GemPharmatech™

Ghr Cas9-KO Strategy

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Overview

Target Gene Name

- Ghr

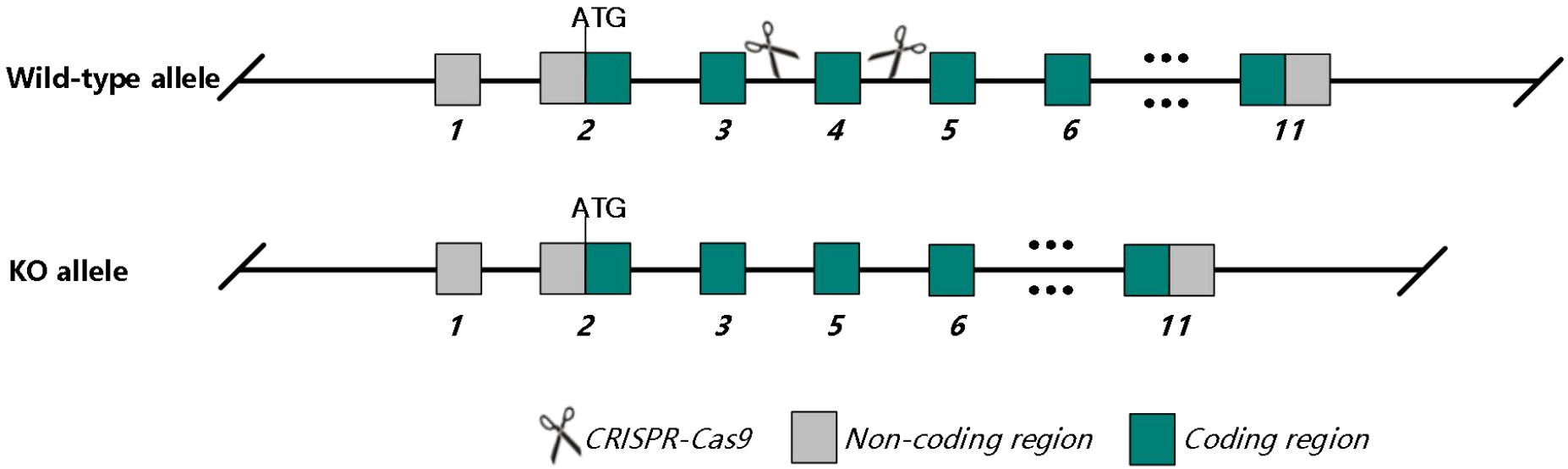
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy

