



Models to  
Accelerate Innovation



# ***Itgax-iCre-WPRE-PolyA* BAC-TG Mouse Model Strategy**

**Designer**

**Shanshan Liu**

**Reviewer**

**Yanhua Shen**

**Date**

**2024-6-25**



# Project Overview

---

---

**Project Name** *Itgax-iCre-WPRE-PolyA*

---

**Project Type** **BAC-TG**

---

**Background** **C57BL/6JGpt**

---

**Timeline** **3-4 Months**

---

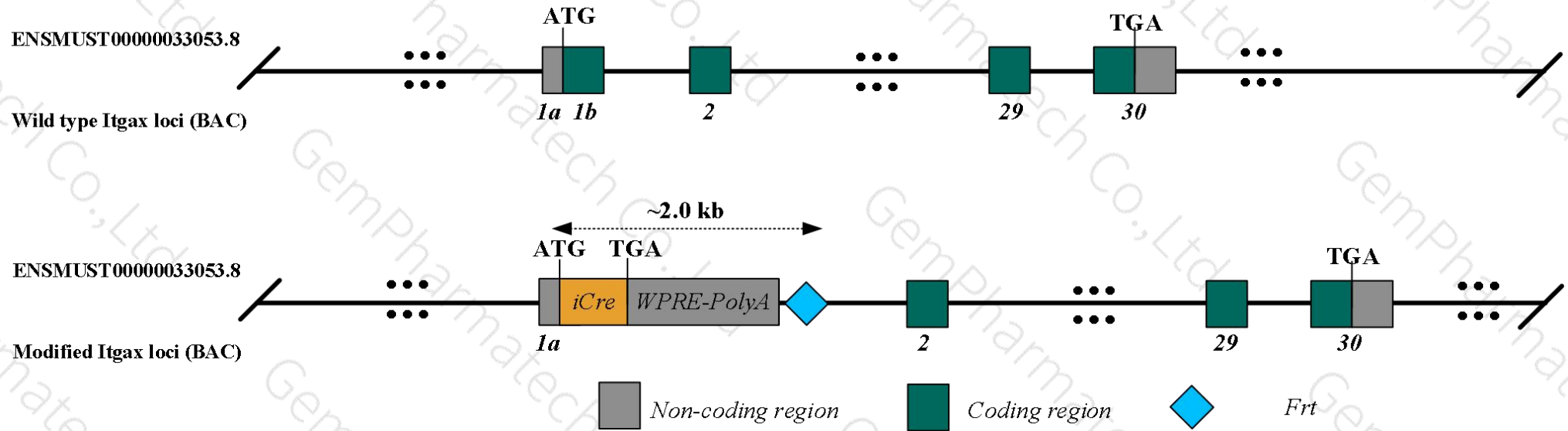
**Deliverable** **3~5 F0 Mice**

---



# Strategy

The schematic diagram is as follows:





# Technical Description

---

- The mouse *Itgax* gene has 4 transcripts. The transcript *Itgax*-201 (ENSMUST00000033053.8) is selected for this strategy. It has 30 exons and codes 1169 aa. The ATG is located in exon 1, and the TGA is located in exon 30.
- According to the references, the *iCre-WPRE-PolyA* sequence was inserted after the translation start codon ATG of the transcript *Itgax*-201, while replacing the coding part of *Itgax* exon 1.
- In this project, BAC (RP24-361C4 or RP24-271F7) containing murine *Itgax* gene was purchased, modified BAC vector in vitro, and microinjected into the fertilized eggs of mice to obtain F0 generation (i.e., founder) mice.



