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# Apc Cas9-KO Strategy

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# Overview

## Target Gene Name

- Apc

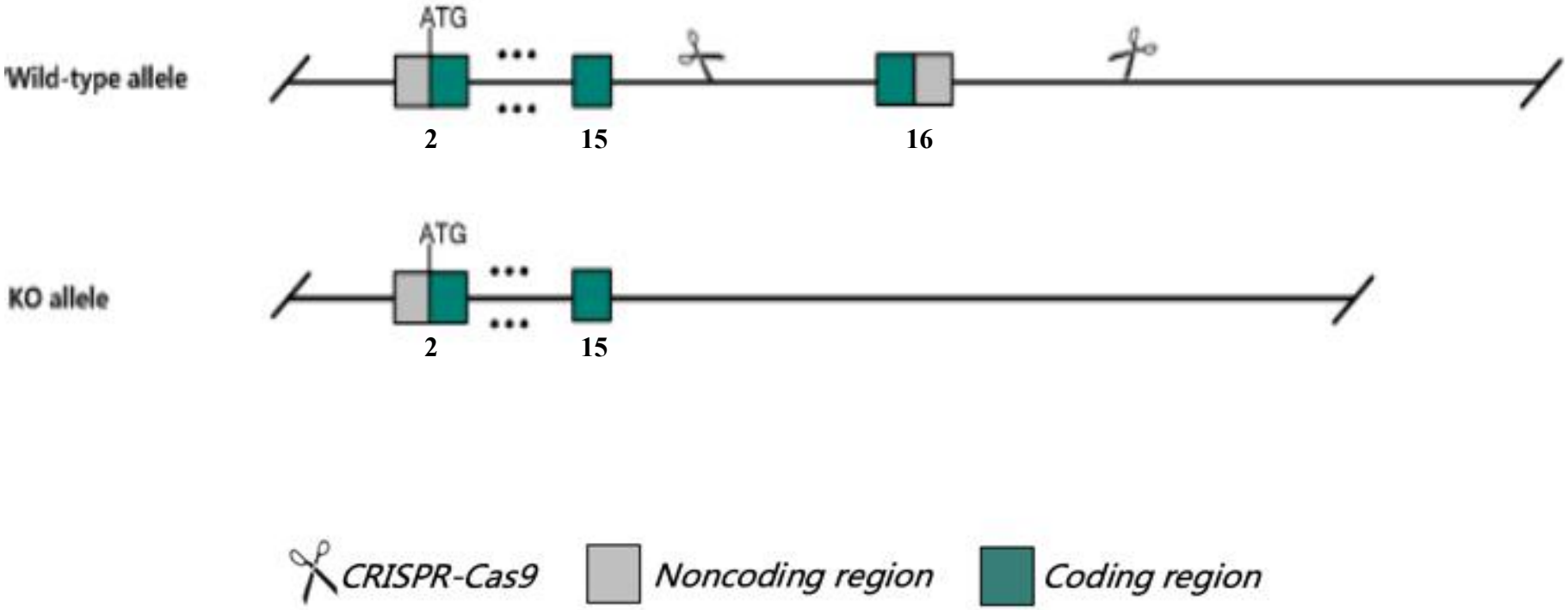
## Project Type

- Cas9-KO

## Genetic Background

- C57BL/6JGpt

# Strain Strategy




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

# Technical Information

- The *Apc* gene has 9 transcripts. According to the structure of *Apc* gene, exon16 of *Apc-202* (ENSMUST00000079362.13) transcript is recommended as the knockout region. The region contains most of coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Apc* 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

## Apc APC, WNT signaling pathway regulator [Mus musculus (house mouse)]

Gene ID: 11789, updated on 12-Jul-2022

### Summary

| | |
|---|---|
| **Official Symbol** | Apc provided by MGI |
| **Official Full Name** | APC, WNT signaling pathway regulator provided by MGI |
| **Primary source** | MGI:MGI:88039 |
| **See related** | Ensembl:ENSMUSG00000005871 |
| **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** | AI047805, AU020952, AW124434, CC1, Min, mAPC |
| **Expression** | Broad expression in frontal lobe adult (RPKM 29.9), CNS E18 (RPKM 22.5) and 18 other tissues See more |
| **Orthologs** | human all |

