

Adrb3 Cas9-KO Strategy

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Project Overview

Project Name

Adrb3

Project type

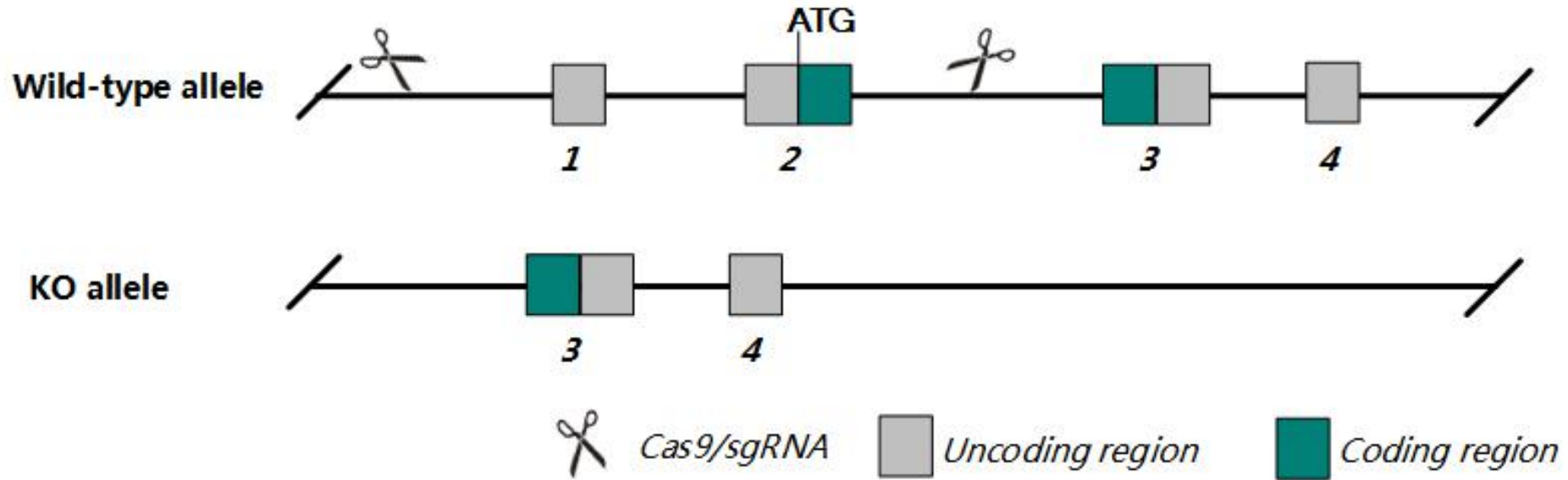
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Adrb3* gene. The schematic diagram is as follows:



- The *Adrb3* gene has 5 transcripts. According to the structure of *Adrb3* gene, exon1-exon2 of *Adrb3-201* (ENSMUST00000081438.9) transcript is recommended as the knockout region. The region contains most of the coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Adrb3* gene. The brief process is as follows: gRNA was transcribed in vitro. Cas9 and gRNA 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.

- According to the existing MGI data, Homozygotes for targeted null mutations develop greater adiposity, especially on a high-fat diet, and are unresponsive to the beta3-adrenergic receptor agonist, CL316,243.
- Partial sequence of *Gm45470* gene will be deleted together in this strategy.
- The floxed region is near to the N-terminal of *Got111* gene, this strategy may influence the regulatory function of the N-terminal of *Got111* gene.
- The *Adrb3* gene is located on the Chr8. 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)

Adrb3 adrenergic receptor, beta 3 [*Mus musculus* (house mouse)]

Gene ID: 11556, updated on 25-Jun-2019

Summary

Official Symbol	Adrb3 provided by MGI
Official Full Name	adrenergic receptor, beta 3 provided by MGI
Primary source	MGI:MGI:87939
See related	Ensembl:ENSMUSG000000031489
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	Adrb-3; beta 3-AR
Expression	Biased expression in mammary gland adult (RPKM 215.3), subcutaneous fat pad adult (RPKM 163.4) and 4 other tissues See more
Orthologs	human all