## Note

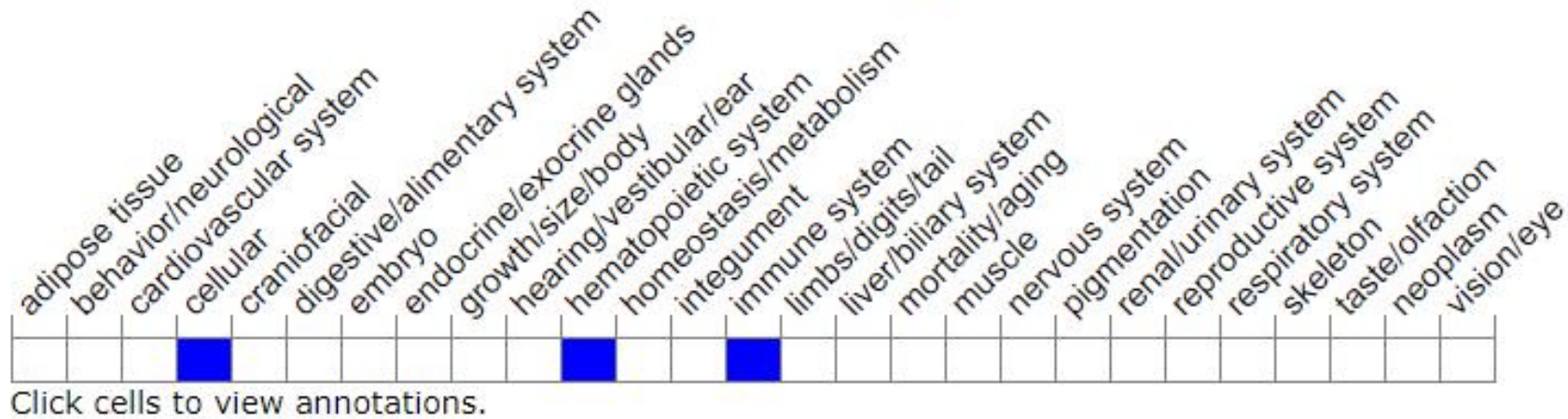
---

- The BAC plasmid is large, and the BAC backbone may affect the expression of the gene of interest. The BAC also contains other genes, and other genes coexisting on the BAC will also be expressed.
- This strategy is designed based on references, and the later phenotypes are not guaranteed to be completely consistent.
- After the transgenic fragment is injected into the pronucleus, it is randomly integrated into the mouse genome, and the expression level of the transgenic mice obtained may also be different depending on the insertion site and copy number of the transgenic fragment.
- This strategy is designed based on the currently available information in the existing databases. Due to the complexity of gene expression regulation, the effect of this strategy on gene expression cannot be completely predicted at the present technology level.



# MGI Information

## Phenotype Overview [?](#)



Mice homozygous for a knock-out allele exhibit increased susceptibility to bacterial infection, decreased susceptibility to experimental autoimmune encephalomyelitis (EAE), increased T cell proliferation, and an abnormal pattern of cytokine production during EAE.

# Target Gene



<b>Gene name</b>	mouse <i>Itgax</i>
<b>Gene ID (NCBI)</b>	16411
<b>Gene link (NCBI)</b>	<a href="https://www.ncbi.nlm.nih.gov/gene/16411">https://www.ncbi.nlm.nih.gov/gene/16411</a>
<b>Gene link (Ensembl)</b>	<a href="http://useast.ensembl.org/Mus_musculus/Gene/Summary?g=ENSMUSG00000030789;r=7:127728719-127749829">http://useast.ensembl.org/Mus_musculus/Gene/Summary?g=ENSMUSG00000030789;r=7:127728719-127749829</a>
<b>Chromosome location</b>	Chr 7



# Gene Information (NCBI)

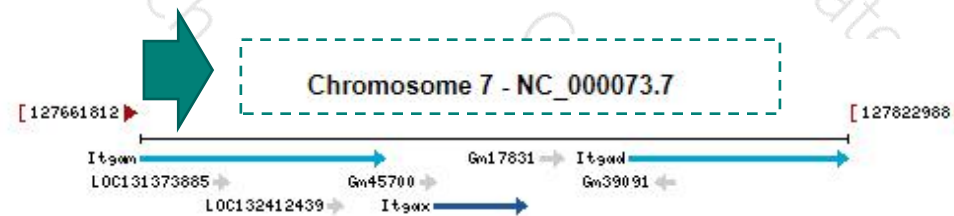
**Itgax** integrin alpha X [ *Mus musculus* (house mouse) ]

