Fkbp10 Cas9-KO Strategy

Designer: Daohua Xu

Reviewer: Yanhua Shen

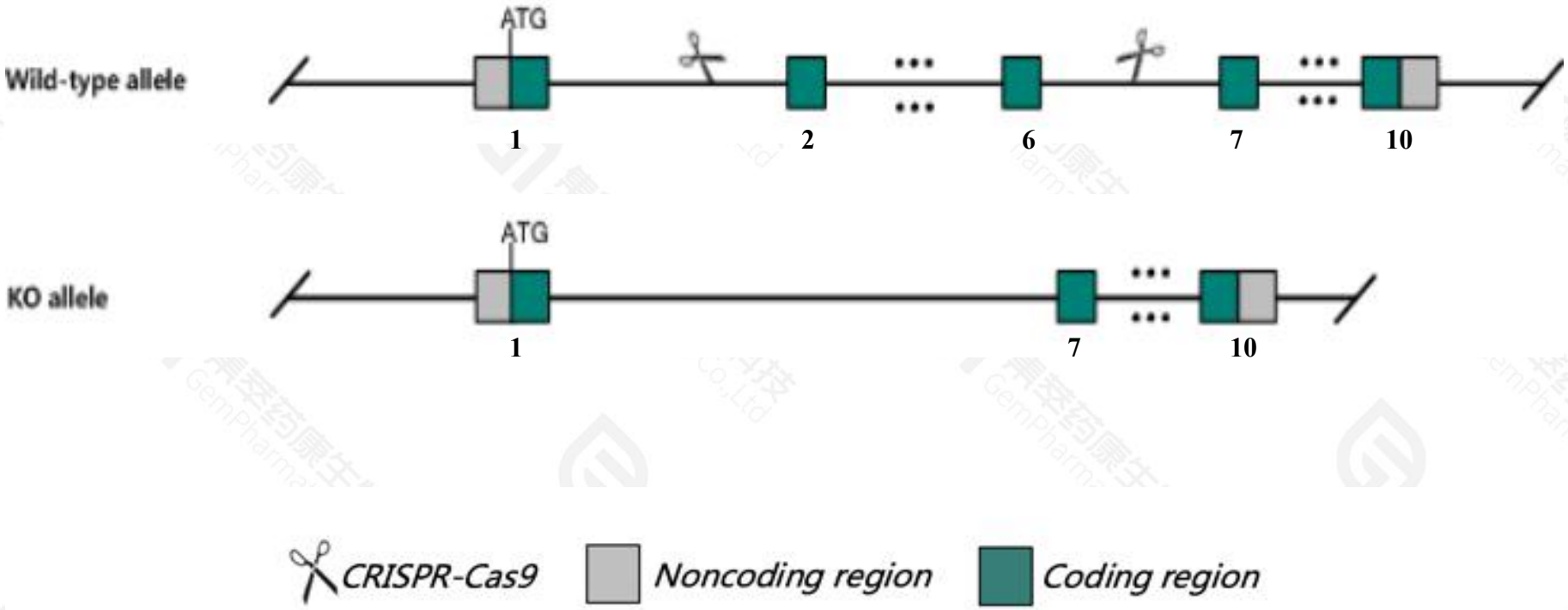
Design Date: 2022-8-3

Project Overview

Project Name	***Fkbp10***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR-Cas9 technology to edit the *Fkbp10* gene. The schematic diagram is as follows:



Technical routes

➢ The *Fkbp10* gene has 5 transcripts. According to the structure of *Fkbp10* gene, exon2-exon6 of *Fkbp10-201*(ENSMUST00000001595.10) transcript is recommended as the knockout region.The region contains 818bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR-Cas9 technology to modify *Fkbp10* 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.

Notice

➢ According to the existing MGI data,homozygous null mice do not survive birth, and embryos exhibit delayed growth, tissue fragility, decreased aorta wall thickness, craniofacial and forelimb anomalies, and connective tissue alterations. Mutant MEFs retain procollagen in the cell layer and show dilated endoplasmic reticulum.

➢ This strategy may affect the regulation of the 3-terminal of the *Nt5c3b* gene.

➢ The *Fkbp10* 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.

