characteristic erythrocytes of the S / S mice. Splenic structure and vasculature are normal, hepatic necrosis and erythrocyte aggregation are absent, and kidney function is restored. These mice may be useful in studying sickle cell disease.

Development

Expression Data

Control Suggestions
Genotyping Protocols
Melt Curve Analysis: Hba<sub>tm1(HBAITow)</sub>
End Point Analysis: Hbb<sub>tm2(HBG1,HB9)Tow</sub>/Hbb<sub>tm3(HBG1,HB9)Tow</sub>, EP
Separated PCR: Hbb<sub>tm2(HBG1,HB9)Tow</sub>/Hbb<sub>tm3(HBG1,HB9)Tow</sub>
Standard PCR: Hba<sub>tm1(HBAITow)</sub>

Genotyping resources and troubleshooting
Hbb<sub>tm2(HBG1,HB9)Tow</sub>/Hbb<sub>tm3(HBG1,HB9)Tow</sub>, Standard PCR

Dietary Information
LabDiet® 5K52 formulation (6% fat)
Breeding Considerations

Mice homozygous at the Hba locus for the $A^-$ mutation (Hba$^{tm1(HBAITow)}$) and harboring the -1400 $A^-$ mutation (Hbb$^{tm2(HBG1,HBBITow)}$) at the Hbb locus on one chromosome and the -383 $A^-$ mutation (Hbb$^{tm3(HBG1,HBBITow)}$) at the Hbb locus on the other homologous chromosome are referred to as $h/h^{::A^-}A^-$. These mice do not harbor any wildtype allele at the Hbb locus.

Mice homozygous at the Hbb locus for the $A^-$ mutation (Hbb$^{tm1(HBAITow)}$) and homozygous at the Hbb locus for the -1400 $A^-$ mutation (Hbb$^{tm2(HBG1,HBBITow)}$) are referred to as $h/h^{::A^-}A^-$. These mice do not harbor any wildtype allele at the Hbb locus.

Mice homozygous at the Hba locus for the $A^-$ mutation (Hba$^{tm1(HBAITow)}$) and homozygous at the Hbb locus for the -383 $A^-$ mutation (Hbb$^{tm3(HBG1,HBBITow)}$) are referred to as $h/h^{::A^-}A^-$. These mice do not harbor any wildtype allele at the Hbb locus.

When maintaining a live colony, $h/h^{::A^-}A^-S$ females may be bred to $h/h^{::A^-}A^-S$ males, $h/h^{::A^-}A^-S$ males, or with $h/h^{::S^-}S$ males. These mice should never be bred with wildtype mice or the humanized genes may be lost. Also, $h/h^{::S^-}S$ females are poor mothers and should not be used for sustaining a live colony.

Additional Breeding and Husbandry Support

Mating System

Homozygous for Hba, Compound Heterozygous for Hbb/Hba x Homozygous for Hba, Homozygous for Hbb Homozygous for Hba, Compound Heterozygous for Hbb/Hba x Homozygous for Hba, Compound Heterozygous for Hbb/Hb

Citation

When using the AX12 in a publication, please cite the originating article(s) and include JAX stock #013071 in your Materials and Methods section.

Facility Barrier Level Descriptions

2, AX12 (Maximum)

Pricing & Availability

0–2 week average lead time for 10 or more mice with age range

Repository Live

Domestic

International

Pricing effective for USA, Canada and Mexico shipping destinations

<table>
<thead>
<tr>
<th>AGE</th>
<th>SEX</th>
<th>GENOTYPE</th>
<th>PRICE</th>
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<tbody>
<tr>
<td>4 weeks</td>
<td>Female</td>
<td>Compound Heterozygous for Hbb$^{tm2(HBG1,HBBITow)}$ /Hbb, Homozygous for Hba$^{tm1(HBAITow)}$</td>
<td>$240.00</td>
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<tr>
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<td>Male</td>
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**Breeder Pair**

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