Genomic context

Location: 8 A2; 8 15.94 cM

See Adrb3 in [Genome Data Viewer](#)

Exon count: 6

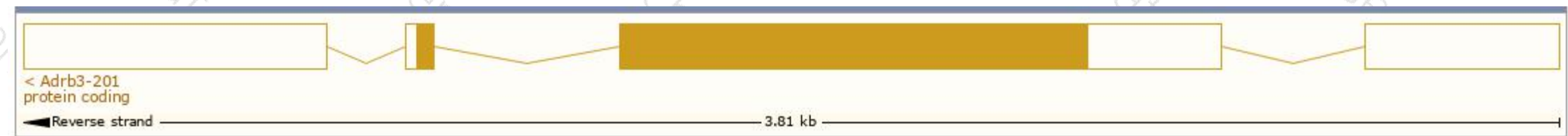
Annotation release	Status	Assembly	Chr	Location
106	current	GRCm38.p4 (GCF_000001635.24)	8	NC_000074.6 (27225776..27230807, complement)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	8	NC_000074.5 (28336248..28340060, complement)

Transcript information (Ensembl)

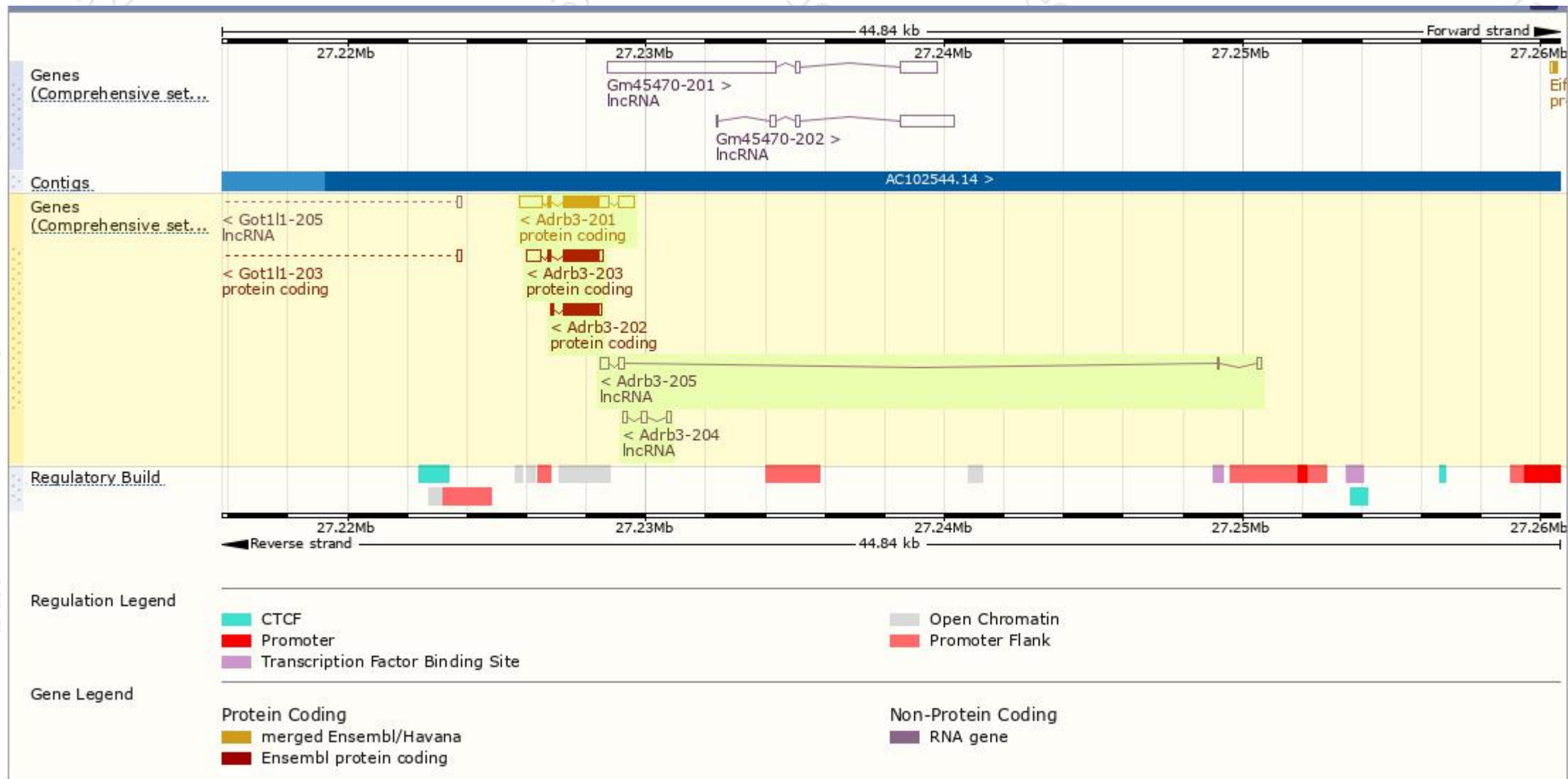
The gene has 5 transcripts,all the transcript are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Adrb3-201	ENSMUST00000081438.9	2795	400aa	Protein coding	CCDS22213	P25962 Q3UP63	TSL:1 GENCODE basic APPRIS P2
Adrb3-202	ENSMUST00000117565.1	1336	404aa	Protein coding	-	P25962	TSL:1 GENCODE basic APPRIS ALT2
Adrb3-203	ENSMUST00000121838.1	1864	400aa	Protein coding	CCDS22213	P25962 Q3UP63	TSL:1 GENCODE basic APPRIS P2
Adrb3-204	ENSMUST00000209447.1	450	No protein	lncRNA	-	-	TSL:3
Adrb3-205	ENSMUST00000211346.1	669	No protein	lncRNA	-	-	TSL:3

