Bioinformatique et biostatistiques appliquées à la biologie

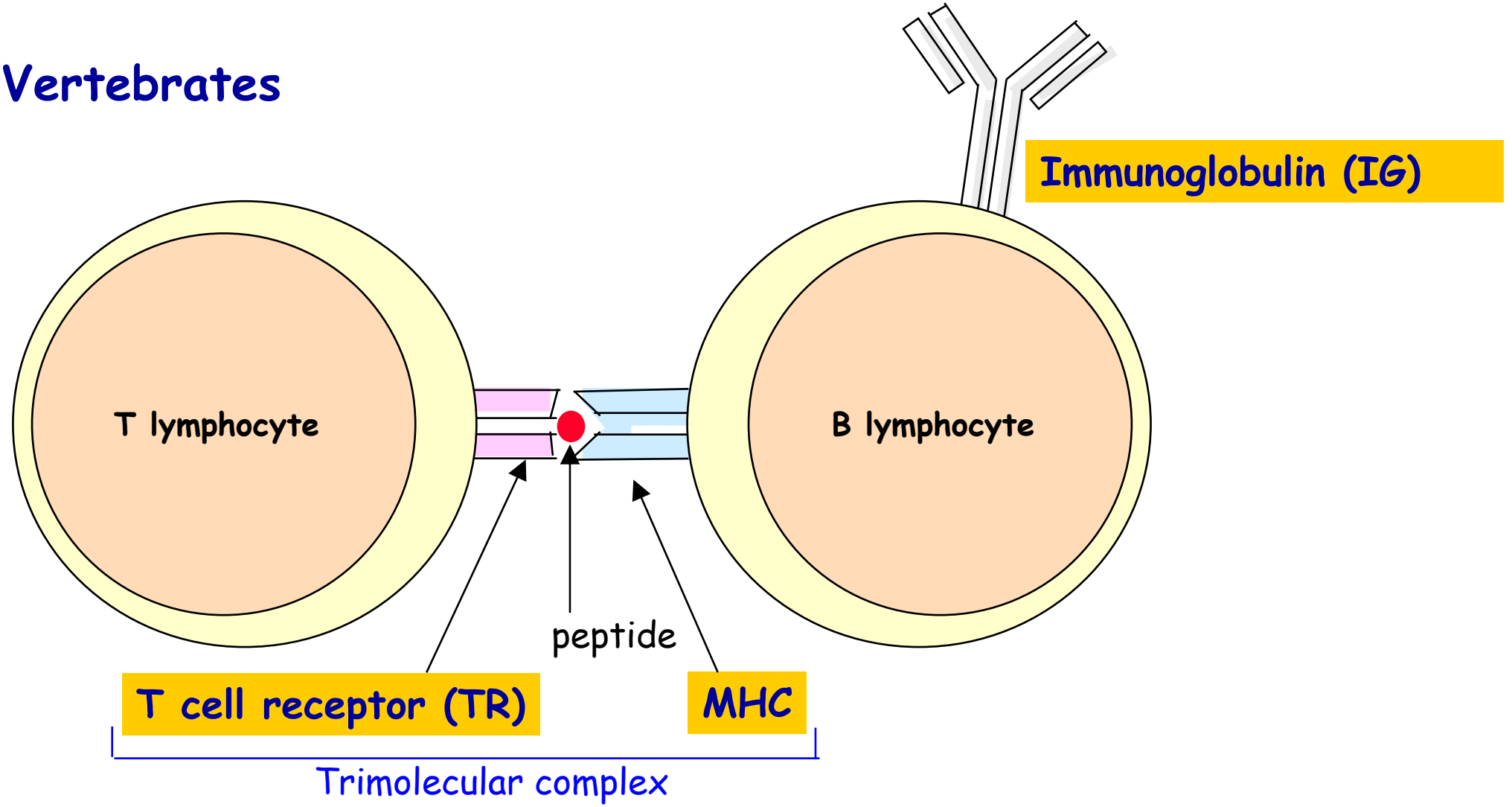
Enseignements d'Immunoinformatique-
IMGT®, the international ImMunoGeneTics information system®
Séances : Vendredi 9 Novembre