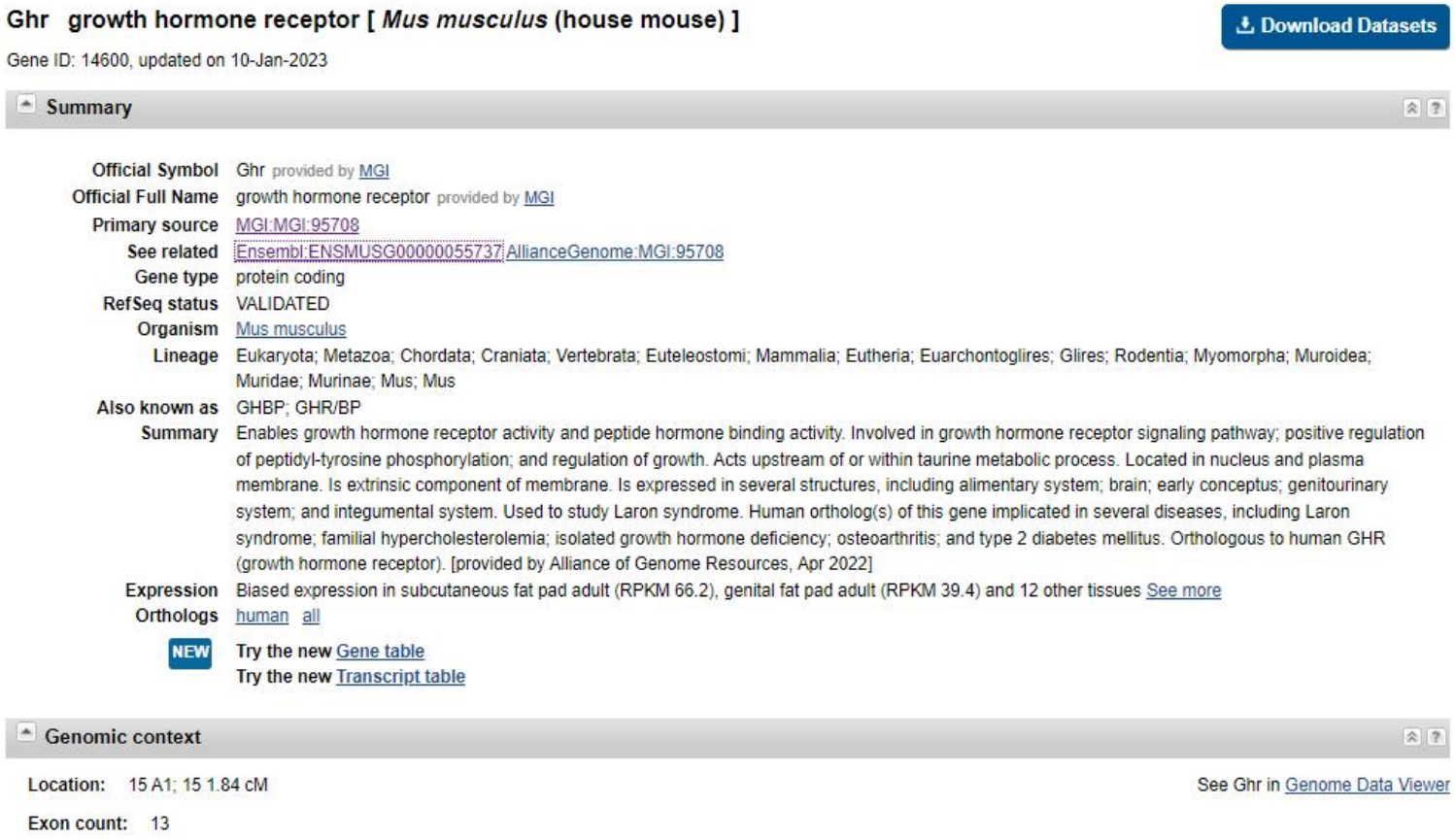


Schematic representation of CRISPR-Cas9 engineering used to edit the *Ghr* gene.

Technical Information

- The *Ghr* gene has 10 transcripts. According to the structure of *Ghr* gene, exon4 of *Ghr*-201 (ENSMUST00000069451.11) transcript is recommended as the knockout region. The region contains 130bp of coding sequences. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Ghr* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs were microinjected into the fertilized eggs of C57BL/6JGpt mice. Fertilized eggs were transplanted to obtain positive F0 mice which were confirmed by PCR and on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.

Gene Information



Ghr growth hormone receptor [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 14600, updated on 10-Jan-2023

Summary

Official Symbol	Ghr provided by MGI
Official Full Name	growth hormone receptor provided by MGI
Primary source	MGI:MGI:95708
See related	Ensembl:ENSMUSG00000055737; AllianceGenome:MGI:95708
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	GHBP; GHR/BP
Summary	Enables growth hormone receptor activity and peptide hormone binding activity. Involved in growth hormone receptor signaling pathway; positive regulation of peptidyl-tyrosine phosphorylation; and regulation of growth. Acts upstream of or within taurine metabolic process. Located in nucleus and plasma membrane. Is extrinsic component of membrane. Is expressed in several structures, including alimentary system; brain; early conceptus; genitourinary system; and integumental system. Used to study Laron syndrome. Human ortholog(s) of this gene implicated in several diseases, including Laron syndrome; familial hypercholesterolemia; isolated growth hormone deficiency; osteoarthritis; and type 2 diabetes mellitus. Orthologous to human GHR (growth hormone receptor). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Biased expression in subcutaneous fat pad adult (RPKM 66.2), genital fat pad adult (RPKM 39.4) and 12 other tissues See more
Orthologs	human all