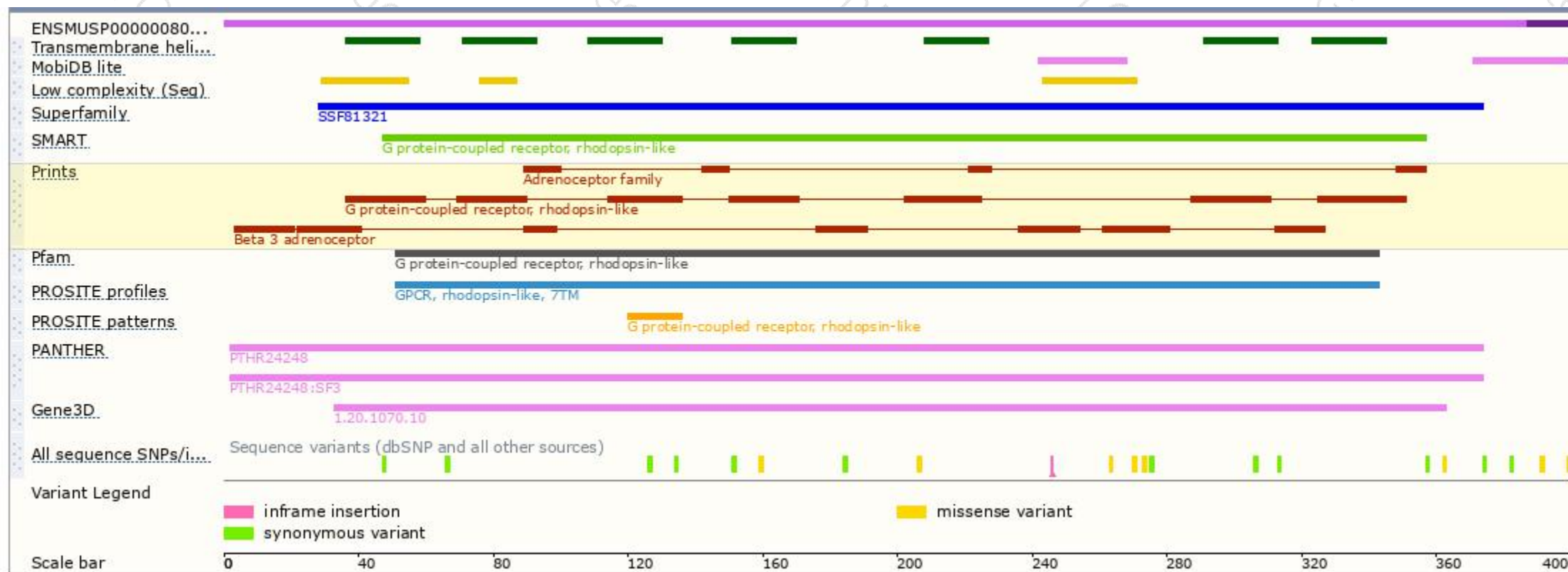
The strategy is based on the design of *Adrb3-201* transcript,The transcription is shown below