Souphatta SASORITH

Structures 3D des complexes trimoléculaires TR/pMHC

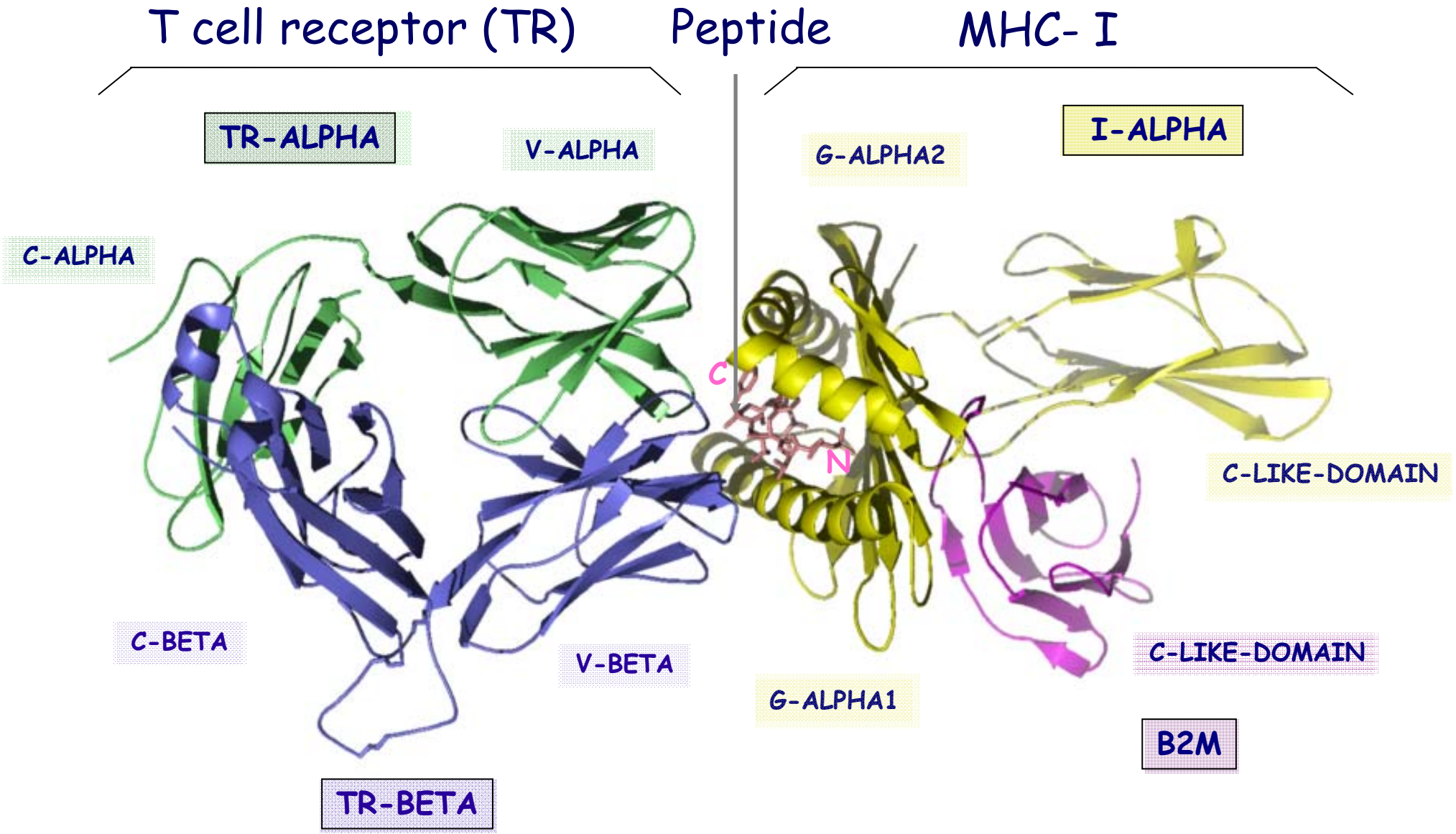
IMGT®: the adaptive immune response

Vertebrates



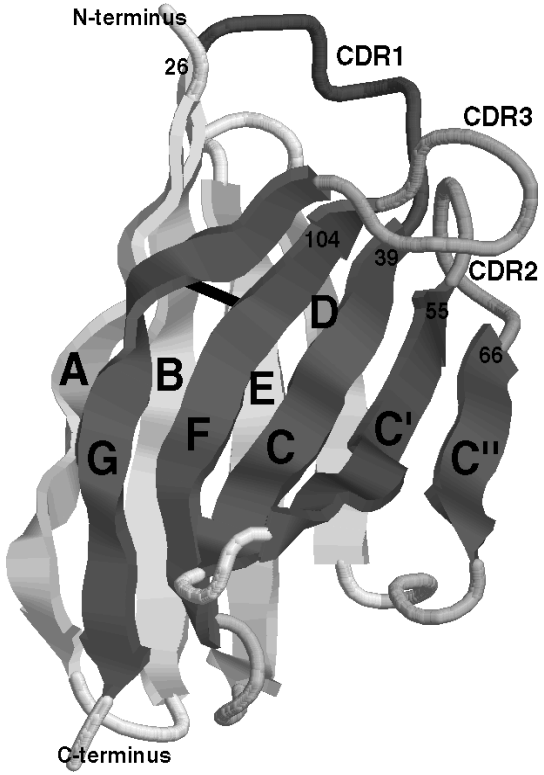
Presentation of peptides by the MHC to the T cell receptors (TR) at the surface of T cells.
➔ characterization of the TR/peptide/MHC trimolecular complexes (TR/pMHC) is crucial