NEW Try the new Gene table
Try the new Transcript table

Genomic context

Location: 15 A1; 15 1.84 cM — See Ghr in Genome Data Viewer

Exon count: 13

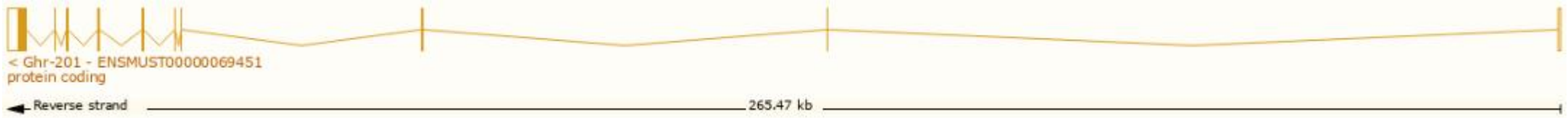
Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

The gene has 10 transcripts, all transcripts are shown below:

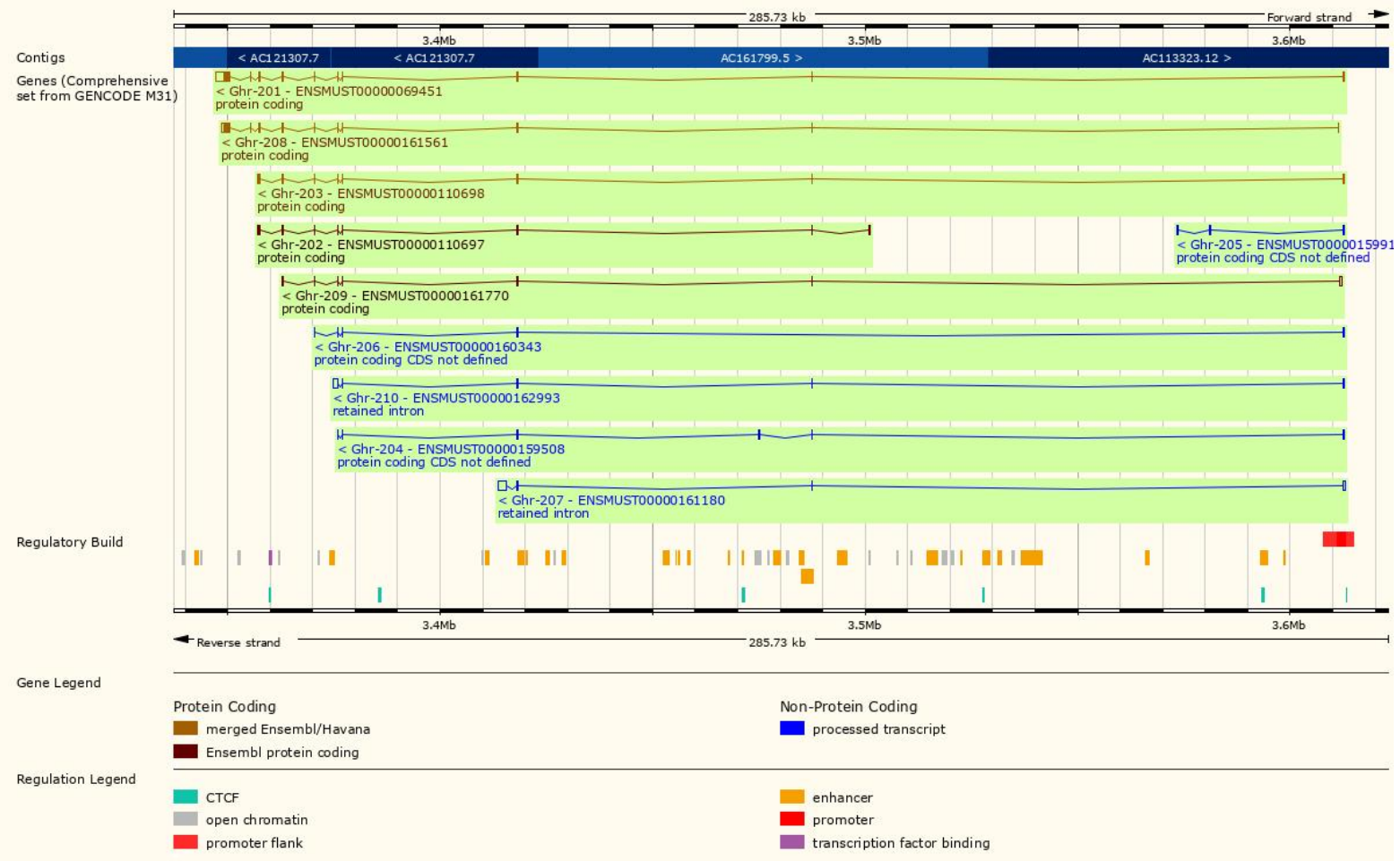
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000069451.11	Ghr-201	4175	650aa	Protein coding	CCDS27358	Q3UP14	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000161561.8	Ghr-208	2749	650aa	Protein coding	CCDS27358	Q3UP14	GENCODE basic APPRIS P1 TSL:1
ENSMUST00000110697.9	Ghr-202	1213	297aa	Protein coding	CCDS37024	P16882-2	GENCODE basic TSL:5
ENSMUST00000110698.9	Ghr-203	1171	297aa	Protein coding	CCDS37024	P16882-2	GENCODE basic TSL:1
ENSMUST00000161770.2	Ghr-209	898	183aa	Protein coding		E0CXS6	TSL:3 CDS 3' incomplete
ENSMUST00000159912.2	Ghr-205	738	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000159508.8	Ghr-204	598	No protein	Protein coding CDS not defined		-	TSL:5
ENSMUST00000160343.8	Ghr-206	472	No protein	Protein coding CDS not defined		-	TSL:3
ENSMUST00000161180.2	Ghr-207	2481	No protein	Retained intron		-	TSL:1
ENSMUST00000162993.8	Ghr-210	1794	No protein	Retained intron		-	TSL:1

