

# Srebf1 Cas9-KO Strategy

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# Overview

## Target Gene Name

- Srebf1

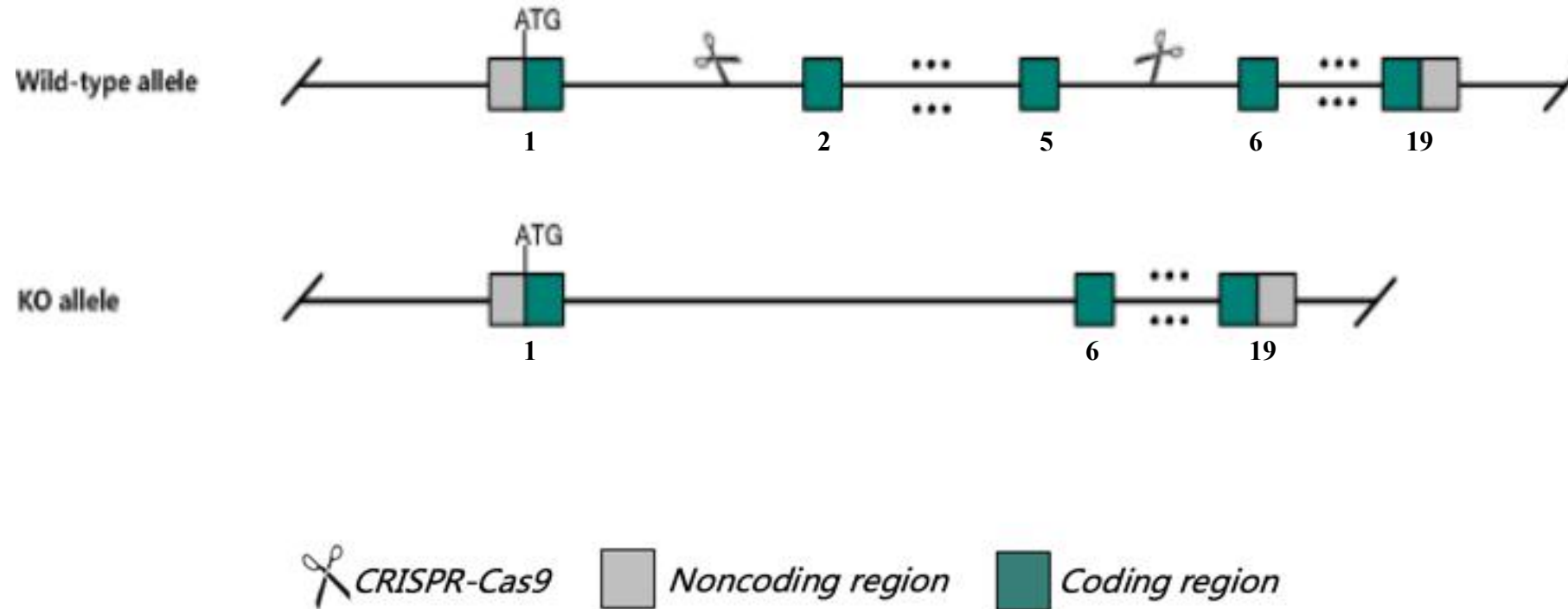
## Project Type

- Cas9-KO

## Genetic Background

- C57BL/6JGpt

# Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Strn4* gene.

# Technical Information

- The *Srebf1* gene has 12 transcripts. According to the structure of *Srebf1* gene, exon2-exon5 of *Srebf1*-201(ENSMUST00000020846.8) transcript is recommended as the knockout region. The region contains 959bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Srebf1* gene. The brief process is as follows: CRISPR-Cas9 system 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 sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.

# Gene Information

## Srebf1 sterol regulatory element binding transcription factor 1 [Mus musculus (house mouse)]

Gene ID: 20787, updated on 12-Jul-2022

### Summary

<b>Official Symbol</b>	Srebf1 <small>provided by MGI</small>
<b>Official Full Name</b>	sterol regulatory element binding transcription factor 1 <small>provided by MGI</small>
<b>Primary source</b>	<a href="#">MGI:MGI:107606</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000020538</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</b>	REVIEWED
<b>Organism</b>	<a href="#">Mus musculus</a>
<b>Lineage</b>	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
<b>Also known as</b>	ADD1, SREBP1, bHLHd1
<b>Summary</b>	This gene encodes a transcription factor that binds to the sterol regulatory element-1 (SRE1), which is a decamer flanking the low density lipoprotein receptor gene and some genes involved in sterol biosynthesis. The protein is synthesized as a precursor that is attached to the nuclear membrane and endoplasmic reticulum. Following cleavage, the mature protein translocates to the nucleus and activates transcription by binding to the SRE1. Sterols inhibit the cleavage of the precursor, and the mature nuclear form is rapidly catabolized, thereby reducing transcription. The protein is a member of the basic helix-loop-helix-leucine zipper (bHLH-Zip) transcription factor family. Alternatively spliced transcript variants have been characterized for this gene. [provided by RefSeq, Nov 2017]
<b>Expression</b>	Broad expression in mammary gland adult (RPKM 175.8), adrenal adult (RPKM 151.4) and 25 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