TR/peptide/MHC complex

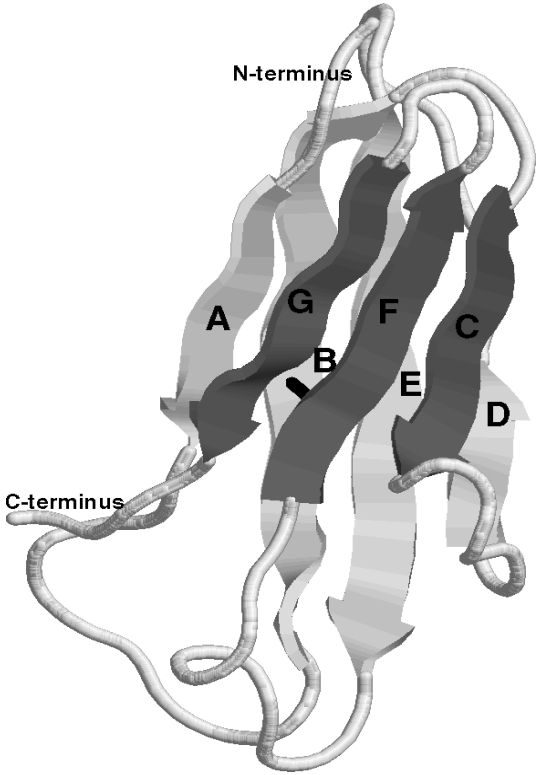


Structural domains (IG,TR et MHC)

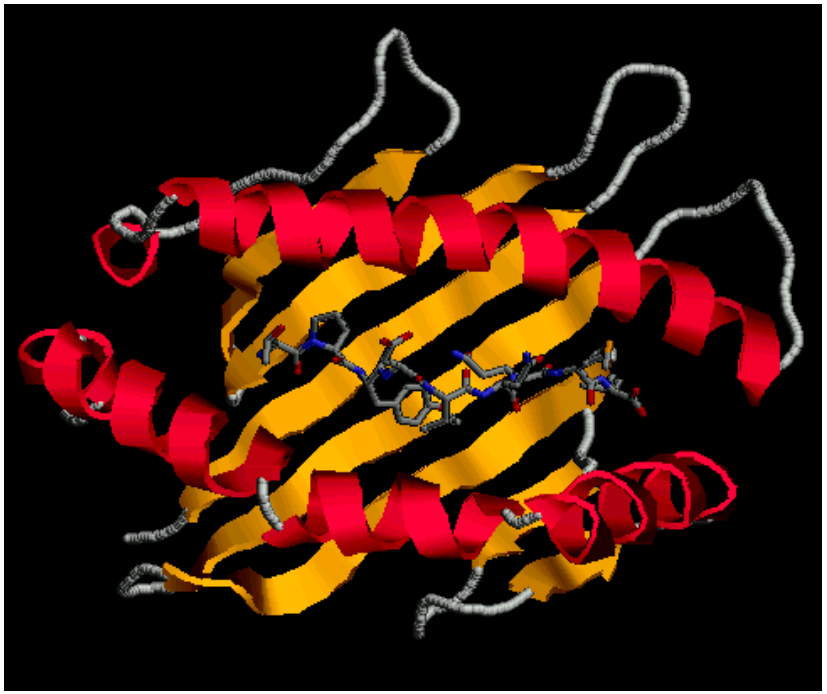
V-DOMAIN (IG,TR) AND V-LIKE-DOMAIN (other than IG,TR)



C-DOMAIN (IG,TR) AND C-LIKE-DOMAIN (other than IG,TR)



G-DOMAIN (MHC) AND G-LIKE-DOMAIN (other than MHC)

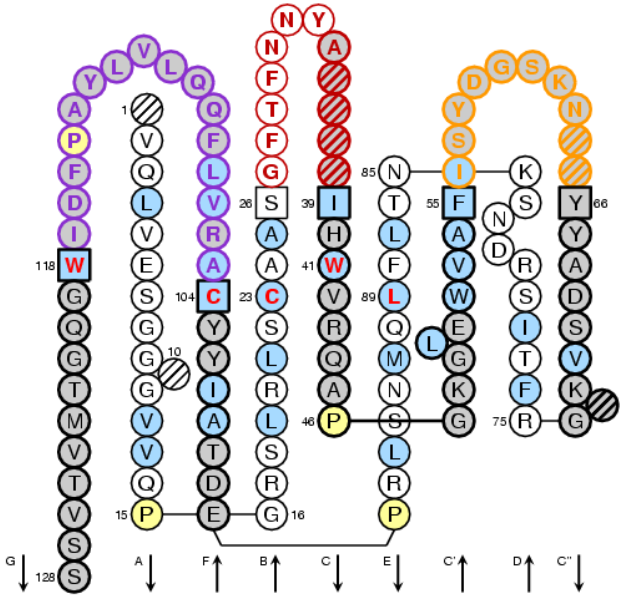


Immunoglobulin superfamily (IgSF)

MHC superfamily (MhcSF)

