# IMGT-ONTOLOGY

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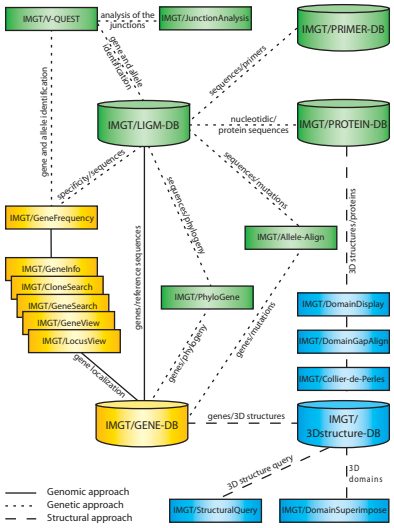
Im Muno Gene Tics Information system®

http://imgt.cines.fr

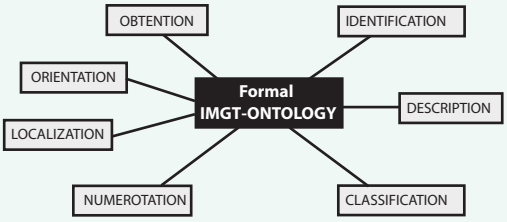
## The IMGT® information system




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

## IMGT-Kaleidoscope axioms

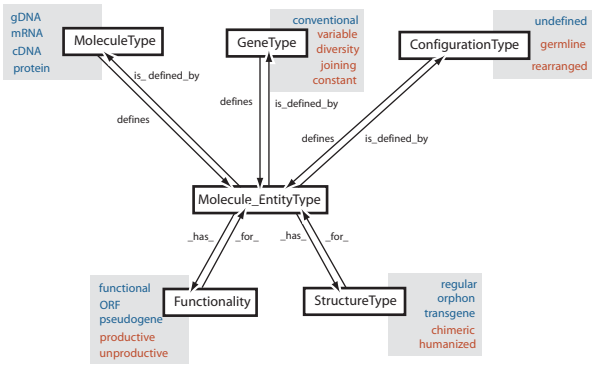
IMGT®, the international ImMunoGeneTics information system (http://imgt.cines.fr) is based on the IMGT-ONTOLOGY concepts. These concepts were generated through the seven axioms of the Formal IMGT-ONTOLOGY or IMGT-Kaleidoscope.



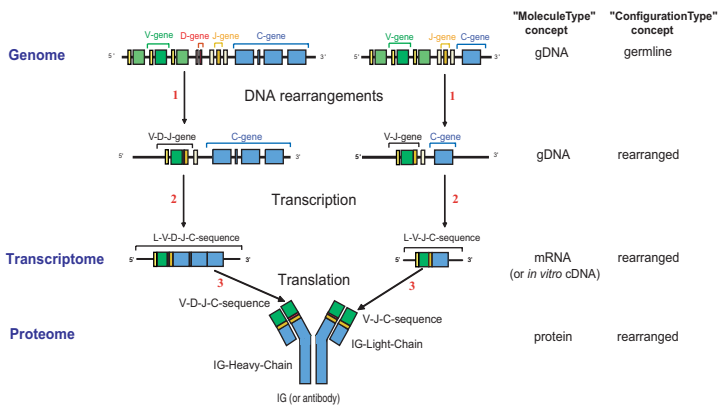

The Formal IMGT-ONTOLOGY or IMGT-Kaleidoscope comprises seven axioms, "IDENTIFICATION", "CLASSIFICATION", "DESCRIPTION", "LOCALIZATION", "NUMEROTATION", "ORIENTATION" and "OBTENTION". These axioms postulate that objects, processes and relations have to be identified, described, classified, numerotated, localized, orientated, and the way they are obtained, determined. The Formal IMGT-ONTOLOGY represents a paradigm for system biology ontologies, which need to identify, to describe, to classify and to numerotate objects, processes and relations at the molecule, cell, tissue, organ, organism or population levels.