Gene information （NCBI）

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Fkbp10 FK506 binding protein 10 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 14230, updated on 5-Jul-2022

Summary

Official Symbol	Fkbp10 provided by MGI
Official Full Name	FK506 binding protein 10 provided by MGI
Primary source	MGI:MGI:104769
See related	Ensembl:ENSMUSG00000001555 AllianceGenome:MGI:104769
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	Fkbp6; FKBP65; Fkbprp; FKBP-10; FKBP-65; AI325255; Fkbp-rs1; Fkbp1-rs
Summary	Enables FK506 binding activity and peptidyl-prolyl cis-trans isomerase activity. Acts upstream of or within several processes, including aorta morphogenesis; extracellular matrix organization; and peptidyl-amino acid modification. Located in endoplasmic reticulum; membrane; and mitochondrial intermembrane space. Is expressed in several structures, including connective tissue; intestine epithelium; lung; metanephros; and skeleton. Human ortholog(s) of this gene implicated in osteogenesis imperfecta type 11. Orthologous to human FKBP10 (FKBP prolyl isomerase 10). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Broad expression in limb E14.5 (RPKM 89.8), ovary adult (RPKM 79.7) and 18 other tissues See more
Orthologs	human all

NEW Try the new Gene table
Try the new Transcript table

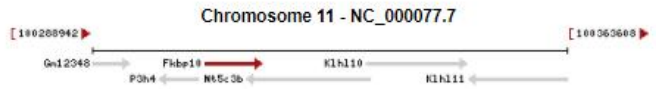
Genomic context

Location: 11 D; 11 63.47 cM

See Fkbp10 in Genome Data Viewer

Exon count: 10

Annotation release	Status	Assembly	Chr	Location
109	current	GRCm39 (GCF_000001635.27)	11	NC_000077.7 (100306520..100315666)
108.20200622	previous assembly	GRCm38.p6 (GCF_000001635.26)	11	NC_000077.6 (100415694..100424840)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	11	NC_000077.5 (100277008..100286154)