V-LIKE-DOMAIN

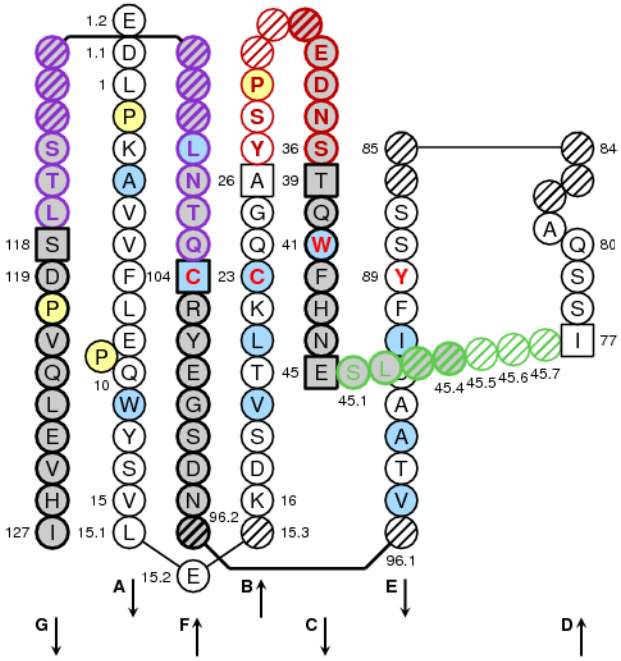
MOG



Duprat, E. et al., Recent Res. Develop. Human Genet., 2, 111-136 (2004)

C-LIKE-DOMAIN

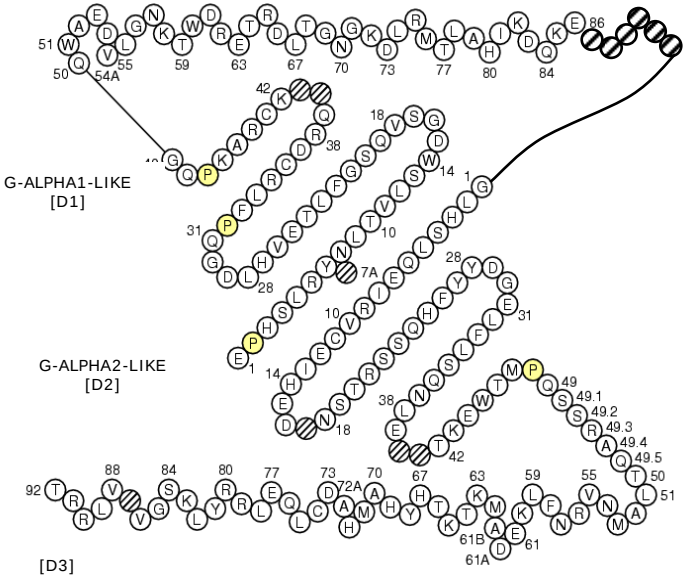
FCGR3B



Bertrand, G. et al., Tissue Antigens, 64, 119-131 (2004)