*Duroux, P. et al. IMGT-Kaleidoscope, the Formal IMGT-ONTOLOGY paradigm. Biochimie, 90, 570-583 (2008)*

## IDENTIFICATION




The "Molecule_EntityType" concept is a major concept of identification. It is defined by the "MoleculeType", "GeneType" and "ConfigurationType" concepts of identification and has relations with the "Functionality" and "StructureType" concepts.

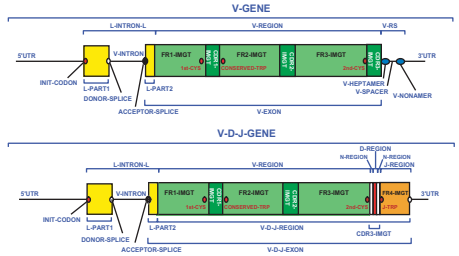



Ten "Molecule_EntityType" concepts are necessary to identify knowledge, at the molecular level, for the synthesis of an immunoglobulin or antibody in humans: V-gene, D-gene, J-gene, C-gene, V-D-J-gene, V-J-gene, L-V-D-J-C-sequence, L-V-J-C-sequence, V-D-J-C-sequence and V-J-C-sequence.

## DESCRIPTION

### Genes

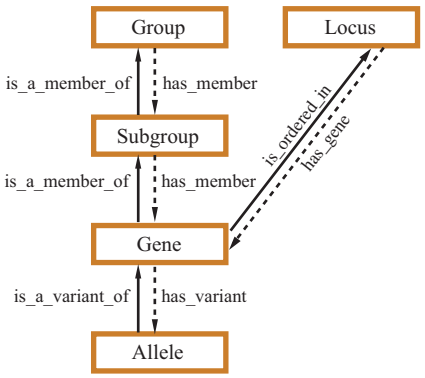
| *Relation* | *Reciprocal relation* |
|---|---|
| "adjacent_at_its_5_prime_to" | "adjacent_at_its_3_prime_to" |
| "included_with_same_5_prime_in", | "includes_with_same_5_prime", |
| "included_with_same_3_prime_in", | "includes_with_same_3_prime", |
| "overlaps_at_its_5_prime_with" | "overlaps_at_its_3_prime_with" |
| "included_in" | "includes" |




Graphical representation of two instances of the "Molecule_EntityPrototype" concept. Twenty-five motifs and ten relations are necessary and sufficient for a complete description of these instances.

## CLASSIFICATION

### Sequences

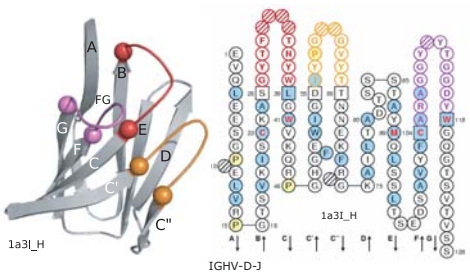



Concepts of classification have allowed to define the IMGT standardized nomenclature for IG and TR.

*Lefranc, M.-P. and Lefranc, G., The Immunoglobulin FactsBook, Academic Press, (2001)*
*Lefranc, M.-P. and Lefranc, G., The T cell receptor FactsBooks, Academic Press, (2001)*

## NUMEROTATION

### Structures




The "IMGT_unique_numbering" concept is illustrated by the "IMGT_Collier_de_Perles" concept which allows graphical representation in two dimensions (2D) of the amino acid sequences of V, C or G type domains and comprises three concept instances.

*Lefranc, M.-P. et al., Dev. Comp. Immunol., 27, 55-77 (2003)*
*Lefranc, M.-P. et al., Dev. Comp. Immunol., 29, 185-203 (2005)*
*Lefranc, M.-P. et al., Dev. Comp. Immunol., 29, 917-938 (2005)*

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