

Bioinformatique et biostatistiques appliquées à la biologie

Enseignements d'Immuno-informatique-
IMGT®, the international ImMunoGeneTics information system®

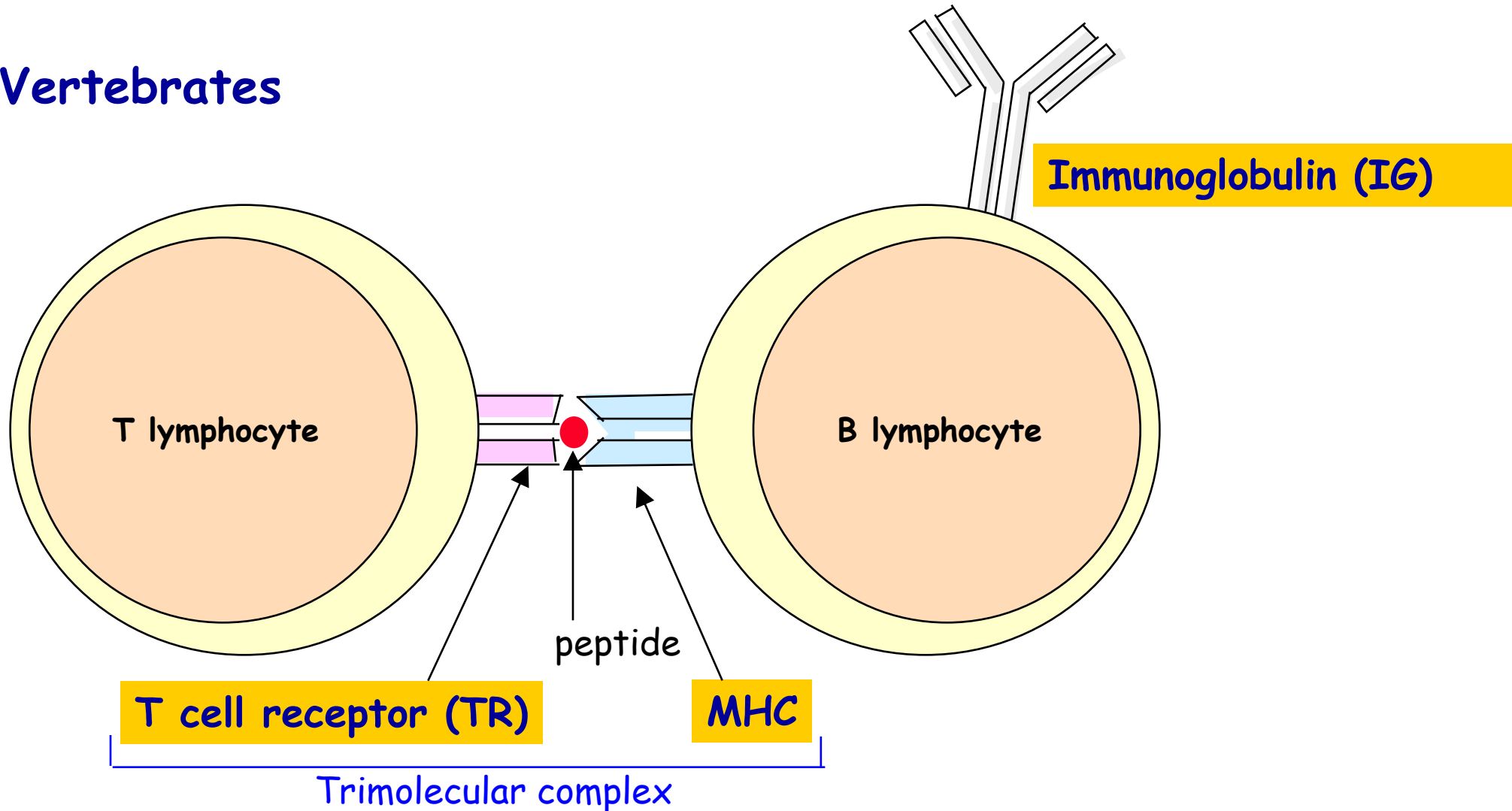
Séances : vendredi 8 novembre

Souphatta SASORITH

Structures 3D des complexes
trimoléculaires TR/pMHC