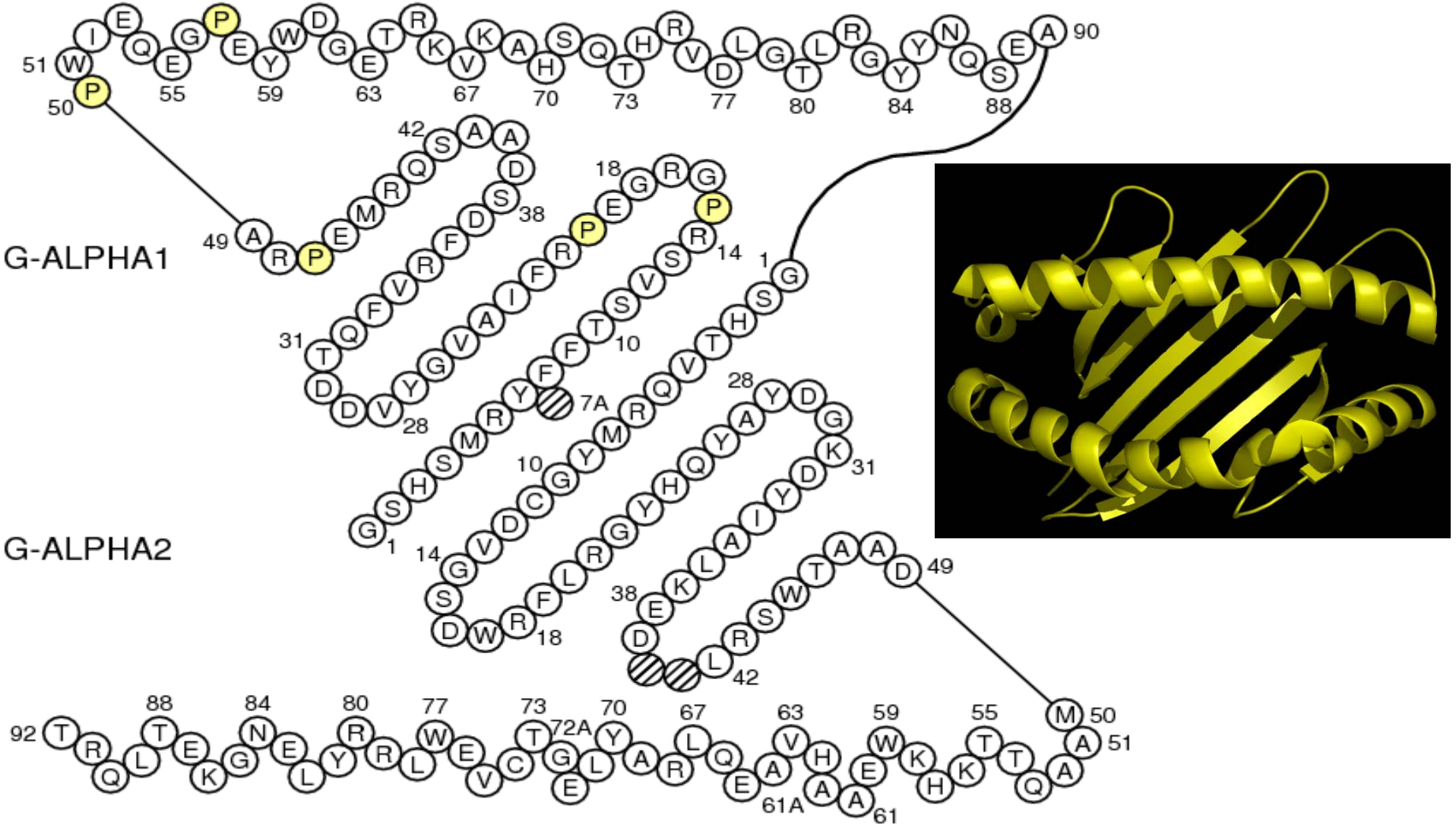
G-LIKE-DOMAIN

MICA



Frigoul, A. et al., Recent Res. Develop. Human Genet., 3, 95-145 (2005)

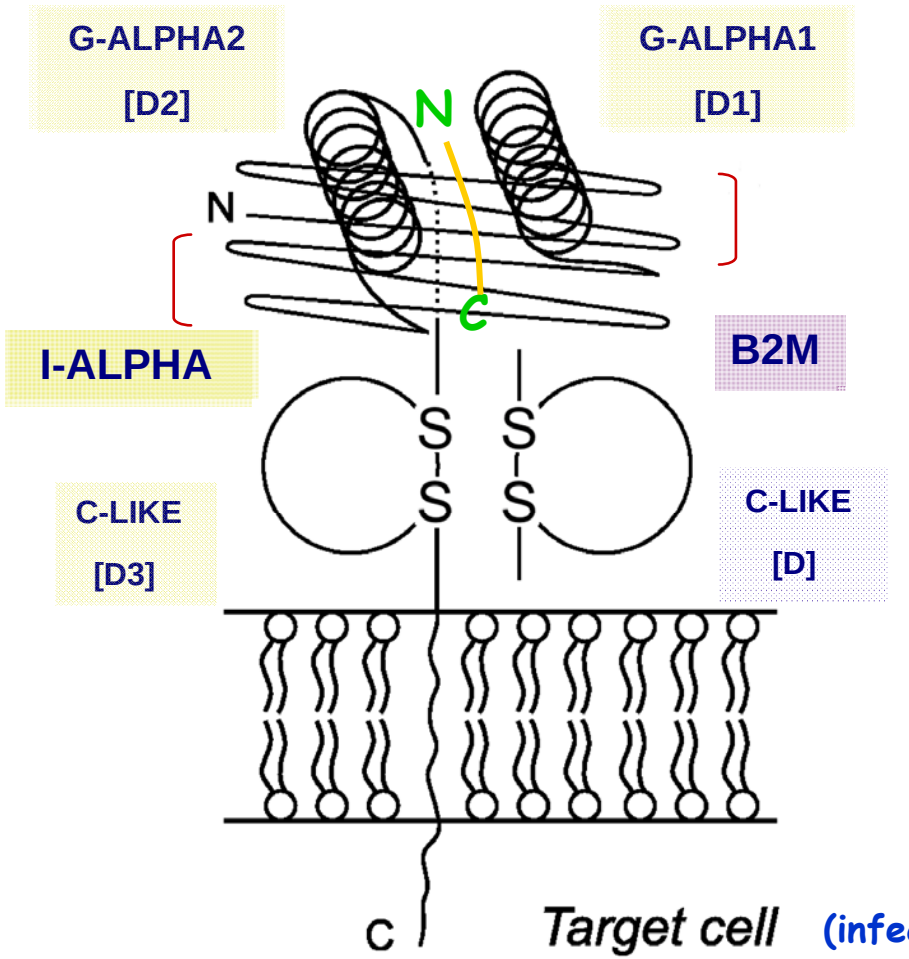
G type domain and IMGT Collier de Perles



