IMGT overview: the mouse T cell receptor alpha TRA genes

N. Bosc, D. Scaviner, G. Folch, C. Ginestoux, V. Giudicelli and M.-P. Lefranc
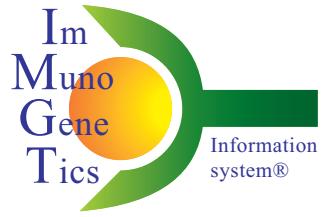
IMGT the international ImMunoGeneTics information system®, LIGM, UM2, CNRS UPR1142, IGH
141 rue de la Cardonille, 34396 Montpellier Cedex 05, France - lefranc@ligm.igh.cnrs.fr

Im Muno Gene Tics Information system®

http://imgt.cines.fr

How many TRA genes?

Chromosome 14 C1

The total number of T cell receptor alpha TRA genes per haploid genome in *Mus musculus* laboratory mice is 159 (including 10 TRAV/DV: 8 rearranged either to TRAJ or to TRDD, 2 assigned by homology).


The mouse (*Mus musculus*) TRA locus is located on chromosome 14 C1 at 19.7 cM.

5'
TRAV: 98
TRAJ: 60
TRAC: 1
1,650 kb
3' (159 genes)

The mouse TRA locus spans 1,650 kb and comprises, from 5' to 3', 98 TRAV genes organized in 2 clusters upstream of 60 TRAJ genes and of a single TRAC gene.
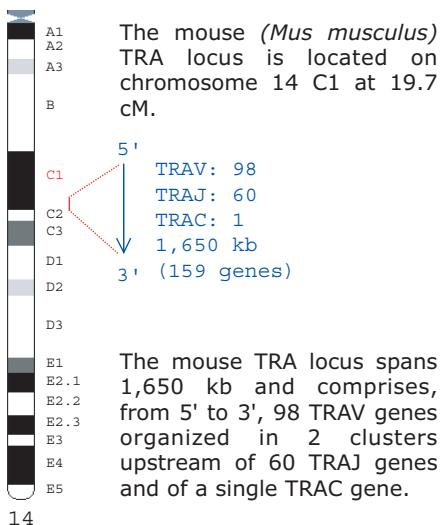
Lefranc, M.-P. et al., In Silico Biology, 5, 45-60 (2005)

How are TRA genes organized?

TRA locus

Locus representation: Mouse (*Mus musculus*) TRA on chromosome 14 C1
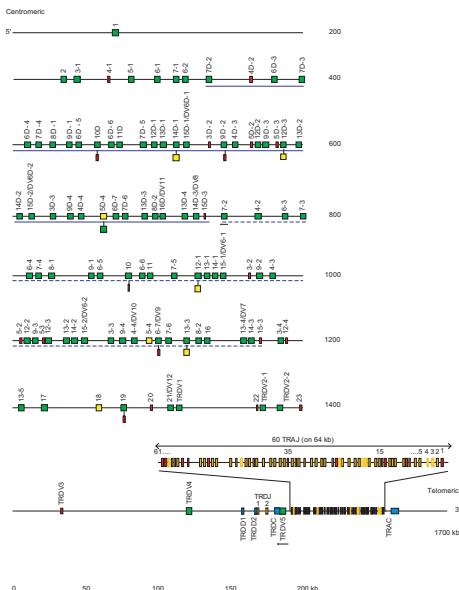
Bosc, N. et al., Dev. Comp. Immunol., 27, 465-497 (2003)

How many functional TRA genes?

Potential repertoire

The potential TRA repertoire per haploid genome comprises 112-123 functional genes (including 10 TRAV/DV): 73-84 TRAV (10 TRAV/DV), 38 TRAJ and 1 TRAC.

Overview	Number of genes	Functional genes
TRAV	98	73-84
TRAJ	60	38
TRAC	1	1
Total	159	112-123

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

The mouse TRA 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 TRAV genes (germline or rearranged) can be performed by IMGT/V-QUEST and analysis of the V-J junctions by IMGT/JunctionAnalysis.

Giudicelli, V. et al., Nucl. Acids Res., 32, W435-W440 (2004)

IMGT Colliers de Perles

2D representations

Mus musculus (Mouse) TRAV_1 V-DOMAIN from 2C (1g6r_A)
CDR-IMGT lengths [6.7.10]
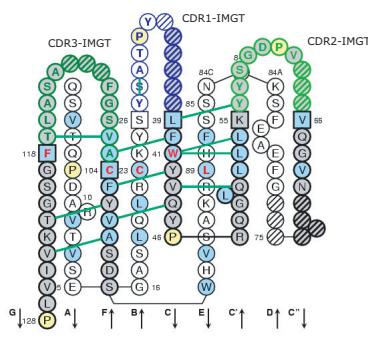
IMGT Colliers de Perles are according to the IMGT unique numbering for V-DOMAIN. Hydrogen bonds are shown as green lines.

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 17 V-ALPHA domains encoded by rearranged TRAV-TRAJ genes are available in IMGT/3D-structure-DB. Seven TR-ALPHA-BETA have been crystallised.
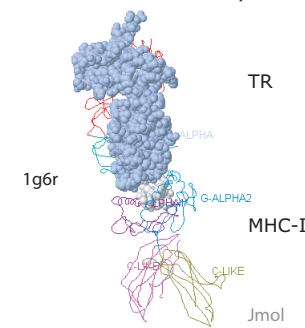
The ALPHA chain is in spacefill (the BETA chain and MHC-I are in wireframe).

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