Dsc1 Cas9-CKO Strategy

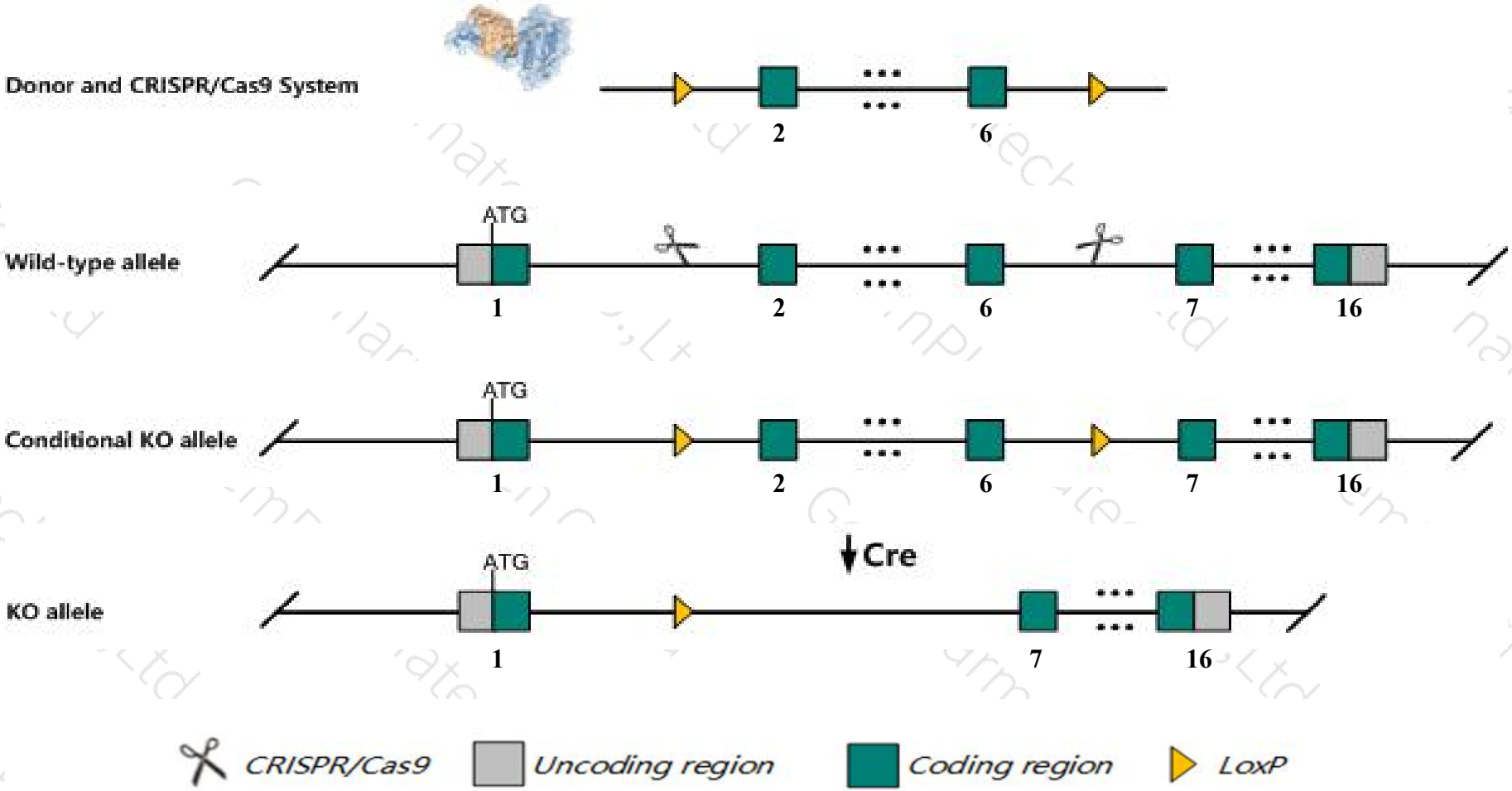
Designer:Xueting Zhang
Reviewer:Yanhua Shen
Date:2020-02-07

Project Overview

Project Name	***Dsc1***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Dsc1* gene. The schematic diagram is as follows:



Technical routes

- The *Dsc1* gene has 4 transcripts. According to the structure of *Dsc1* gene, exon2-exon6 of *Dsc1-201* (ENSMUST00000038710.5) transcript is recommended as the knockout region.The region contains 709bp coding sequence. Knock out the region will result in disruption of protein function.

- In this project we use CRISPR/Cas9 technology to modify *Dsc1* gene. The brief process is as follows:CRISPR/Cas9 system and Donor 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.