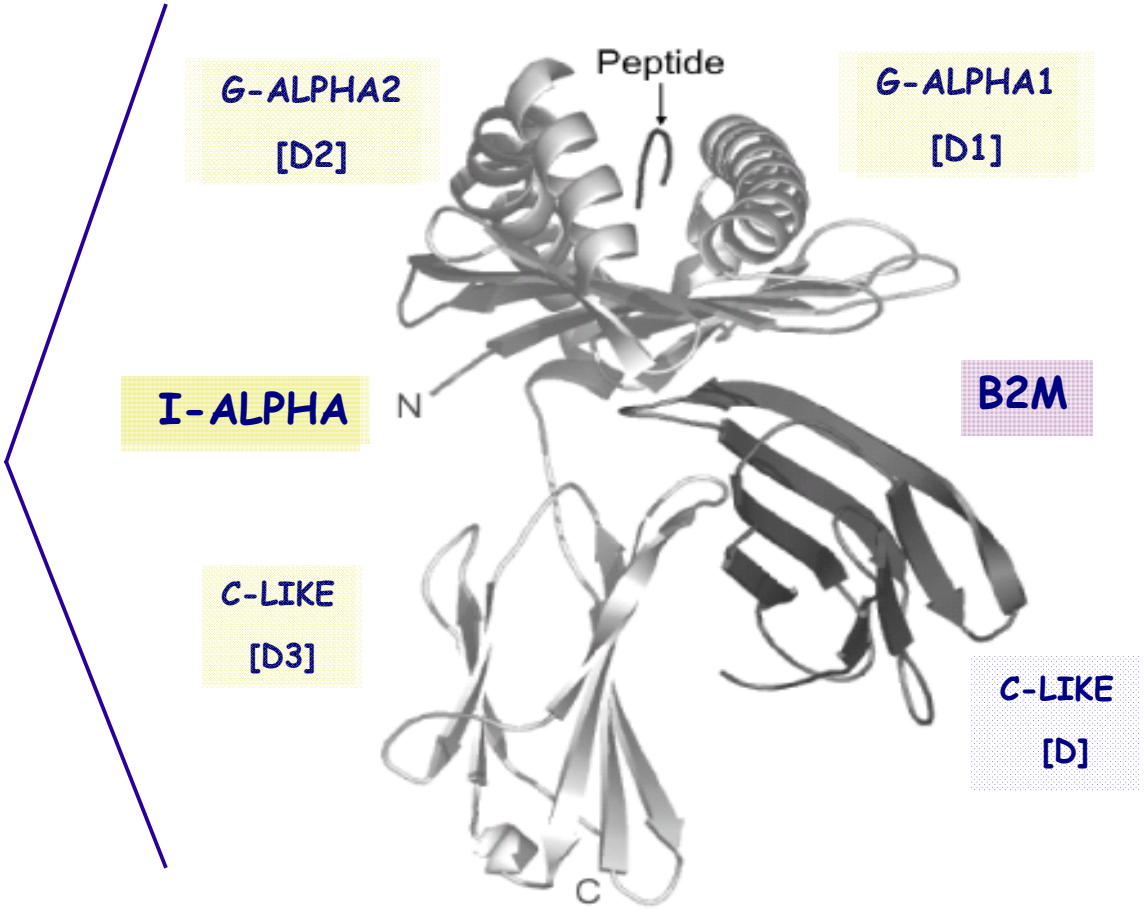
*Lefranc MP, Duprat E, **Kaas Q**, Tranne M, Thiriot A and Lefranc G. Dev Comp Immunol. 2005*