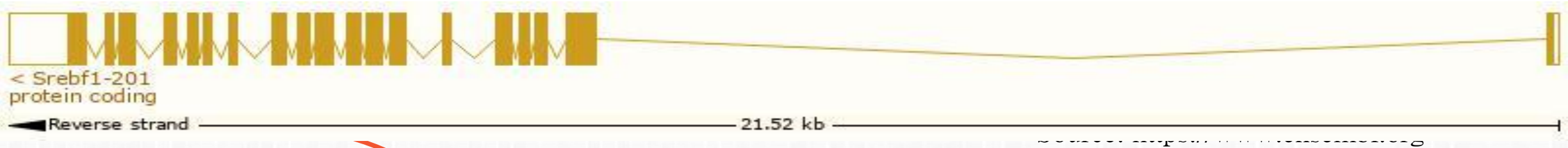
Source: <https://www.ncbi.nlm.nih.gov/>

# Transcript Information

The gene has 12 transcripts,all transcripts are shown below:

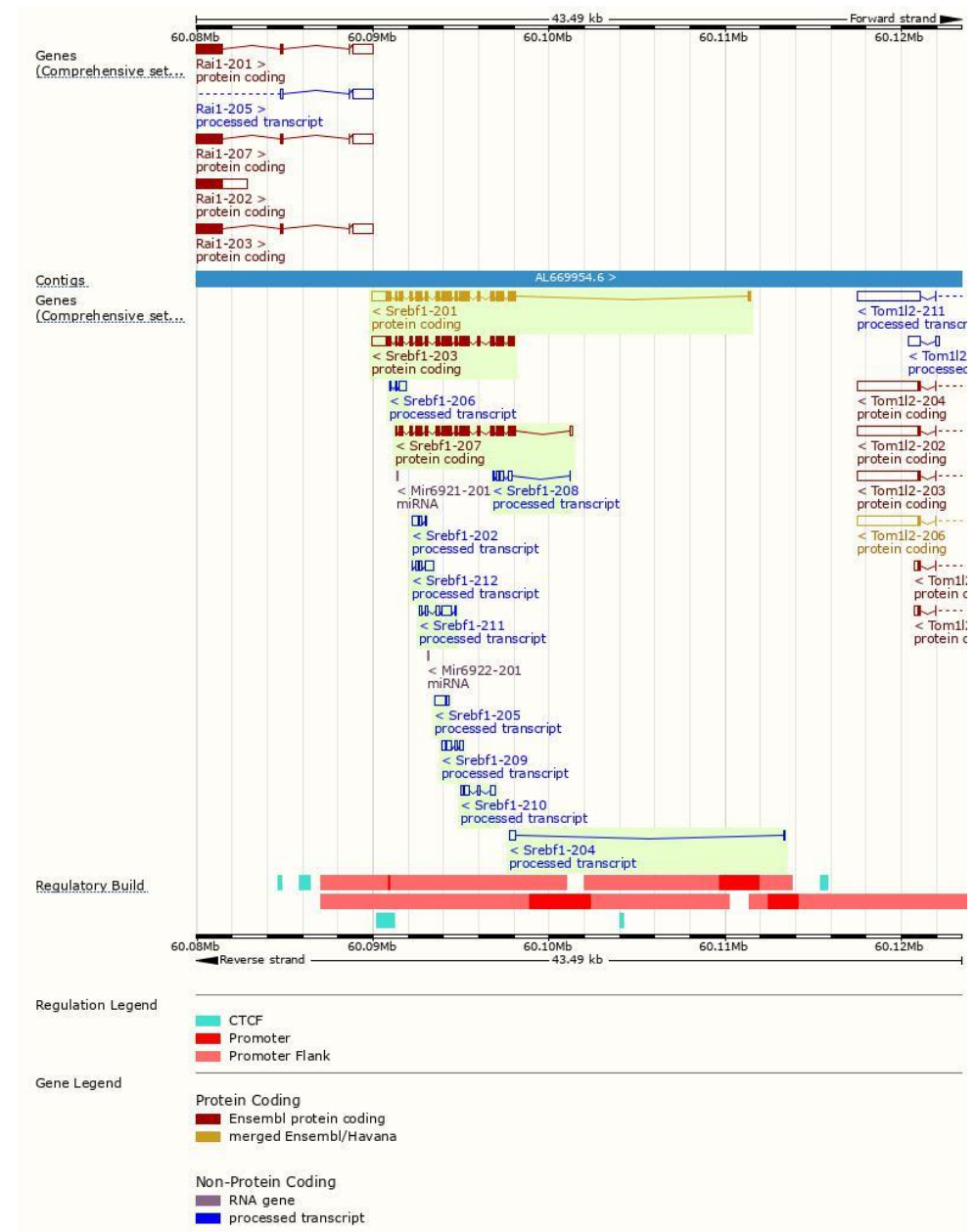
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Srebf1-201	<a href="#">ENSMUST00000020846.8</a>	4299	<a href="#">1134aa</a>	Protein coding	<a href="#">CCDS24785</a>		TSL:1 , GENCODE basic , APPRIS P1 ,
Srebf1-203	<a href="#">ENSMUST00000134660.8</a>	4063	<a href="#">1076aa</a>	Protein coding	-		CDS 5' incomplete , TSL:1 ,
Srebf1-207	<a href="#">ENSMUST00000144942.2</a>	3177	<a href="#">1022aa</a>	Protein coding	-		CDS 3' incomplete , TSL:5 ,
Srebf1-211	<a href="#">ENSMUST00000154925.2</a>	945	No protein	Processed transcript	-		TSL:5 ,
Srebf1-209	<a href="#">ENSMUST00000149238.2</a>	826	No protein	Processed transcript	-		TSL:2 ,
Srebf1-212	<a href="#">ENSMUST00000156304.2</a>	755	No protein	Processed transcript	-		TSL:3 ,
Srebf1-205	<a href="#">ENSMUST00000136426.2</a>	750	No protein	Processed transcript	-		TSL:2 ,
Srebf1-208	<a href="#">ENSMUST00000147967.2</a>	686	No protein	Processed transcript	-		TSL:3 ,
Srebf1-210	<a href="#">ENSMUST00000154620.2</a>	662	No protein	Processed transcript	-		TSL:2 ,
Srebf1-206	<a href="#">ENSMUST00000141161.2</a>	540	No protein	Processed transcript	-		TSL:2 ,
Srebf1-202	<a href="#">ENSMUST00000129869.8</a>	516	No protein	Processed transcript	-		TSL:1 ,
Srebf1-204	<a href="#">ENSMUST00000136215.2</a>	367	No protein	Processed transcript	-		TSL:3 ,