- The flox mice will be knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues and cell types.

Notice

➢ According to the existing MGI data,Mutants with targeted disruptions of this gene have fragile epidermis, flaky skin, and defects in the epidermal barrier, leading to chronic dermatitis and display abnormal epidermal differentiation as indicated by hyperproliferation and overxpression of keratin 6 and 16.

➢ The *Dsc1* gene is located on the Chr18. 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information （NCBI）

集萃药康 GemPharmatech

Dsc1 desmocollin 1 [*Mus musculus* (house mouse)]

Gene ID: 13505, updated on 24-Oct-2019

Summary

Official Symbol	Dsc1 provided by MGI
Official Full Name	desmocollin 1 provided by MGI
Primary source	MGI:MGI:109173
See related	Ensembl:ENSMUSG00000044322
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	AI507491; 1110020A10Rik
Summary	This gene encodes a member of the cadherin family of proteins that mediates adhesion in desmosomes. The encoded preproprotein undergoes proteolytic processing to generate the mature, functional protein. Mice lacking the encoded protein exhibit epidermal fragility together with defects of epidermal barrier and differentiation. The neonatal mice lacking the encoded protein exhibit epidermal lesions and older mice develop chronic dermatitis. This gene is located in a cluster of desmosomal cadherin genes on chromosome 18. Alternate splicing of this gene results in multiple transcript variants encoding different isoforms that may undergo similar proteolytic processing. [provided by RefSeq, Jan 2016]
Expression	Biased expression in stomach adult (RPKM 1.7), lung adult (RPKM 1.0) and 2 other tissues See more
Orthologs	human all

Genomic context

Location: 18; 18 A2

See Dsc1 in Genome Data Viewer

Exon count: 17

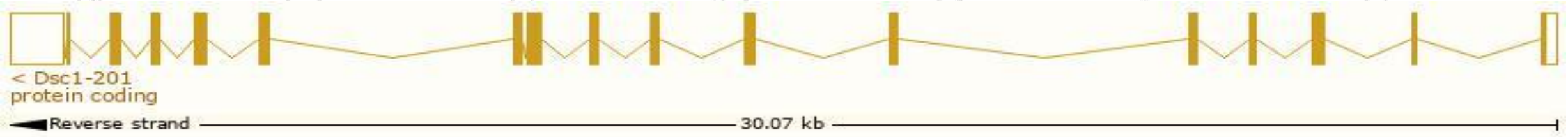
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	18	NC_000084.6 (20083471..20114773, complement)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	18	NC_000084.5 (20243204..20273274, complement)