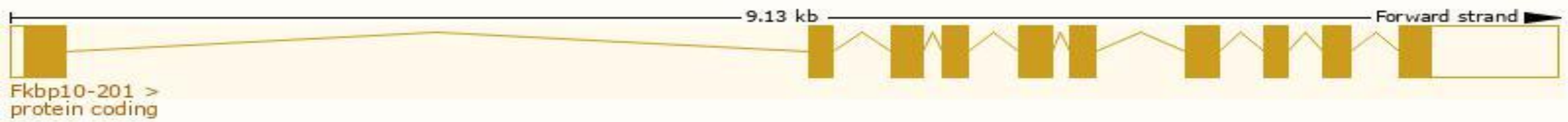


Transcript information（Ensembl）

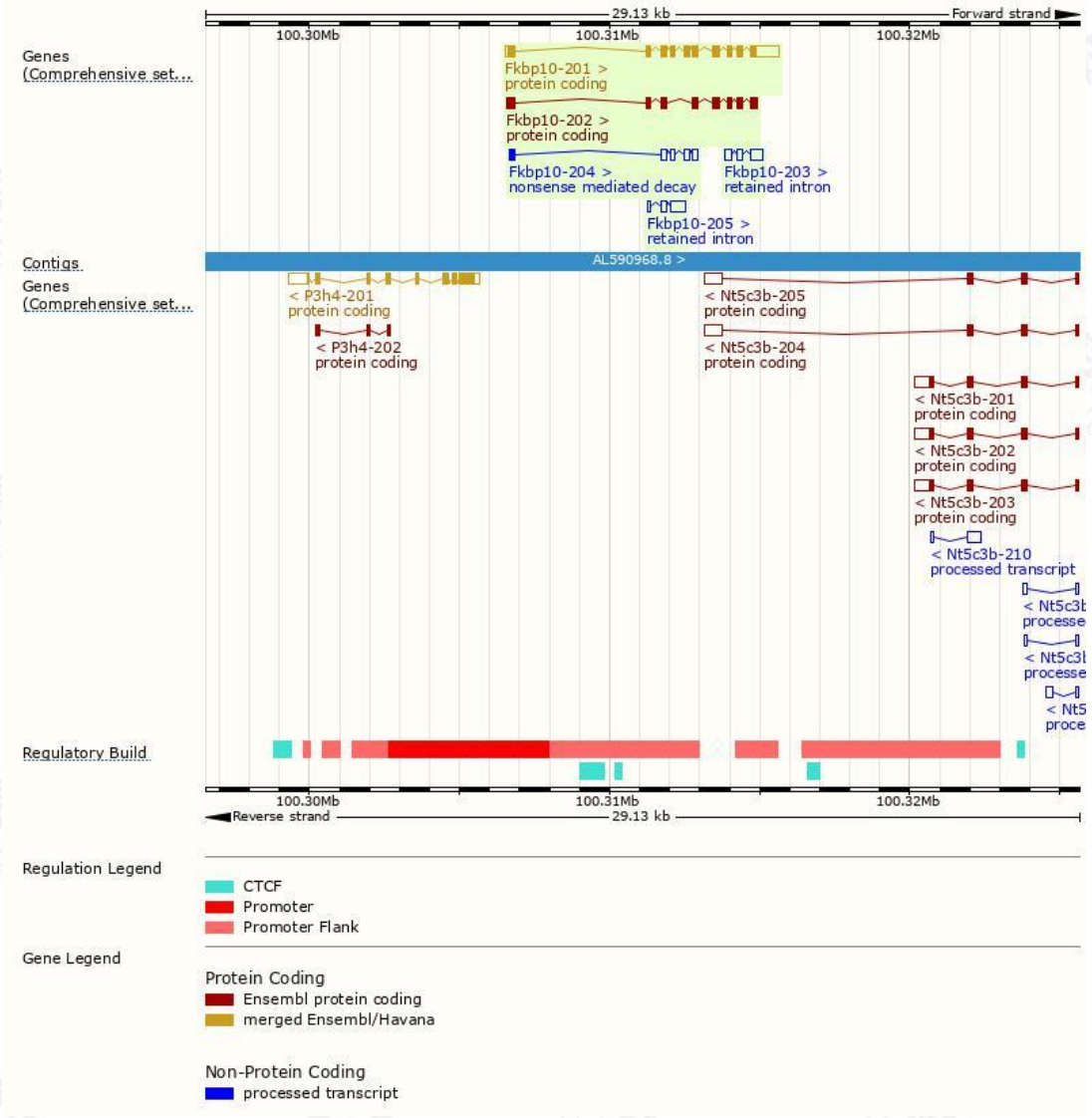
The gene has 5 transcripts,all transcripts are shown below:

Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000001595.10	Fkbp10-201	2584	581aa	Protein coding	CCDS25422	Q61576	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000107400.3	Fkbp10-202	1467	469aa	Protein coding		A2A4H9	GENCODE basic TSL:5
ENSMUST00000134815.2	Fkbp10-204	853	66aa	Nonsense mediated decay		F6W360	TSL:5 CDS 5' incomplete
ENSMUST00000139084.2	Fkbp10-205	815	No protein	Retained intron		-	TSL:2
ENSMUST00000125616.2	Fkbp10-203	767	No protein	Retained intron		-	TSL:2

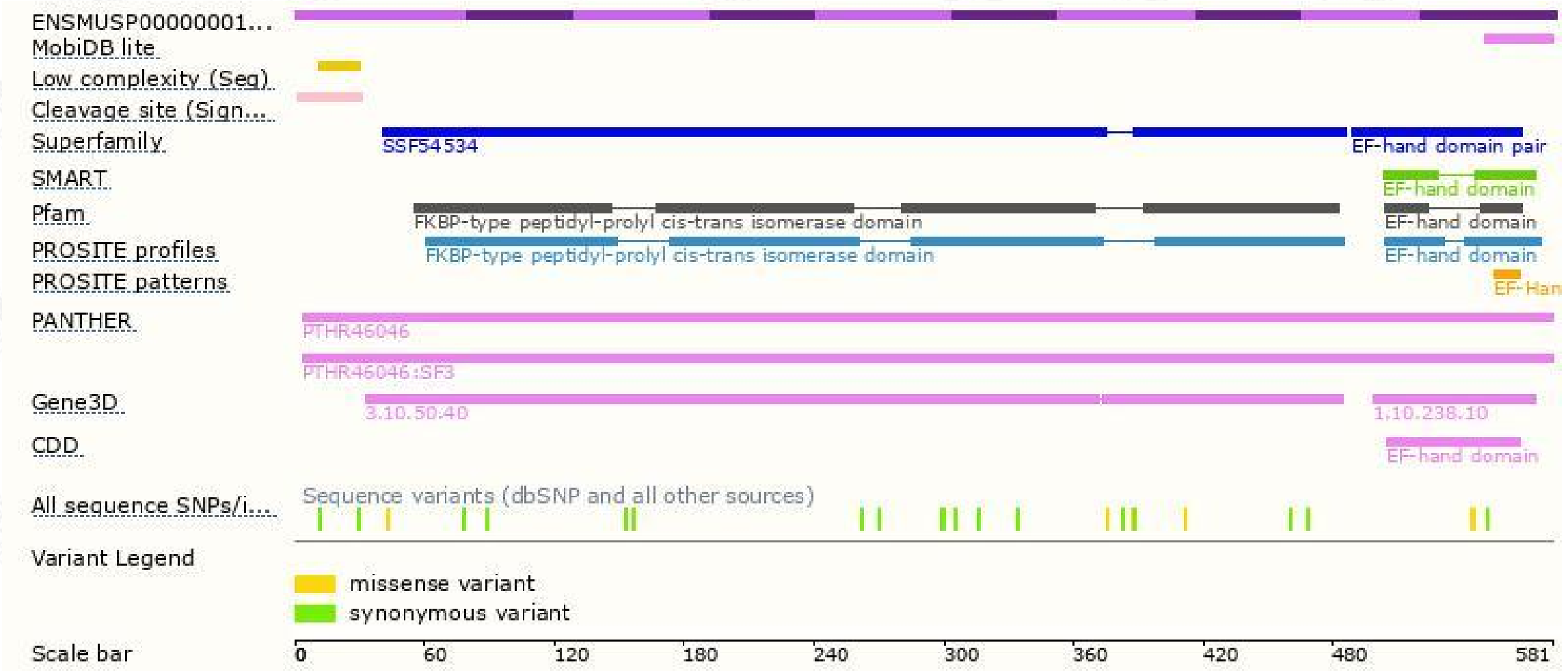
The strategy is based on the design of *Fkbp10-201* transcript,the transcription is shown below:



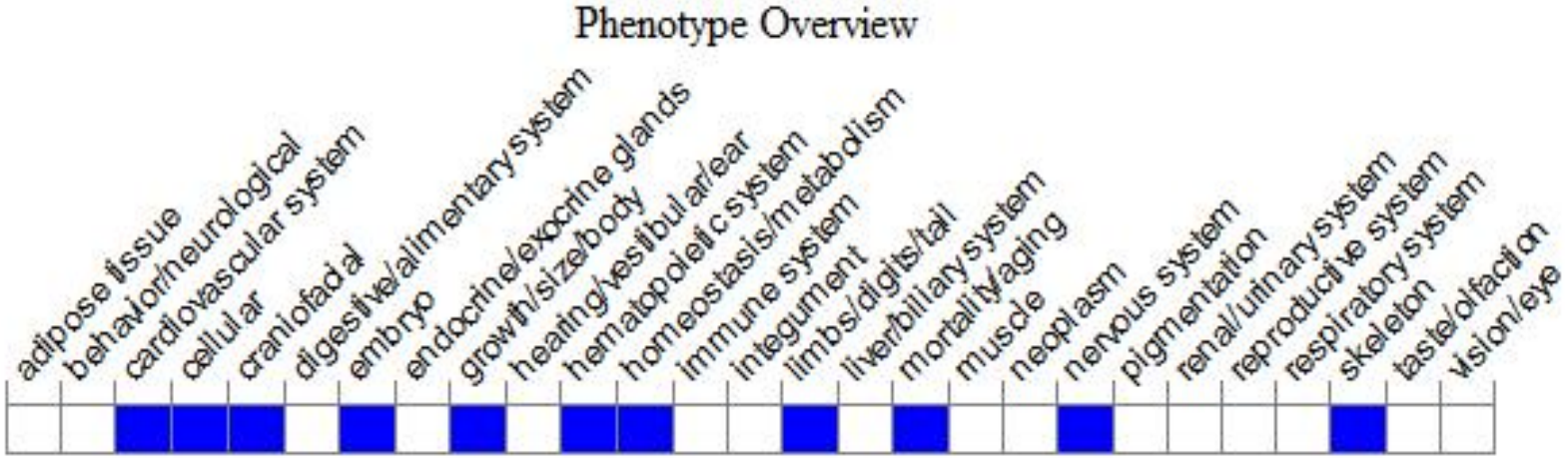
Genomic location distribution



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,homozygous null mice do not survive birth, and embryos exhibit delayed growth, tissue fragility, decreased aorta wall thickness, craniofacial and forelimb anomalies, and connective tissue alterations. Mutant MEFs retain procollagen in the cell layer and show dilated endoplasmic reticulum.

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If you have any questions, you are welcome to inquire.
Tel: 400-9660890

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