MHC-I chains and domains

Peptide 8, 9 or 10 amino acids
Groove with "closed" ends

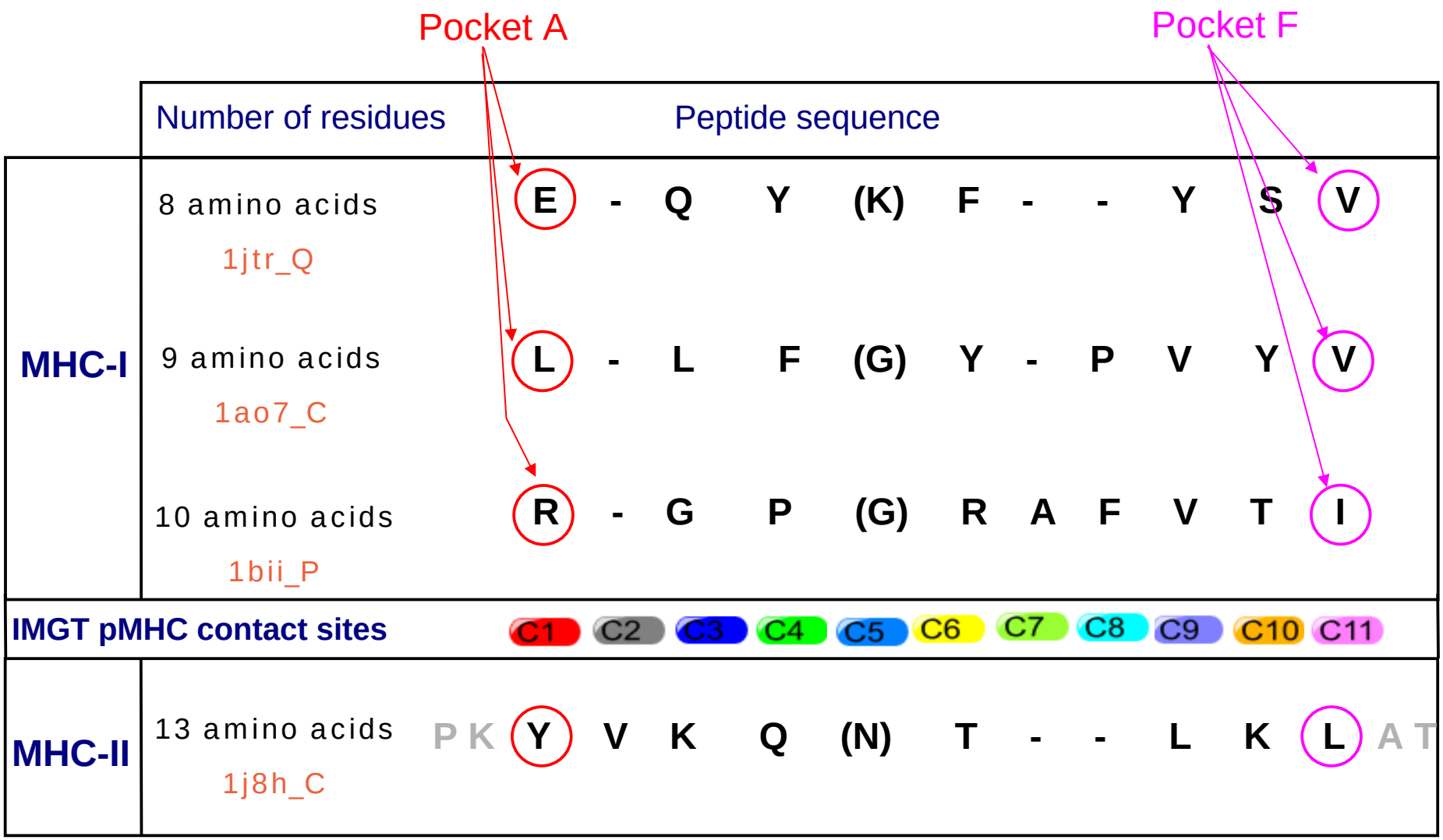


MHC-I-ALPHA_B2M



Lefranc et al., Dev. Comp. Immunol. 29, 917-938 (2005)

