IMGT overview: the mouse immunoglobulin kappa IGK genes

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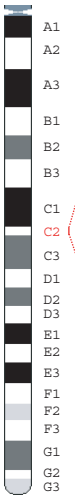
How many IGK genes?

Chromosome 6 C2

The total number of immunoglobulin kappa IGK genes per haploid genome in *Mus musculus* laboratory mice is 180 (190, if the 10 IGKV orphons are included).



The mouse IGK locus is located on chromosome 6 C2 at 30.0 cM.

5'

IGKV: 174
IGKJ: 5
IGKC: 1
3,200 kb
(180 genes)

3'

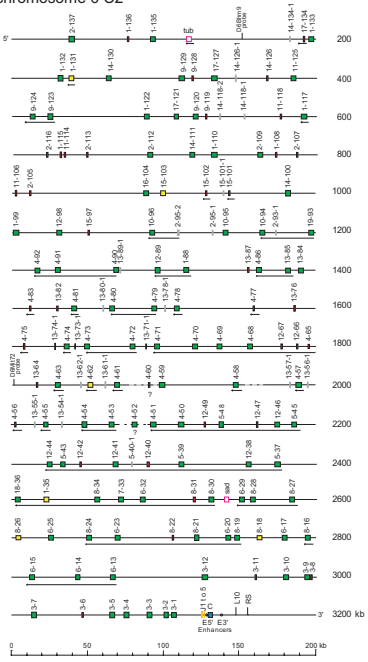
The mouse IGK locus spans 3,200 kb and comprises, from 5' to 3", 174 IGKV genes that belong to 19 subgroups and to three clans, 5 IGKJ genes and 1 IGKC.

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

How are IGK genes organized?

IGK locus

Locus representation: Mouse *(Mus musculus)* IGK on chromosome 6 C2



Martinez-Jean, C. et al., Exp. Clin. Immuno., 18, 255-279 (2001)

How many functional IGK genes?

Potential repertoire

The potential IGK repertoire per haploid genome comprises 99-101 functional genes: 94-96 IGKV, 4 IGKJ, and 1 IGKC.

Overview

	Number of genes	Functional genes
IGKV	174	94-96
IGKJ	5	4
IGKC	1	1
Total	180	99-101

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

The mouse IGK 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.

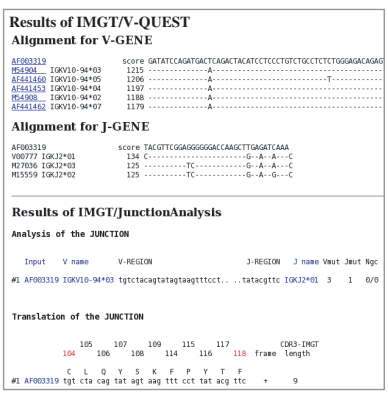
Giudicelli, V. et al., Nucl. Acids Res., 33, D256-D261 (2005)

IMGT tools to analyse expressed variable genes

IMGT/V-QUEST IMGT/JunctionAnalysis

Sequence analysis

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

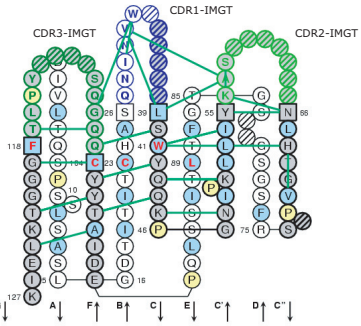


Giudicelli, V. et al., Nucl. Acids Res., 32, W435-W440 (2004)
Yousfi Monod, M. et al., Bioinformatics, 20, I379-I385 (2004)

IMGT Colliers de Perles

2D representations

Mus musculus (Mouse) IGKV_1 V-DOMAIN from 231 (1igt_A)
CDR-IMGT lengths [6.3.9]



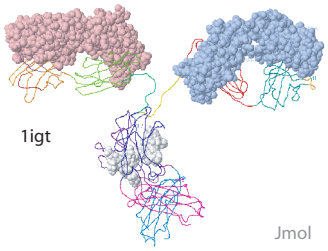
IMGT Colliers de Perles are according to the IMGT unique numbering for V-DOMAIN and C-DOMAIN. Hydrogen bonds are shown as green lines.

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 396 V-KAPPA domains encoded by rearranged IGKV-IGKJ genes are available in IMGT/3D-structure-DB. Only two complete IG with KAPPA chains (1 igt, 1 igy) have been crystallised.



The IG kappa chains (pink and blue) are in spacefill (heavy chains are in wireframe with carbohydrates in white spacefill).

Kaas, Q. et al., Nucl. Acids Res., 32, D208-210 (2004)

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