MHC and MHC-like domains: standardization based on the IMGT-ONTOLOGY NUMEROTATION concept

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A standardized IMGT unique numbering has been defined for the MhcSF groove domains: G-DOMAINs of the MHC of all jawed vertebrates, and G-LIKE-DOMAINs of the MHC-like proteins (MhcSF proteins other than MHC) of any species. We show that this IMGT unique numbering is required for the standardized description and comparison of any G-DOMAIN or G-LIKE-DOMAIN whatever the species and whatever the chain type: G-ALPHA1 [D1] and G-ALPHA2 [D2] of MHC I-ALPHA chains, G-ALPHA [D1] of MHC II-ALPHA chains and G-BETA [D1] of MHC II-BETA chains, G-ALPHA1-LIKE [D1] and G-ALPHA2-LIKE [D2] of MHC-like proteins.

The IMGT unique numbering leads, for the first time, to the standardized description of the mutations, allelic polymorphisms, two-dimensional representations (IMGT Colliers de Perles), and three-dimensional structures of the G-DOMAINs and G-LIKE-DOMAINs in any species. Therefore, beyond standardization, it represents a major breakthrough for their comparative, structural, functional and evolutionary studies.

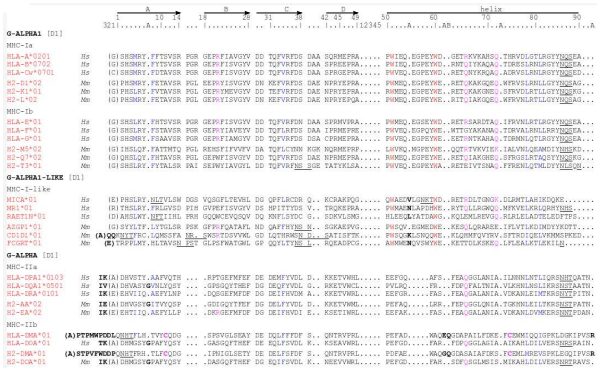
A Alignment of G-DOMAINs of MHC and G-LIKE-DOMAINs of MHC-like is based on the IMGT unique numbering. Lefranc M.-P. et al. Dev. Comp. Immunol. 29, 917-938 (2005). pdf available on the IMGT site, http://imgt.cines.fr

B IMGT Collier de Perles and standardized IMGT peptide/MHC contact sites are based on the IMGT unique numbering for G-DOMAIN. Kaas Q. and Lefranc M.-P. *In Silico Biology* **5**, 505-528 (2005).

C IMGT Collier de Perles for G-LIKE-DOMAIN are characterized by the position 54A, occupied in the G-ALPHA1-LIKE [D1] of human MICA, MR1 and RAET1N, mouse CD1D1 and FCGRT, but not in that of mouse AZGP1. Kaas Q. et al. *Nucl. Acids. Res.* **32**, D208-D210 (2004).

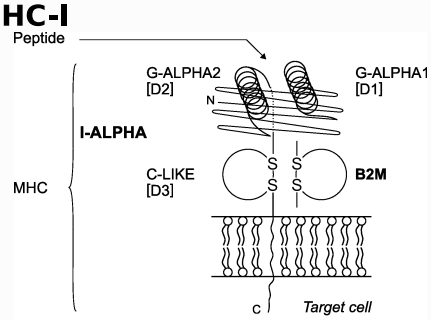
A G-ALPHA1, G-ALPHA1-LIKE, G-ALPHA alignment.

Alignment of G-ALPHA2, G-ALPHA2-LIKE and G-BETA is also available in IMGT/3Dstructure-DB (http://imgt.cines.fr)

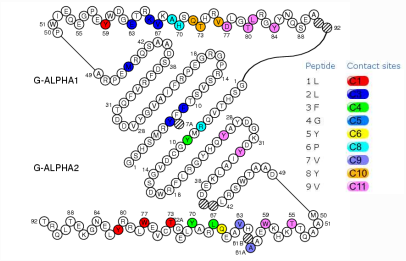


B IMGT Collier de Perles for G-DOMAIN and IMGT pMHC contact sites. Available in IMGT/3Dstructure-DB (http://imgt.cines.fr).

MHC-I

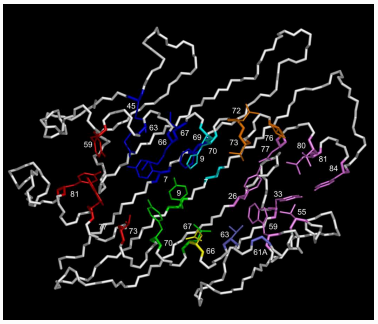


MHC-I



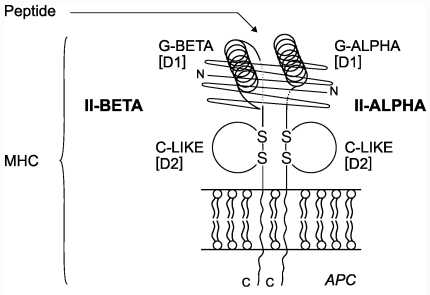
HLA-A*0201

(1ao7)

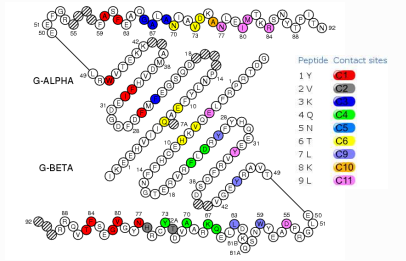


(1ao7)

MHC-II

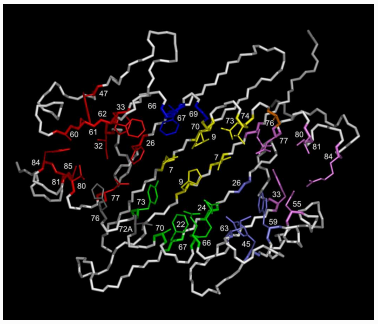


MHC-II



HLA-DRA*0101_HLA-DRB1*0401

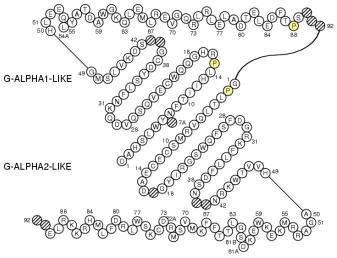
(1j8h)



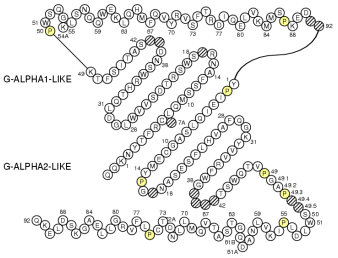
(1j8h)

C IMGT Collier de Perles for G-LIKE-DOMAIN. Available in IMGT/3Dstructure-DB (http://imgt.cines.fr).

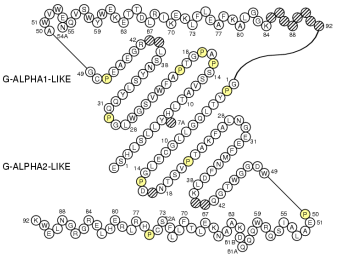
MHC-I-LIKE



RAET1N *(1kcg)*



CD1D1 *(1cd1)*



FCGRT *(1exu)*

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