IMGT overview: the mouse immunoglobulin lambda IGL genes

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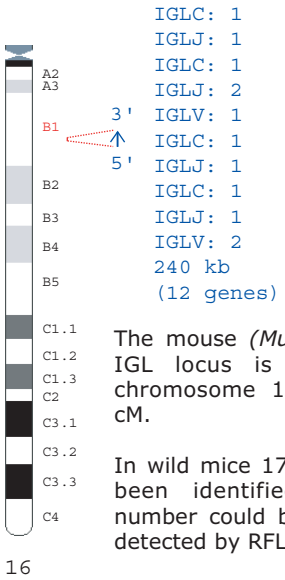
How many IGL genes?

Chromosome 16 B1

The total number of immunoglobulin lambda IGL genes per haploid genome in *Mus musculus* laboratory mice is 12.



The mouse *(Mus musculus)* IGL locus is located on chromosome 16 B1 at 13 cM.

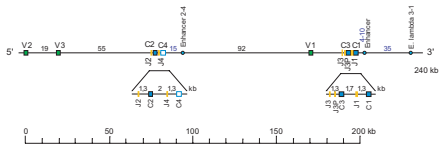
In wild mice 17 genes have been identified but this number could be higher, as detected by RFLP.

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

How are IGL genes organized?

IGL locus

The mouse IGL locus spans 240 kb and comprises, in laboratory mice, 3 IGLV genes that belong to 2 subgroups. In wild mice there are 8 IGLV genes that belong to 3 subgroups, 5 IGLJ genes and 4 IGLC genes which belong to 2 subgroups. Each of the IGLC gen is preceded by one (or two) IGLJ gene(s).



The IGLJ genes and IGLC genes are organized in two clusters: J2-C2-J4-C4 and J3-J3P-C3-J1-C1 preceded of 2 V and 1 V gene, respectively.

Lefranc, M.-P. and Lefranc, G., In: Molecular Biology of B cells (ed. Honjo, Alt and Neuberger) Elsevier, pp 37-59 (2004)

How many functional IGL genes?

Potential repertoire

The potential IGL repertoire per haploid genome comprises, in laboratory mice, 8-9 functional genes: 3 IGLV, 3 IGLJ, and 2-3 IGLC. In wild mice, the number of known functional IGLV genes is 8.

Overview

	Number of genes	Functional genes
IGLV	3 (8)	3 (8)
IGLJ	5	3
IGLC	4	2-3
Total	12 (17)	8-9 (13-14)

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

The mouse IGL 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.

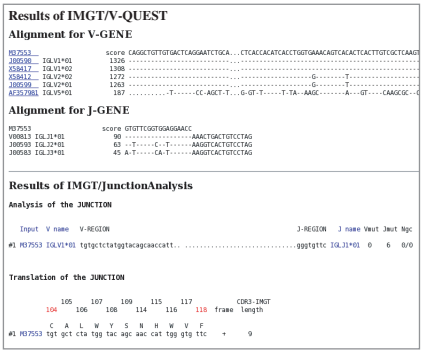
Giudicelli, V. et al., Nucl. Acids Res., 33, D256-D261 (2005)

IMGT tools to analyse expressed variable genes

IMGT/V-QUEST IMGT/JunctionAnalysis

Sequence analysis

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

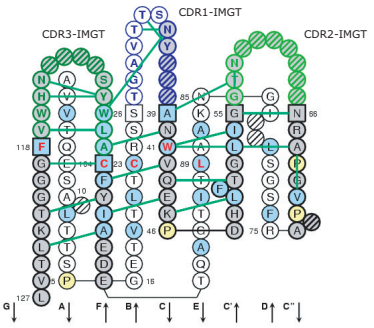


Giudicelli, V. et al., Nucl. Acids Res., 32, W435-W440 (2004)
Yousfi Monod, M. et al., Bioinformatics, 20, I379-I385 (2004)

IMGT Colliers de Perles

2D representations

Mus musculus (Mouse) IGLV_1 V-DOMAIN from B1-8 (1a6w_L)
CDR-IMGT lengths [9.3.9]



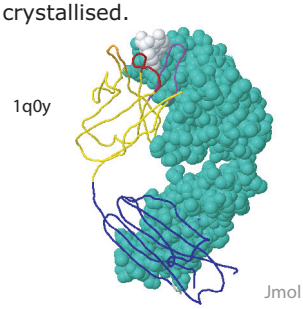
IMGT Colliers de Perles are according to the IMGT unique numbering for V-DOMAIN and C-DOMAIN. Hydrogen bonds are shown as green lines.

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 33 V-LAMBDA domains encoded by rearranged IGLV-IGLJ genes are available in IMGT/3D-structure-DB. No complete IG with LAMBDA chains has been crystallised.



The LAMBDA chain (from Fab) is in spacefill (VH-CH1 in wireframe with the ligand (morphine) in white spacefill).

Kaas, Q. et al., Nucl. Acids Res., 32, D208-D210 (2004)

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