IMGT®: the adaptive immune response

Vertebrates



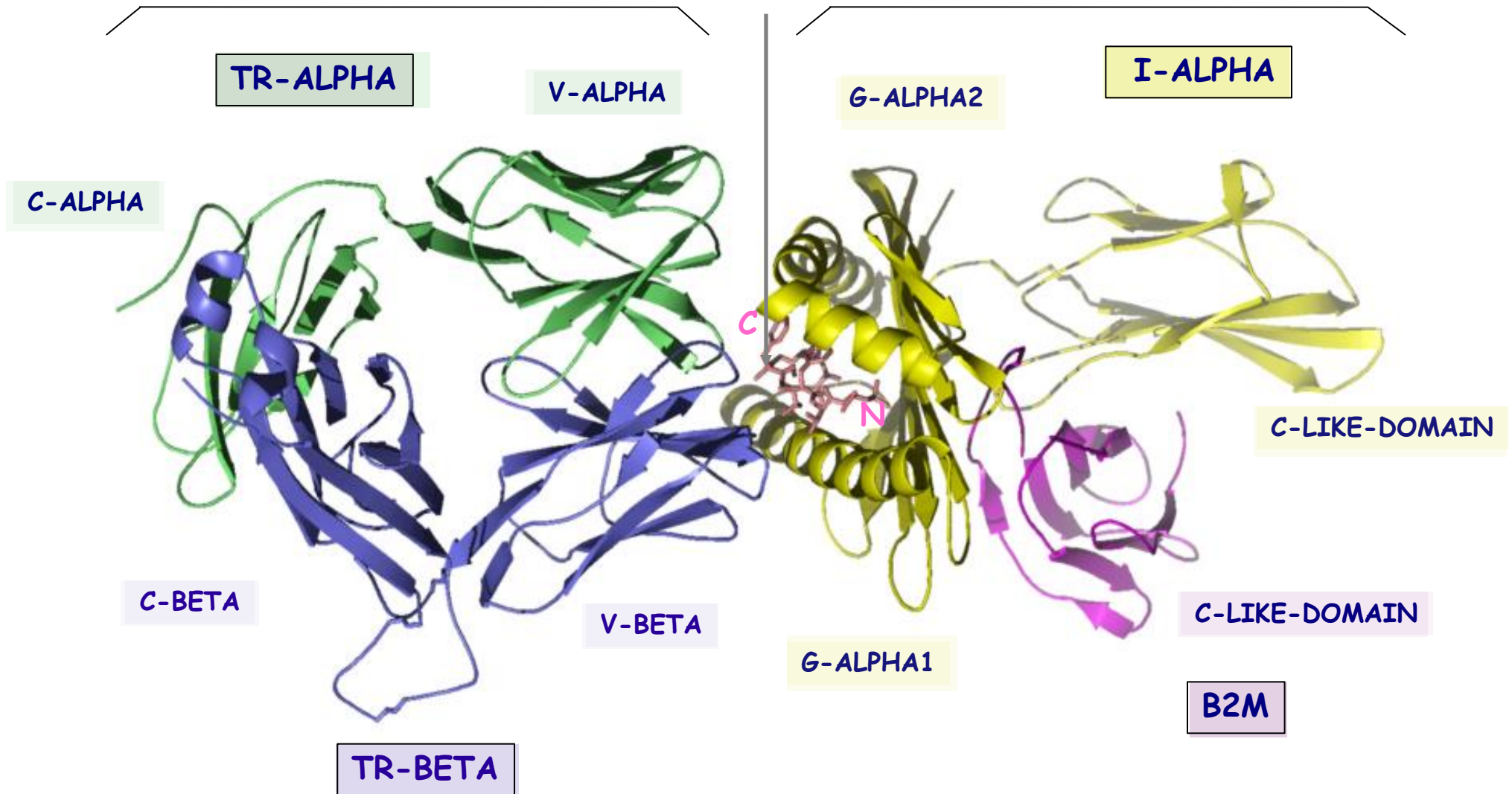
Presentation of peptides by the MHC to the T cell receptors (TR) at the surface of T cells.
→ characterization of the TR/peptide/MHC trimolecular complexes (TR/pMHC) is crucial

TR/peptide/MHC complex

T cell receptor (TR)