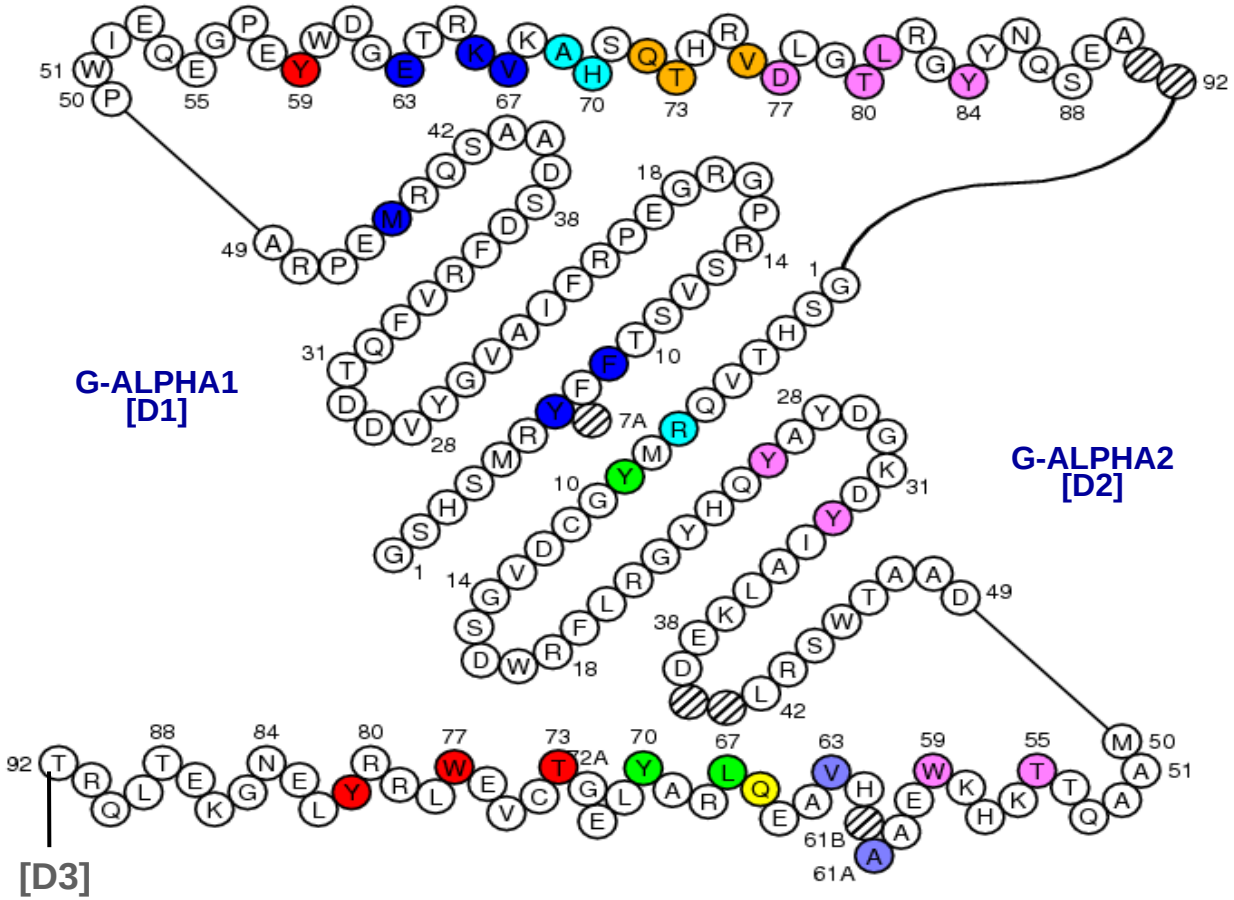
Peptide alignment



Kaas and Lefranc, In Silico Biology 5, 505-528 (2005)

IMGT Collier de Perles pMHC contact sites

Human HLA-A*0201 (MHC-I) and a 9-amino acid peptide

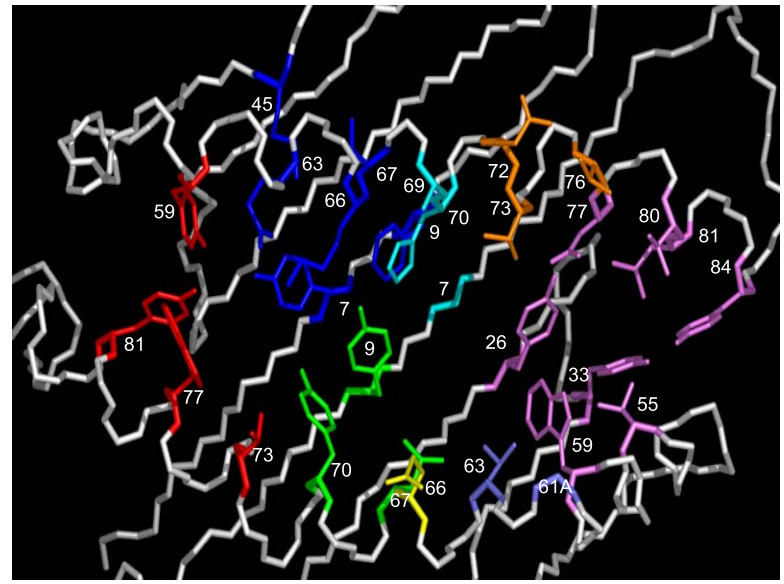


Peptide chain: 1ao7_C
MHC chain: 1ao7_A

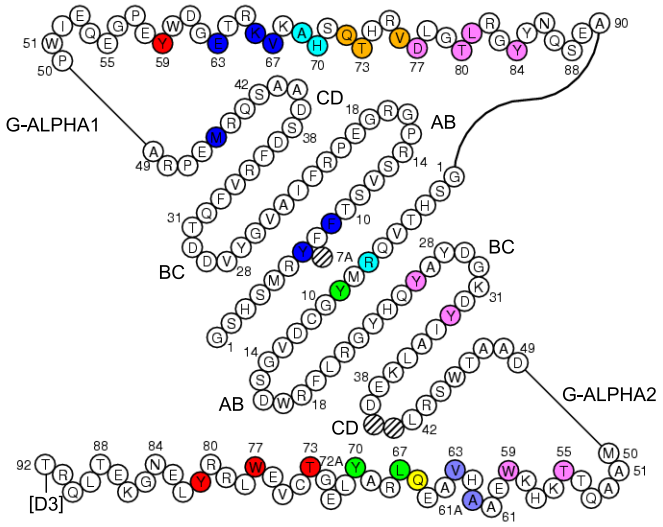
	9-amino acid peptides	Peptide	Pocket (approx.)
C1	1	1 L	A
C2	-	--	
C3	2	2 L	B
C4	3	3 F	D
C5	4	(4 G)	
C6	5	5 Y	
C7	-	--	
C8	6	6 P	
C9	7	7 V	E
C10	8	8 Y	
C11	9	9 V	F

Kaas and Lefranc, In Silico Biology 5, 505-528 (2005)

IMGT Collier de Perles pMHC contact sites



C1	1 E
C2	--
C3	2 Q
C4	3 Y
C5	(4 K)
C6	5 F
C7	--
C8	6 P
C9	7 V
C10	8 Y
C11	9 V



Contacts between MHC-I and the peptide side chains for a 9-amino acid peptide. Views from above the cleft with G-A1 on top and G-A2 on bottom. In the box, C1 to C11 refer to contact sites in MHC-I 3D structures with 9-amino acid peptides. There is no C5 in this 3D structure as P4 does not contact MHC amino acids (4G is shown between parentheses in the box).

Kaas and Lefranc, In Silico Biology 5, 505-528 (2005)