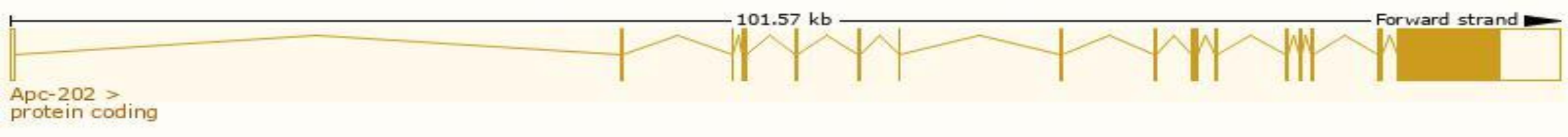
Source: https://www.ncbi.nlm.nih.gov/

# Transcript Information

The gene has 9 transcripts, all transcripts are shown below:

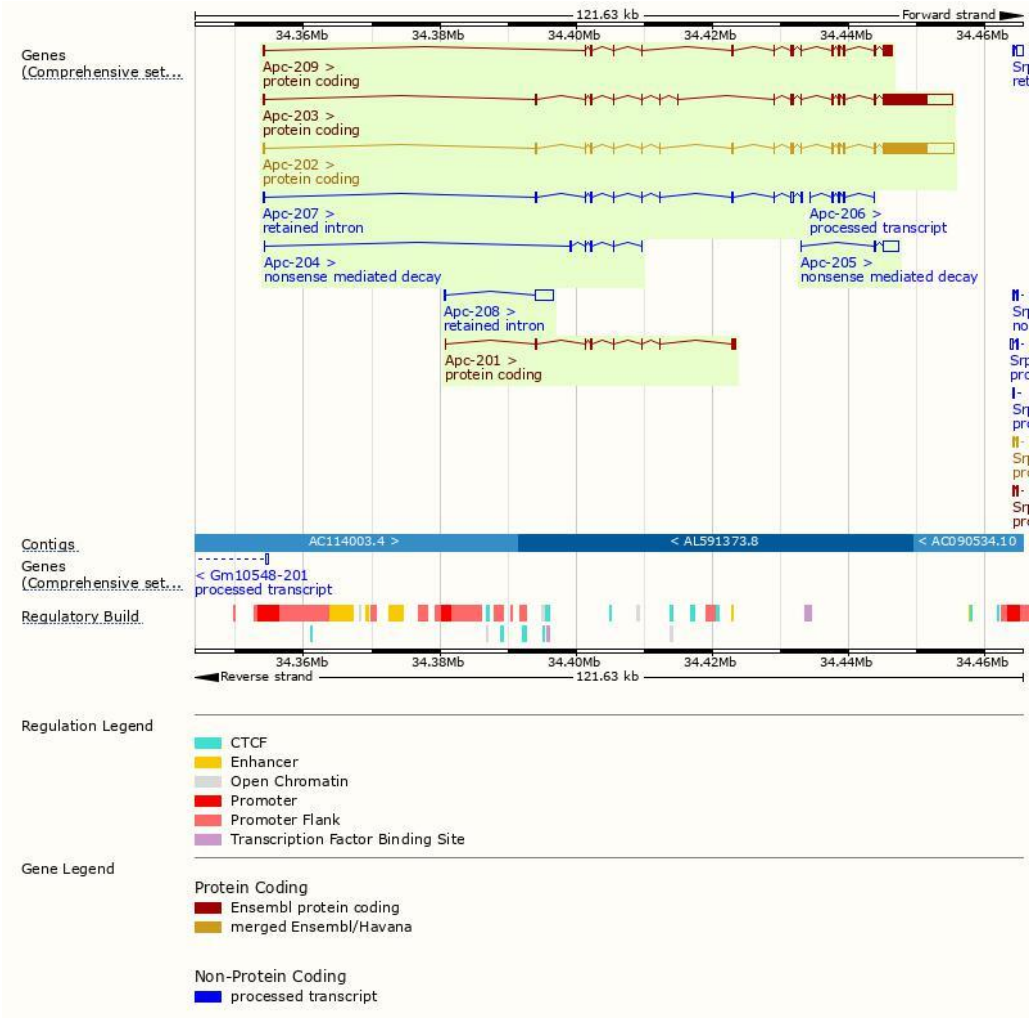
| Name | Transcript ID | bp | Protein | Biotype | CCDS | UniProt | Flags |
|---|---|---|---|---|---|---|---|
| **Apc-202** | ENSMUST00000079362.13 | 12811 | 2842aa | Protein coding | CCDS29125 | | TSL:1 , GENCODE basic , APPRIS P2 , |
| **Apc-203** | ENSMUST00000115781.10 | 12346 | 2808aa | Protein coding | - | | TSL:5 , GENCODE basic , APPRIS ALT2 , |
| **Apc-209** | ENSMUST00000171187.8 | 3588 | 1133aa | Protein coding | - | | CDS 3' incomplete , TSL:5 , |
| **Apc-201** | ENSMUST00000066133.7 | 1185 | 324aa | Protein coding | - | | TSL:1 , GENCODE basic , |
| **Apc-205** | ENSMUST00000165590.2 | 2633 | 51aa | Nonsense mediated decay | - | | CDS 5' incomplete , TSL:5 , |
| **Apc-204** | ENSMUST00000163295.2 | 608 | 21aa | Nonsense mediated decay | - | | CDS 5' incomplete , TSL:5 , |
| **Apc-206** | ENSMUST00000167136.2 | 435 | No protein | Processed transcript | - | | TSL:3 , |
| **Apc-208** | ENSMUST00000170195.2 | 2732 | No protein | Retained intron | - | | TSL:1 , |
| **Apc-207** | ENSMUST00000170023.8 | 1825 | No protein | Retained intron | - | | TSL:1 , |