Gene ID: 16411, updated on 4-Jun-2024

[Download Datasets](#)

## Summary

**Official Symbol** [Itgax](#) provided by [MGI](#)  
**Official Full Name** [integrin alpha X](#) provided by [MGI](#)  
**Primary source** [MGI:MG1:96609](#)  
**See related** [Ensembl:ENSMUSG00000030789](#) [AllianceGenome:MG1:96609](#)  
**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** Cr4; N418; Cd11c  
**Summary** Predicted to enable receptor tyrosine kinase binding activity. Involved in positive regulation of gene expression and positive regulation of myelination. Acts upstream of or within defense response to virus. Located in external side of plasma membrane. Is expressed in heart and hemolymphoid system. Orthologous to human ITGAX (integrin subunit alpha X). [provided by Alliance of Genome Resources, Apr 2022]  
**Expression** Biased expression in spleen adult (RPKM 12.4), lung adult (RPKM 9.2) and 10 other tissues [See more](#)  
**Orthologs** [human](#) [all](#)  
**NEW** Try the new [Gene table](#)  
Try the new [Transcript table](#)



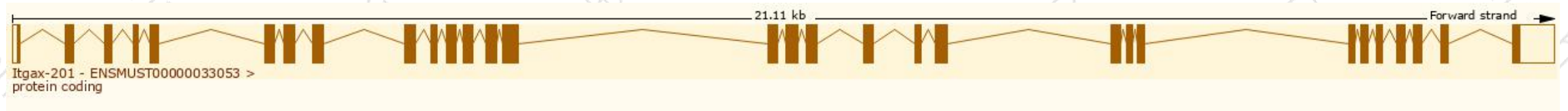


# Transcript Information (Ensembl)

The gene has 4 transcripts, as shown below:

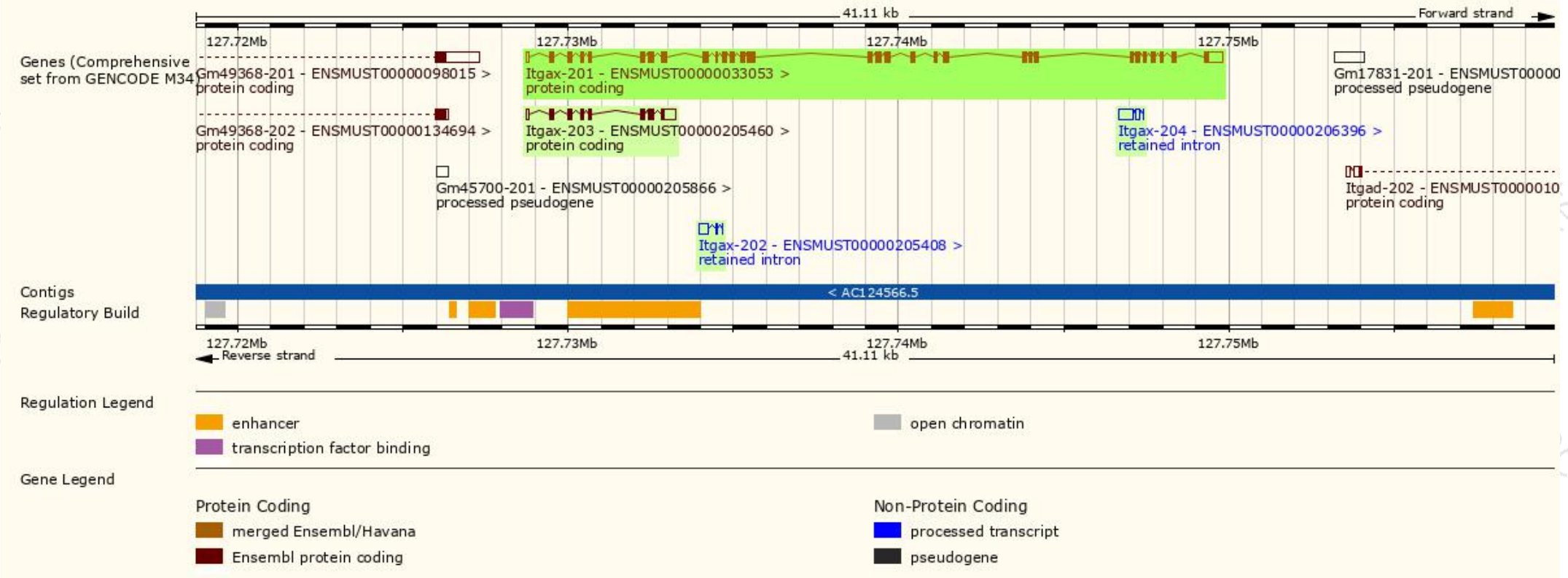
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
<a href="#">ENSMUST00000033053.8</a>	Itgax-201	4046	<a href="#">1169aa</a>	Protein coding	<a href="#">CCDS40150</a>	<a href="#">Q9QXH4</a>	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
<a href="#">ENSMUST00000205460.2</a>	Itgax-203	1215	<a href="#">257aa</a>	Protein coding		<a href="#">A0A0U1RNJ3</a>	GENCODE basic TSL:1
<a href="#">ENSMUST00000206396.2</a>	Itgax-204	544	No protein	Retained intron		-	TSL:3
<a href="#">ENSMUST00000205408.2</a>	Itgax-202	352	No protein	Retained intron		-	TSL:3

