

# *Macf1* Cas9-KO Strategy

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**Reviewer:**

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**Design Date:**

**2019-9-19**

# Project Overview

**Project Name**

*Macf1*

**Project type**

**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Macf1* gene. The schematic diagram is as follows:



- The *Macf1* gene has 18 transcripts. According to the structure of *Macf1* gene, exon2-exon5 of *Macf1*-203 (ENSMUST00000097897.10) transcript is recommended as the knockout region. The region contains 323bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Macf1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Mice homozygous for a null allele exhibit lethality before somitogenesis with failure of the primitive streak to form. Mice heterozygous for a knock-out and floxed allele activated in neurons exhibit impaired cortical neuron migration, respiratory distress, and early postnatal lethality.
- Transcript *Macf1*-204,207,208,209,210,214,216 may not be affected.
- The *Macf1* gene is located on the Chr4. 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)

## Macf1 microtubule-actin crosslinking factor 1 [ *Mus musculus* (house mouse) ]

Gene ID: 11426, updated on 12-Aug-2019

### Summary

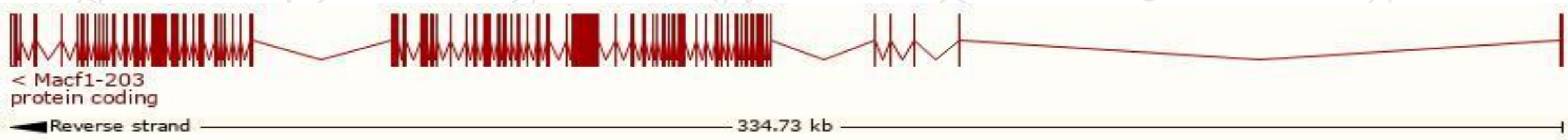
<b>Official Symbol</b>	Macf1 provided by <a href="#">MGI</a>
<b>Official Full Name</b>	microtubule-actin crosslinking factor 1 provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:108559</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000028649</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</b>	VALIDATED
<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>	Acf7; MACF; AcIp7; ABP620; R74989; mKIAA0465
<b>Expression</b>	Ubiquitous expression in lung adult (RPKM 15.9), CNS E18 (RPKM 10.5) and 28 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

The gene has 18 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Macf1-203	<a href="#">ENSMUST00000097897.10</a>	23495	<a href="#">7355aa</a>	Protein coding	<a href="#">CCDS57295</a>	<a href="#">E9PVY8</a>	TSL:1 GENCODE basic APPRIS P2
Macf1-201	<a href="#">ENSMUST00000082108.11</a>	17331	<a href="#">5328aa</a>	Protein coding	<a href="#">CCDS57294</a>	<a href="#">A0A0A0MQA6</a>	TSL:1 GENCODE basic
Macf1-206	<a href="#">ENSMUST000000106224.7</a>	23402	<a href="#">7353aa</a>	Protein coding	-	<a href="#">B1ARU4</a>	TSL:5 GENCODE basic APPRIS ALT2
Macf1-202	<a href="#">ENSMUST00000084301.11</a>	23398	<a href="#">7351aa</a>	Protein coding	-	<a href="#">E9QA63</a>	TSL:5 GENCODE basic APPRIS ALT2
Macf1-204	<a href="#">ENSMUST000000106213.7</a>	18957	<a href="#">5895aa</a>	Protein coding	-	<a href="#">B1ARU1</a>	TSL:5 GENCODE basic
Macf1-205	<a href="#">ENSMUST000000106220.8</a>	17608	<a href="#">5478aa</a>	Protein coding	-	<a href="#">E9QNP1</a>	TSL:5 GENCODE basic
Macf1-217	<a href="#">ENSMUST000000238555.1</a>	17480	<a href="#">5323aa</a>	Protein coding	-	-	GENCODE basic
Macf1-218	<a href="#">ENSMUST000000238731.1</a>	17268	<a href="#">5309aa</a>	Protein coding	-	-	GENCODE basic
Macf1-215	<a href="#">ENSMUST000000151346.7</a>	17175	<a href="#">5333aa</a>	Protein coding	-	<a href="#">F7ACR9</a>	CDS 5' incomplete TSL:5
Macf1-209	<a href="#">ENSMUST000000134458.7</a>	14463	<a href="#">4429aa</a>	Protein coding	-	<a href="#">F6Q750</a>	CDS 5' incomplete TSL:5
Macf1-213	<a href="#">ENSMUST000000147228.7</a>	6281	<a href="#">2030aa</a>	Protein coding	-	<a href="#">F6SHS0</a>	CDS 3' incomplete TSL:1
Macf1-212	<a href="#">ENSMUST000000147030.1</a>	5706	<a href="#">1837aa</a>	Protein coding	-	<a href="#">F6XCT0</a>	CDS 3' incomplete TSL:1
Macf1-208	<a href="#">ENSMUST000000125447.2</a>	5597	<a href="#">1358aa</a>	Protein coding	-	<a href="#">A0A286YD76</a>	CDS 3' incomplete TSL:5
Macf1-216	<a href="#">ENSMUST000000154824.7</a>	2808	<a href="#">544aa</a>	Protein coding	-	<a href="#">F6YKN8</a>	CDS 5' incomplete TSL:1
Macf1-207	<a href="#">ENSMUST000000123765.7</a>	2613	<a href="#">452aa</a>	Protein coding	-	<a href="#">F6RCJ3</a>	CDS 5' incomplete TSL:1
Macf1-214	<a href="#">ENSMUST000000149022.7</a>	2222	<a href="#">349aa</a>	Protein coding	-	<a href="#">F6RL59</a>	CDS 5' incomplete TSL:5
Macf1-210	<a href="#">ENSMUST000000140596.1</a>	1109	<a href="#">369aa</a>	Protein coding	-	<a href="#">A0A0A0MQH5</a>	CDS 5' and 3' incomplete TSL:5
Macf1-211	<a href="#">ENSMUST000000146000.1</a>	1378	No protein	Retained intron	-	-	TSL:1