The strategy is based on the design of *Srebf1-201* transcript,the transcription is shown below:

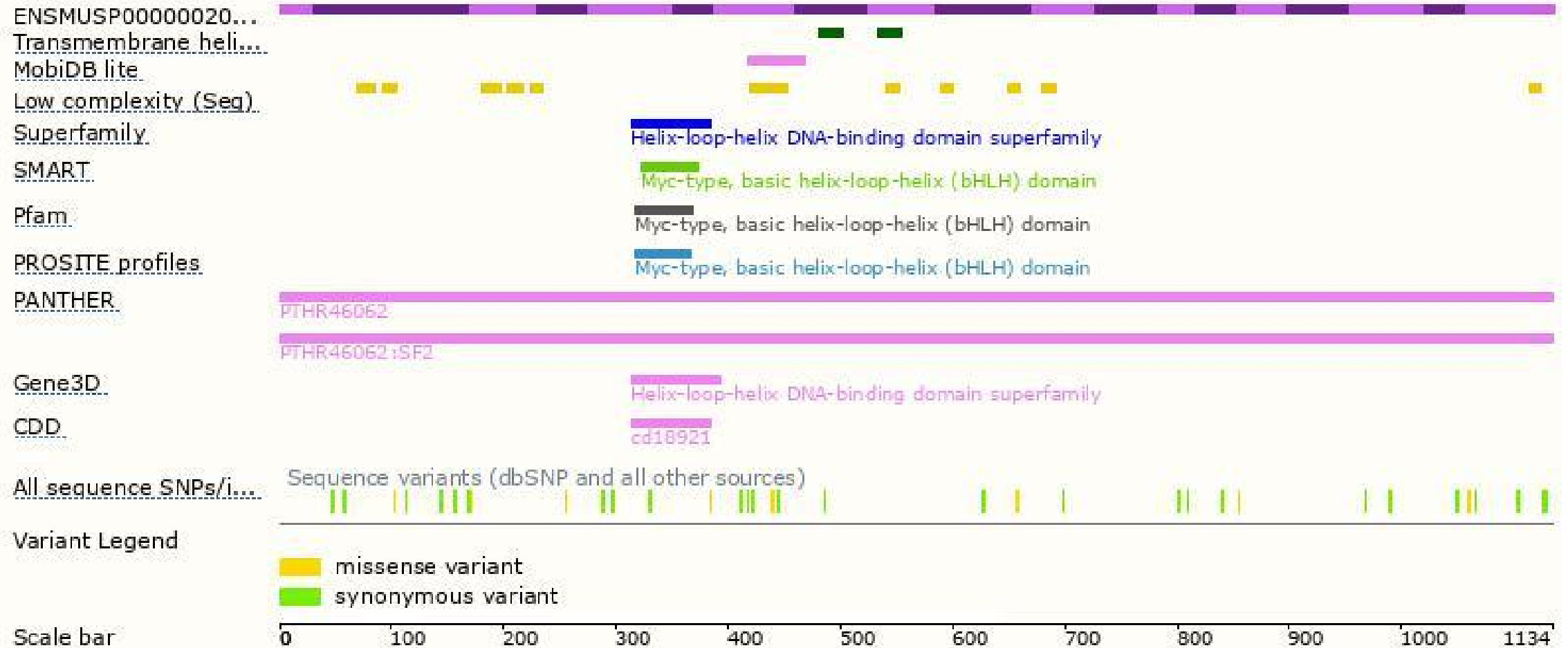




# Genomic Information

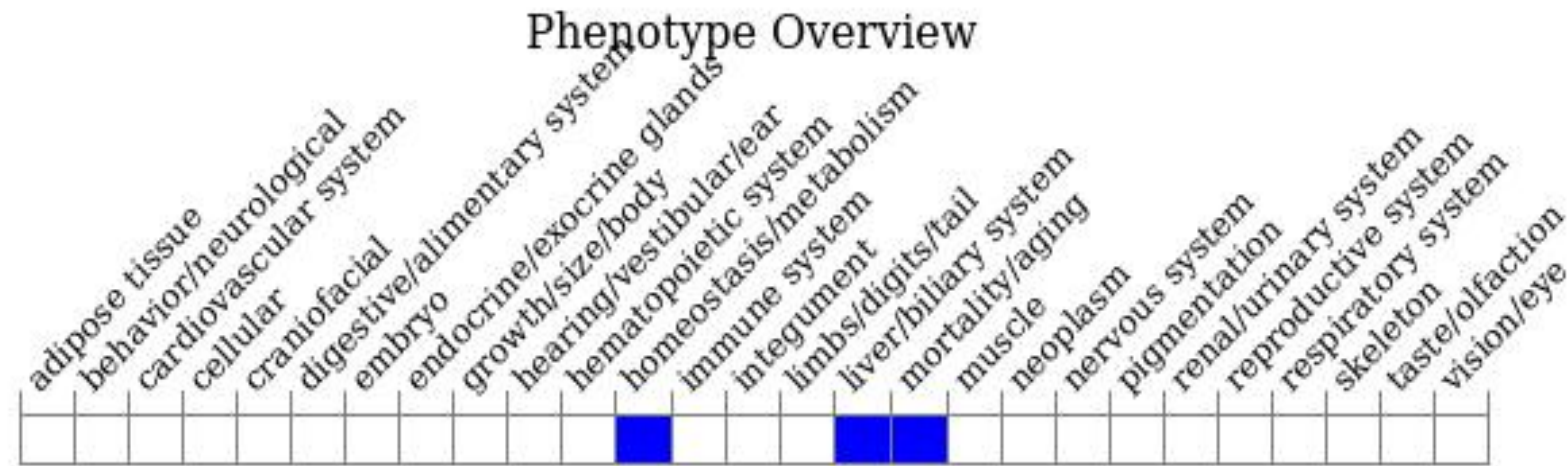


# Protein Information





# Mouse Phenotype Information (MGI)



Phenotypes affected by the gene are marked in blue. Data quoted from MGI database (<http://www.informatics.jax.org/>).

According to the existing MGI data, mice homozygous for a knock-out allele of transcript A die between E11.5 and E14.5. Mice homozygous for a knock-out allele of transcript C exhibit decreased circulating triglyceride levels. Mice homozygous for a gene trap allele exhibit decreased hepatic triglyceride storage.

# Important Information

- The *Srebf1* gene is located on the Chr11. If the knockout mice are crossed with other mice strains to obtain double gene positive homozygous mouse offspring, please avoid the two genes on the same chromosome.
- This strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risk of the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.