The strategy is based on *Itgax-201* transcript, which contains 30 exons, is 4046 bps long, and encodes 1169 amino acids.



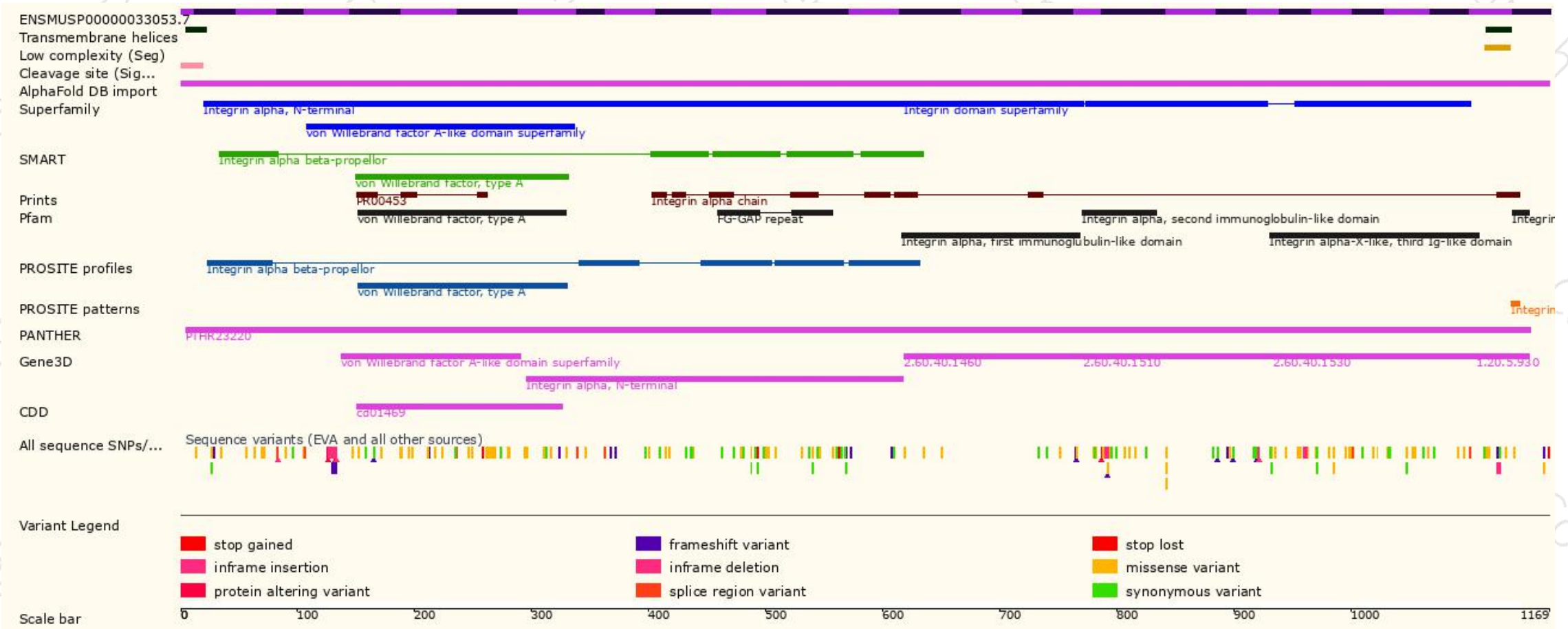


# Genomic Information





# Protein Information





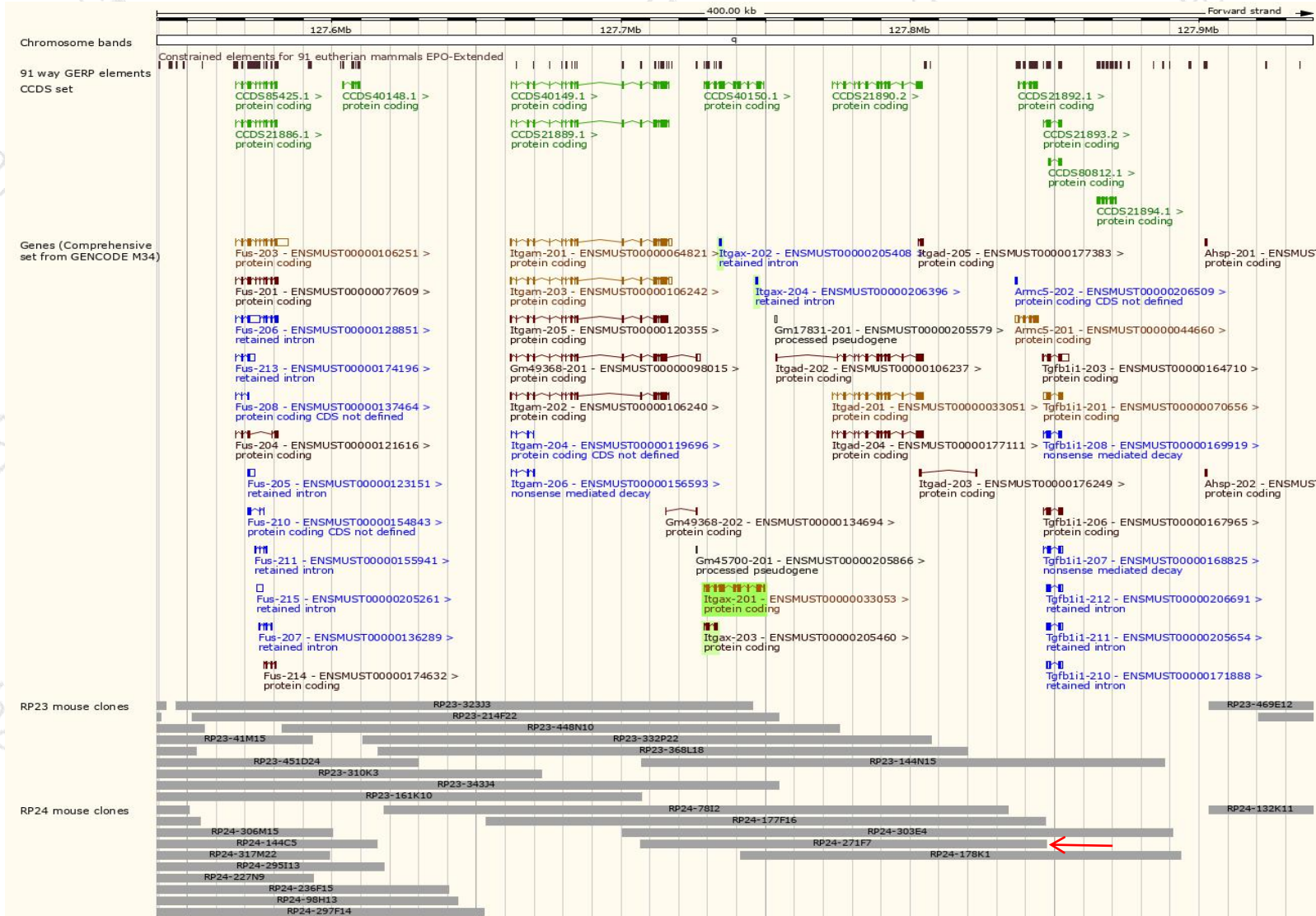
# Reference

Mice. To generate the *CD11c*-Cre transgene, the 160-kb mouse genomic BAC clone RP24-361C4 (BACPAC Resources) was modified by ET recombination, as previously described (43). The clone contains the entire *Itgax* (*CD11c*) gene but lacks the 5' end of the adjacent *Itgam* (*CD11b*) gene, preventing the overexpression of the latter. The recombination cassette containing the Cre recombinase open reading frame, followed by the bovine growth hormone (*BGH*) polyA signal and the FRT site-flanked prokaryotic Zeocin resistance cassette ( $\text{Zeo}^{\text{R}}$ ), replaced the coding part of the first *CD11c* exon, and the  $\text{Zeo}^{\text{R}}$  cassette was subsequently removed by FLP-mediated recombination. The clone insert was released from the vector backbone using NotI digestion, gel-purified, and microinjected into fertilized oocytes. The founder line containing two copies of the transgene (as determined by quantitative Southern hybridization) was chosen for further analysis. Mice were genotyped by genomic PCR using either generic Cre primers or primers specific for the *CD11c*-Cre transgene (5'-ACTTGGCAGCTGTCTCCAAG-3' and 5'-GCGAACATCTTCAGGTTCTG-3' were specific for the *CD11c* promoter and Cre, respectively).

PMID: 17591855



# BAC Information



Selected BAC: RP24-361C4  
(BACPAC Resources)  
Alternate BAC: RP24-271F7

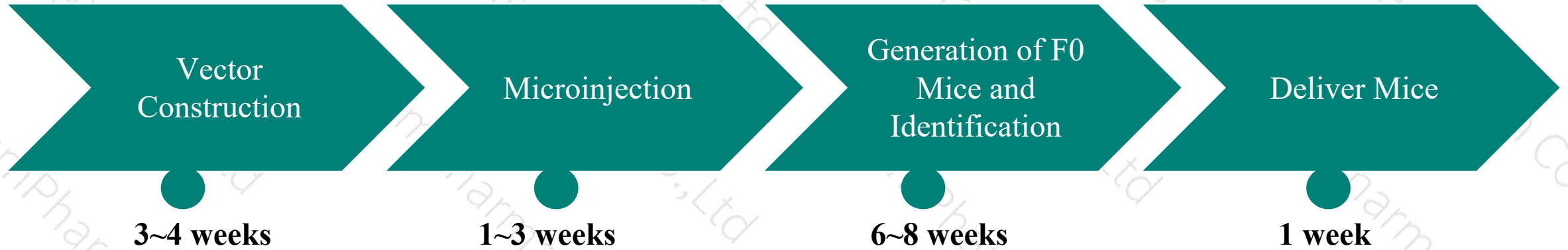


# Additional Billable Item

Item	Timeline	Cost
mouse <i>Itgax</i> BAC order	1.5 month	5000 CNY



# Work Flow





# Accelerate your innovation with GemPharmatech

## **U.S. and E.U.**

11558 Sorrento Valley Road, Suite 4  
San Diego, CA 92121, USA  
1.888.899.5899

## **Asia and Other**

12 Xuefu Road, Jiangbei New Area District,  
Nanjing, 210061 P.R., China  
025-58641508

## **Online**

[globalservice@gempharmatech.com](mailto:globalservice@gempharmatech.com)  
<https://en.gempharmatech.com/>