Transcript information（Ensembl）

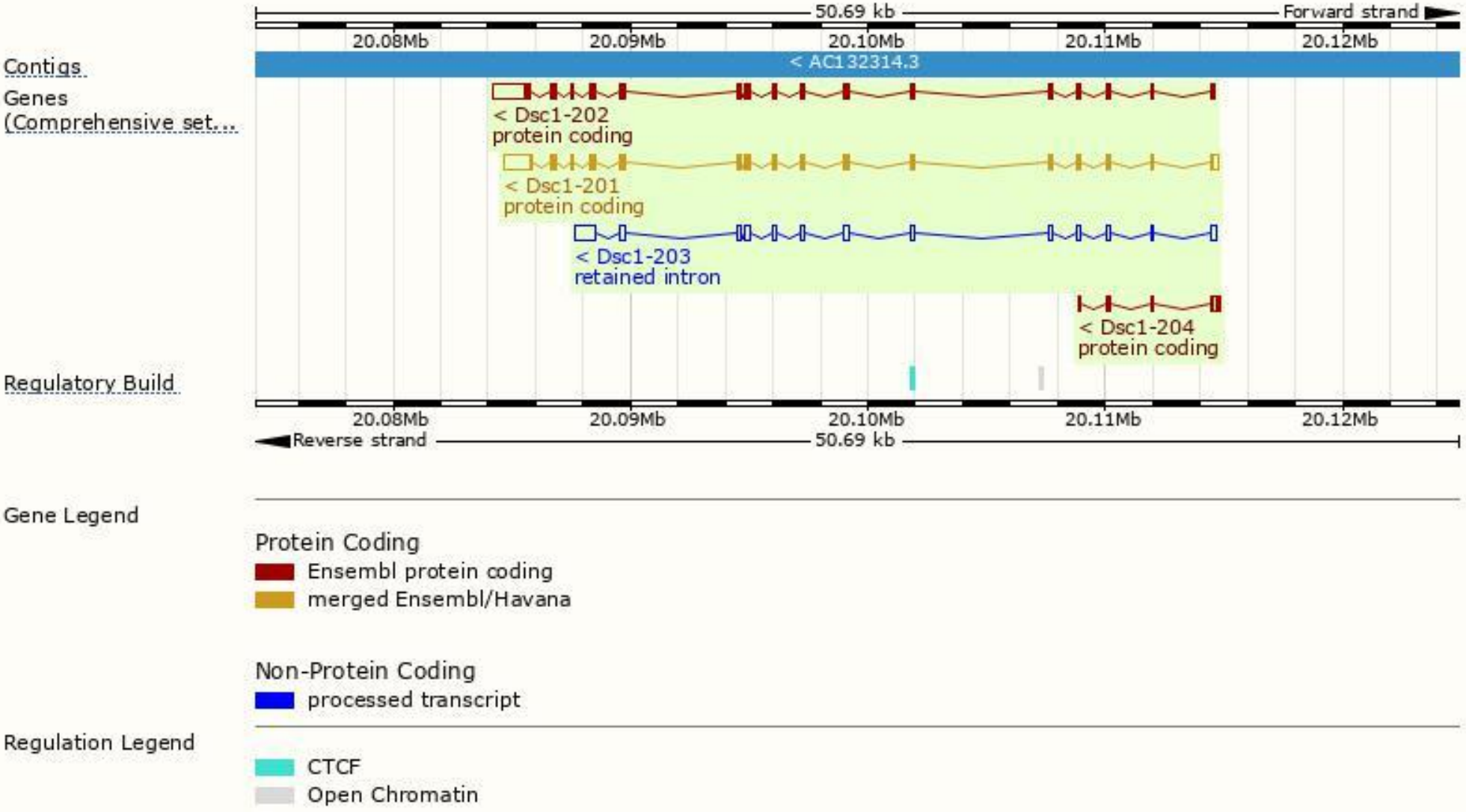
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Dsc1-201	ENSMUST00000038710.5	3775	832aa	Protein coding	CCDS29078	Q32ME9	TSL:1 GENCODE basic APPRIS P2
Dsc1-202	ENSMUST00000224432.1	4085	886aa	Protein coding	-	P55849	GENCODE basic APPRIS ALT2
Dsc1-204	ENSMUST00000226115.1	663	147aa	Protein coding	-	A0A286YCT9	CDS 3' incomplete
Dsc1-203	ENSMUST00000224557.1	2872	No protein	Retained intron	-	-	

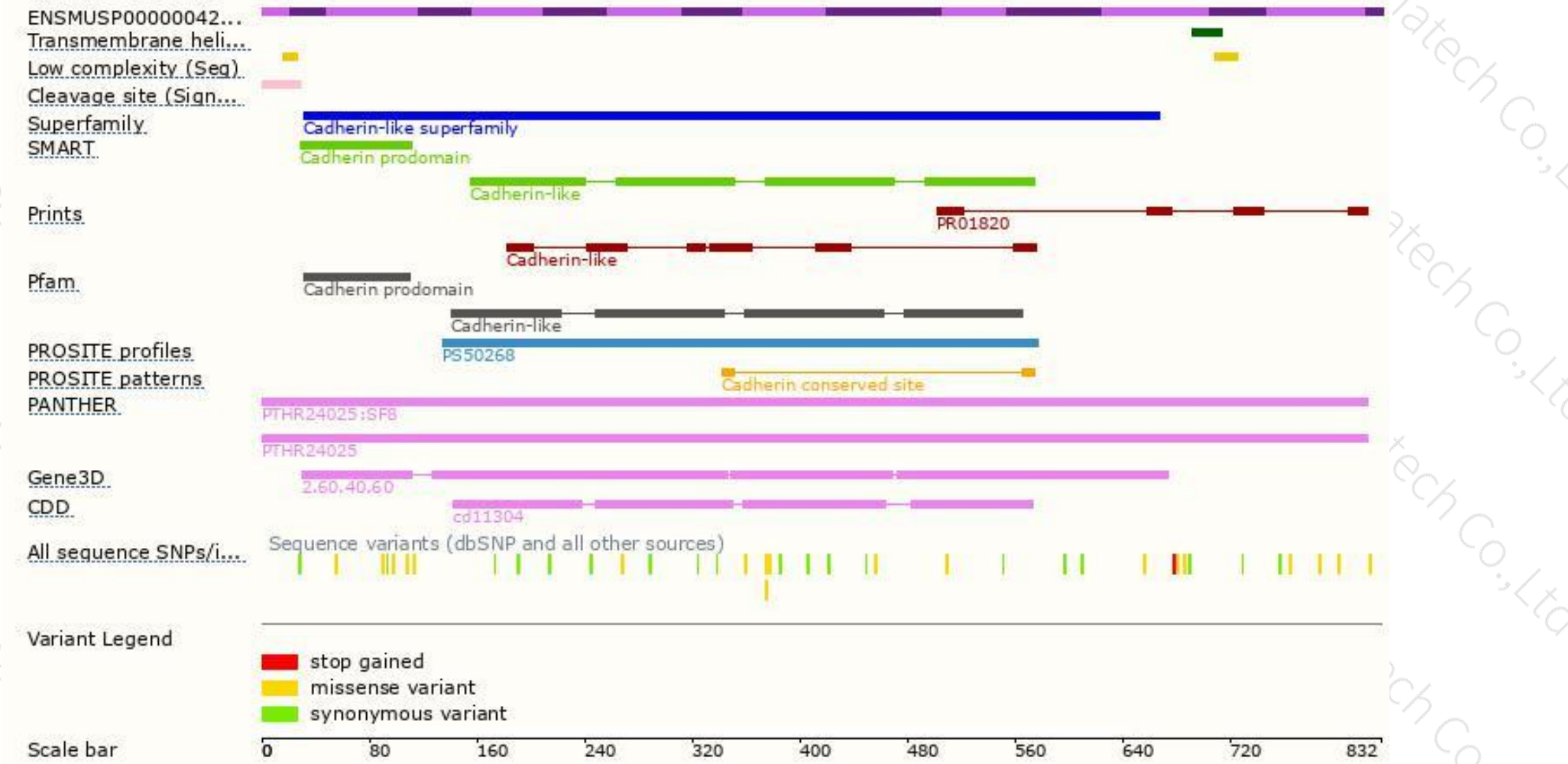
The strategy is based on the design of *Dsc1-201* transcript,The transcription is shown below