The strategy is based on the design of *Apc-202* transcript, the transcription is shown below:



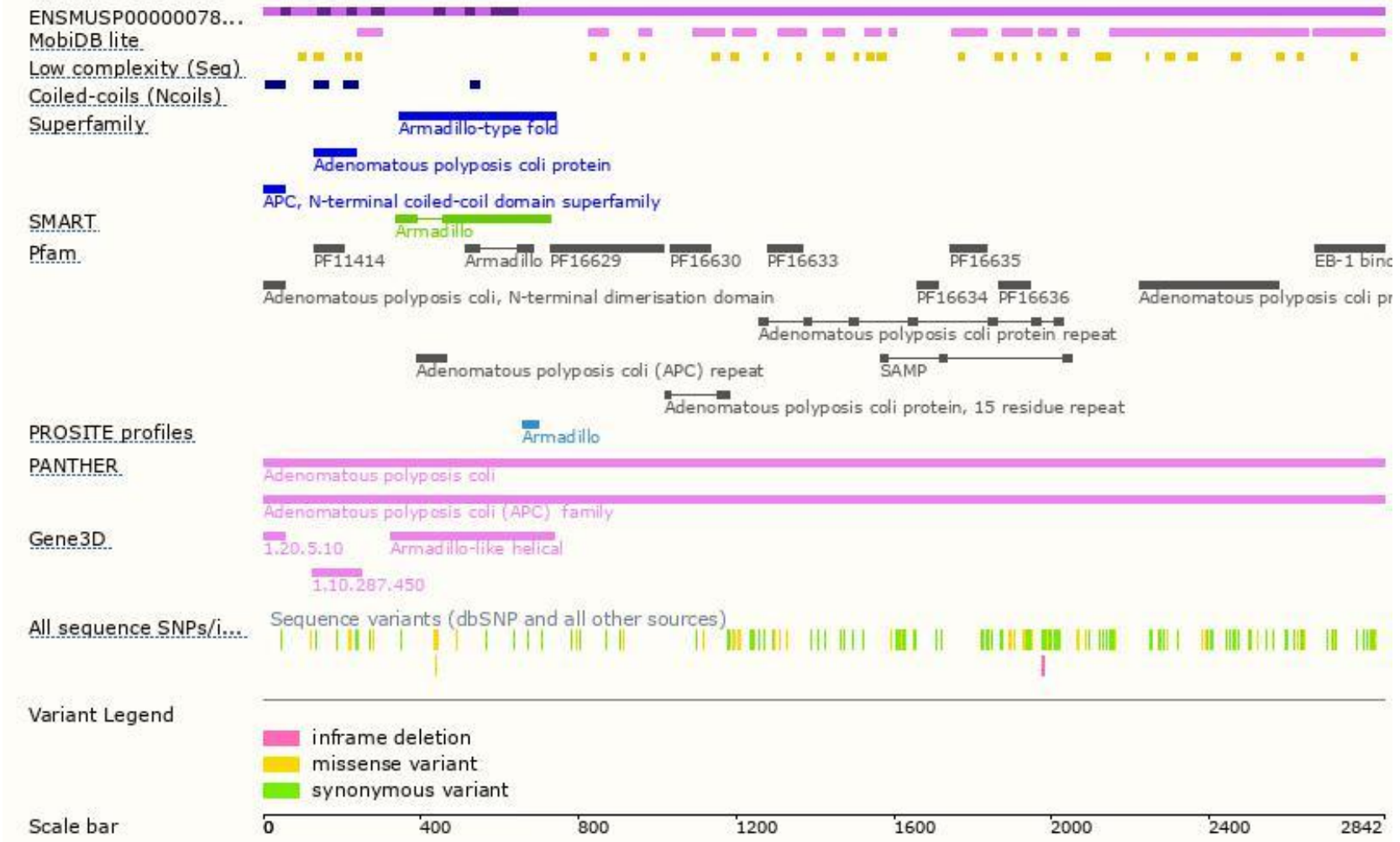

Source: https://www.ensembl.org

# Genomic Information




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

# Protein Information

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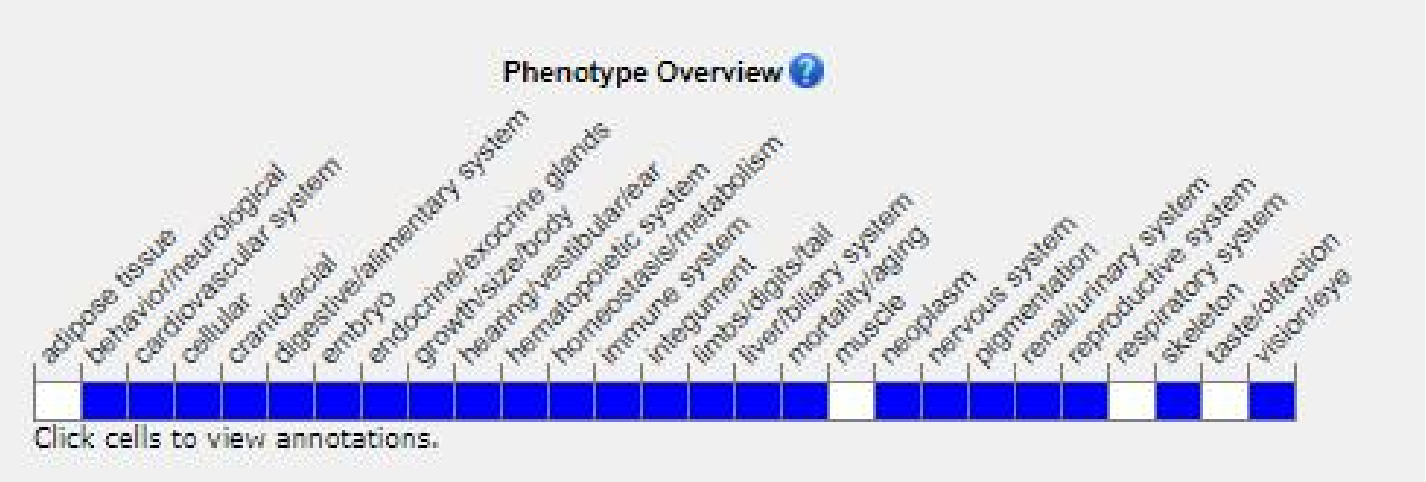
Source: : https://www.ensembl.org

# Mouse Phenotype Information (MGI)




- Most targeted and hypomorphic heterozygous mutants develop intestinal polyps and colorectal cancer, associated with anemia from intestinal bleeding. Homozygotes are embryonic lethal. Homozygotes for a mild alleles survive and have less extreme tumor incidence.



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

# Important Information

- According to the existing MGI data,most targeted and hypomorphic heterozygous mutants develop intestinal polyps and colorectal cancer, associated with anemia from intestinal bleeding. Homozygotes are embryonic lethal. Homozygotes for a mild alleles survive and have less extreme tumor incidence.
- The effect of this strategy on *Apc*-201 transcript is unknown.
- *Apc* is located on Chr18. 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.