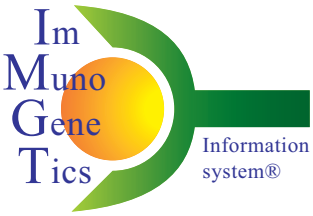
IMGT overview: the mouse T cell receptor beta TRB genes

N. Bosc, G. Folch, C. Ginestoux, V. Giudicelli and M.-P. Lefranc

IMGT the international ImMunoGeneTics information system®, LIGM, UM2, CNRS UPR1142, IGH
141 rue de la Cardonille, 34396 Montpellier Cedex 05, France - lefranc@ligm.igh.cnrs.fr

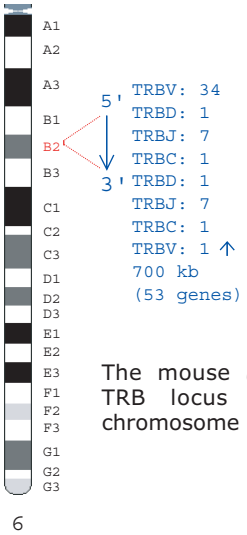


http://imgt.cines.fr

How many TRB genes?

Chromosome 6 B2

The total number of T cell receptor beta TRB genes per haploid genome in *Mus musculus* laboratory mice is 53.



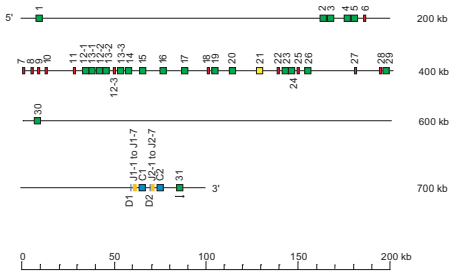
The mouse *(Mus musculus)* TRB locus is located on chromosome 6 B2 at 20.5 cM.

Lefranc, M.-P. et al., In Silico Biology, 5, 45-60 (2005)

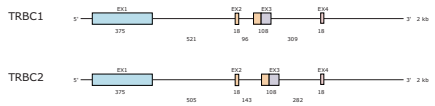
How are TRB genes organized?

TRB locus

The mouse TRB locus spans 700 kb and comprises, for 5' to 3', 35 TRBV genes belonging to 31 subgroups. Except for TRBV31, localized downstream of the TRBC2 gene in inverted orientation of transcription, all the other TRBV genes are located upstream of a duplicated "1 TRBD, 7 TRBJ, 1 TRBC" cluster.



Gene exon/intron organization of the mouse TRBC1 and TRBC2.



Lefranc, M.-P. et al., Nucl. Acids Res., 33, D593-D597 (2005)

How many functional TRB genes?

Potential repertoire

The potential TRB repertoire per haploid genome comprises 36-37 functional genes: 21-22 TRBV, 2 TRBD, 11 TRBJ and 2 TRBC.

Overview

	Number of genes	Functional genes
TRBV	35	21-22
TRBD	2	2
TRBJ	14	11
TRBC	2	2
Total	53	36-37

The definitive IMGT nomenclature of the mouse TRBV genes and the correspondence with the provisional nomenclature have been established.

The mouse TRB genes and alleles and the corresponding IMGT reference sequences were provided to Mouse Genome Informatics MGD in July 2002 and are available in IMGT/GENE-DB.

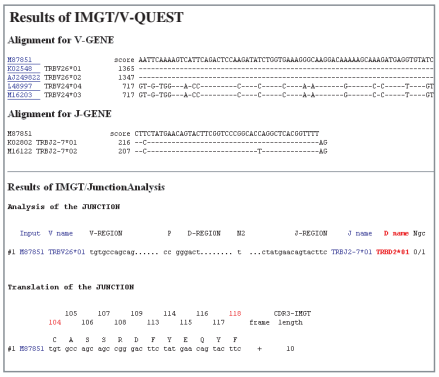
Giudicelli, V. et al., Nucl. Acids Res., 33, D256-D261 (2005)

IMGT tools to analyse expressed variable genes

IMGT/V-QUEST IMGT/JunctionAnalysis

Sequence analysis

Analysis of the TRBV genes (germline or rearranged) can be performed by IMGT/V-QUEST and analysis of the V-D-J junctions by IMGT/JunctionAnalysis.

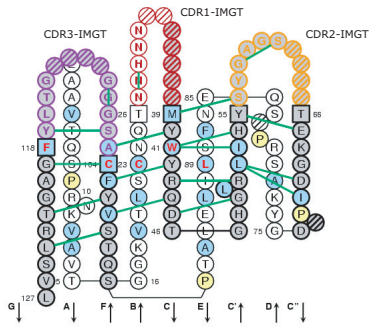


Giudicelli, V. et al., Nucl. Acids Res., 32, W435-W440 (2004)
Yousfi Monod, M. et al., Bioinformatics, 20, I379-I385 (2004)

IMGT Colliers de Perles

2D representations

Mus musculus (Mouse) TRBV_1 V-DOMAIN from 2C (1g6r_B)
CDR-IMGT lengths [5.6.9]



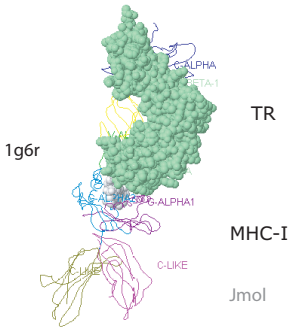
IMGT Colliers de Perles are according to the IMGT unique numbering for V-DOMAIN. Hydrogen bonds are shown as green lines.

Lefranc, M.-P. et al., Dev. Comp. Immunol., 25, 55-77 (2003)
Lefranc, M.-P. et al., Dev. Comp. Immunol., 29, 185-203 (2005)

IMGT/3Dstructure-DB IMGT/StructuralQuery

3D structures

Three-dimensional structures of 18 V-BETA domains encoded by rearranged TRBV-TRBD-TRBJ genes are available in IMGT/3D-structure-DB. Seven TR-ALPHA_BETA have been crystallised.



The BETA chain is in spacefill (the ALPHA chain and MHC-I are in wireframe).

Kaas, Q. et al., Nucl. Acids Res., 32, D208-210 (2004)
Kaas, Q. and Lefranc, M.-P., In Silico Biol., 5, 0046 (2005)

IMGT initiator and coordinator: Marie-Paule Lefranc (lefranc@ligm.igh.cnrs.fr)
Bioinformatics manager: Véronique Giudicelli (giudi@ligm.igh.cnrs.fr)
Computer manager: Denys Chaume (Denys.Chaume@igh.cnrs.fr)
Interface design: Chantal Ginestoux (chantal@ligm.igh.cnrs.fr)
© Copyright 1995-2005 IMGT, the international ImMunoGeneTics information system®

©2005 C. Ginestoux and M.-P. Lefranc