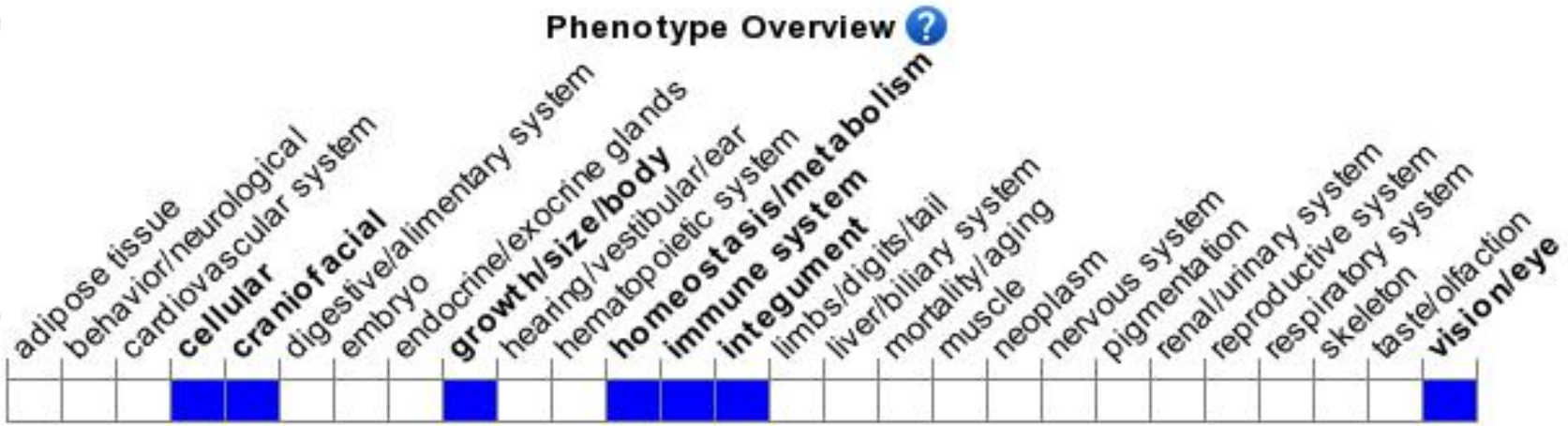
Genomic location distribution



Protein domain



Mouse phenotype description(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,Mutants with targeted disruptions of this gene have fragile epidermis, flaky skin, and defects in the epidermal barrier, leading to chronic dermatitis and display abnormal epidermal differentiation as indicated by hyperproliferation and overxpression of keratin 6 and 16.

集萃药康
GemPharmatech

If you have any questions, you are welcome to inquire.

Tel: 400-9660890

集萃药康生物科技
GemPharmatech Co.,Ltd