The strategy is based on the design of *Ghr*-201 transcript, the transcription is shown below:



Source: https://www.ensembl.org

Genomic Information



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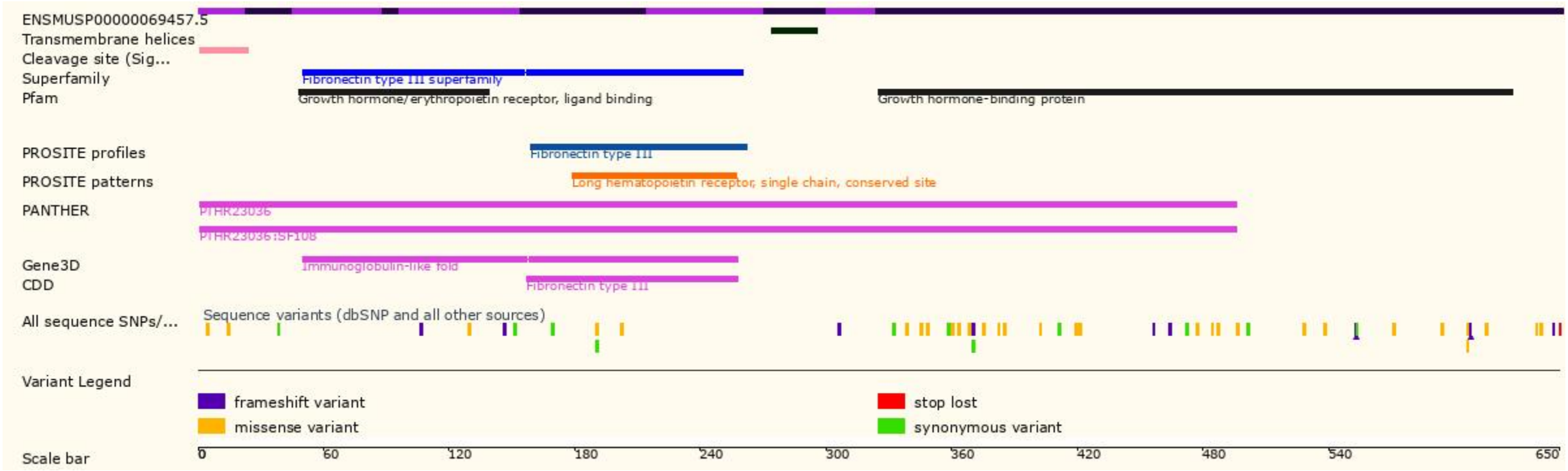
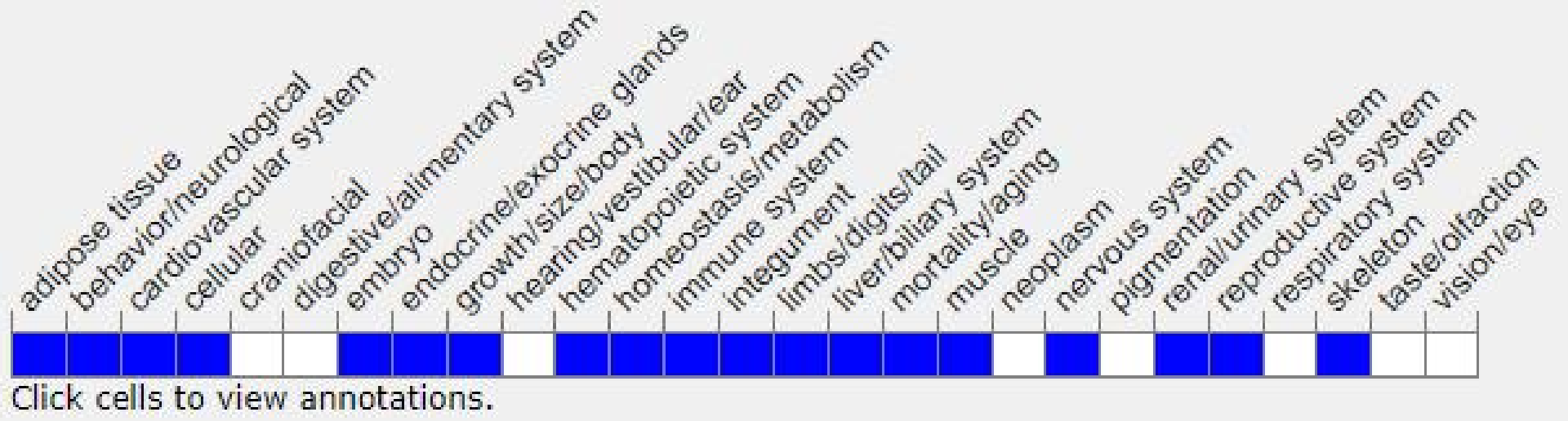
Source: : https://www.ensembl.org

Protein Information



Source: : https://www.ensembl.org

Mouse Phenotype Information (MGI)



- Homozygotes for targeted null mutations exhibit retarded postnatal growth, proportionate dwarfism, decreased plasma insulin-like growth factor I levels, small pituitaries, reduced fecundity in females, and extended life-span.

Source: https://www.informatics.jax.org

Important Information

- The effect of *Ghr*-205 and *Ghr*-207 gene is unknown.
- *Ghr* is located on Chr15. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is on the same chromosome.
- This Strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.