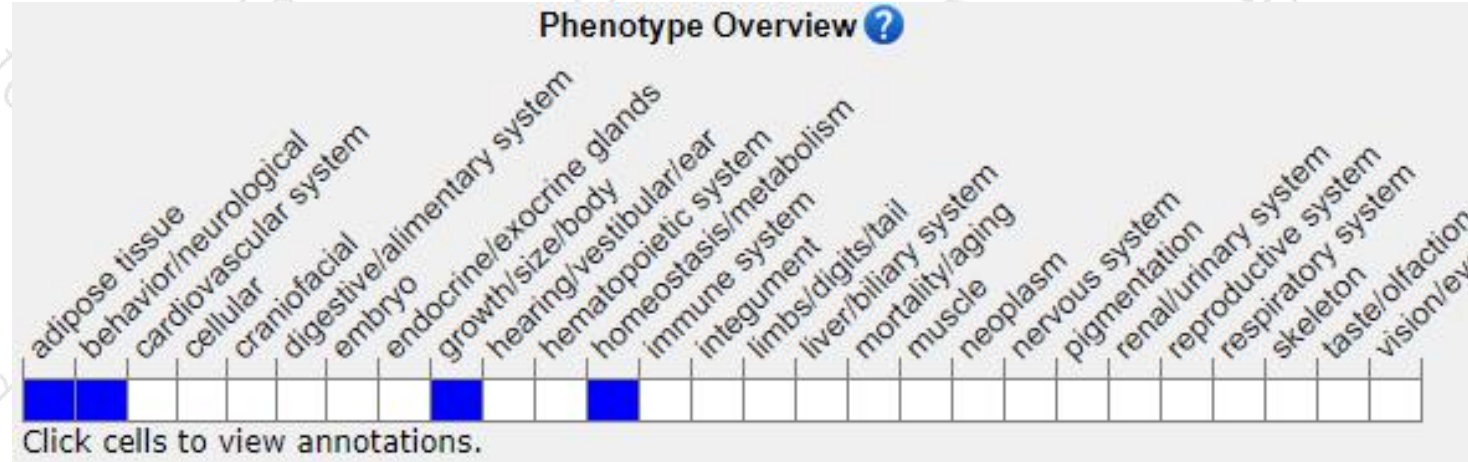
Genomic location distribution



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/>).

Homozygotes for targeted null mutations develop greater adiposity, especially on a high-fat diet, and are unresponsive to the beta3-adrenergic receptor agonist, CL316,243.

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

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