The strategy is based on the design of *Macf1-203* transcript,The transcription is shown below





# Genomic location distribution

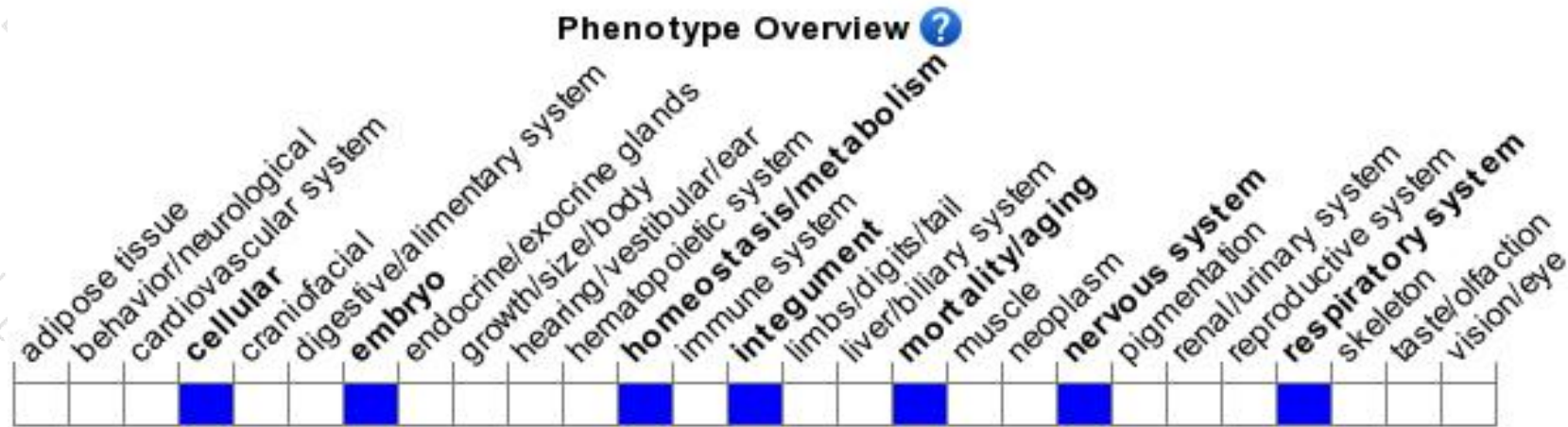




# Protein domain



# 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, Mice homozygous for a null allele exhibit lethality before somitogenesis with failure of the primitive streak to form. Mice heterozygous for a knock-out and floxed allele activated in neurons exhibit impaired cortical neuron migration, respiratory distress, and early postnatal lethality.

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

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