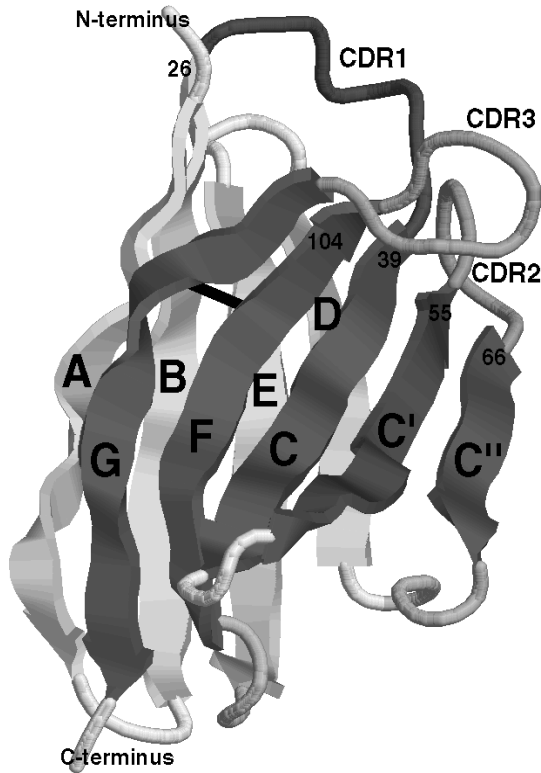
Peptide

MHC- I



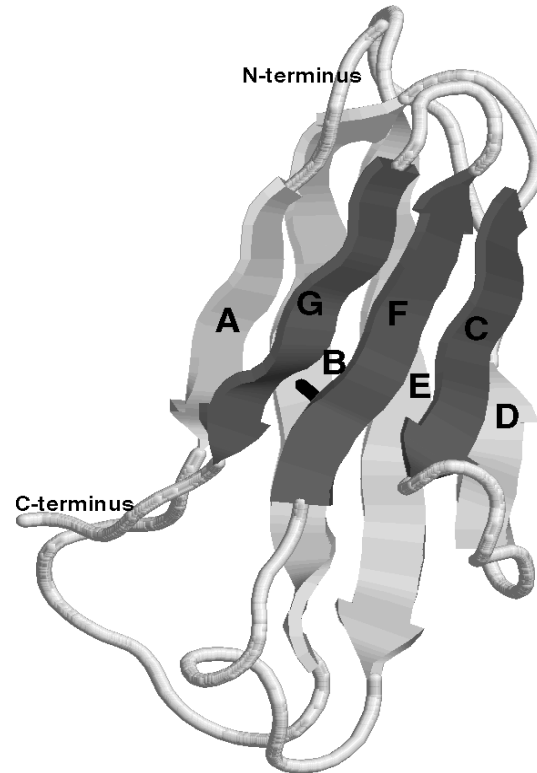
Structural domains (IG,TR et MHC)

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

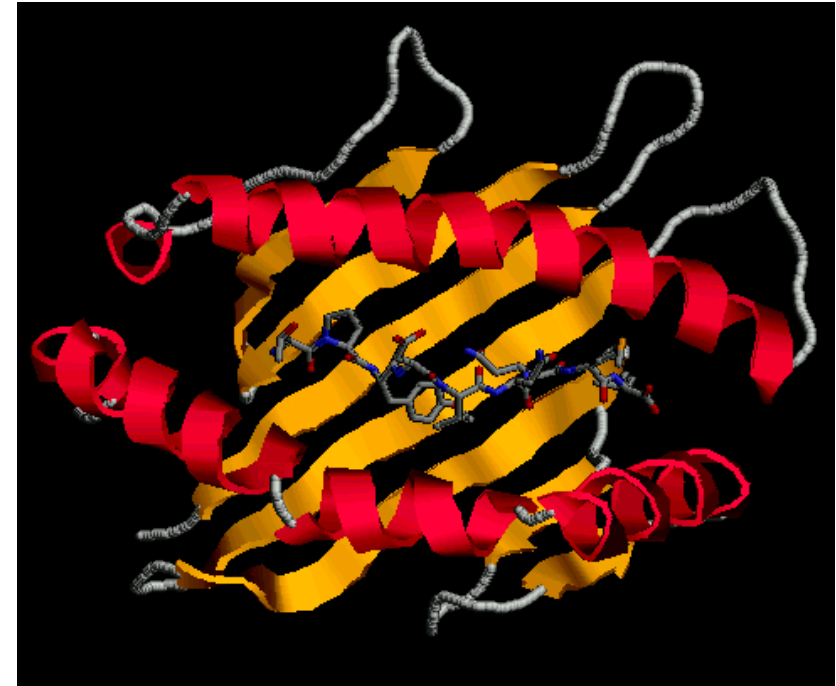


Immunoglobulin superfamily (IgSF)

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



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



MHC superfamily (MhcSF)

V-LIKE-DOMAIN

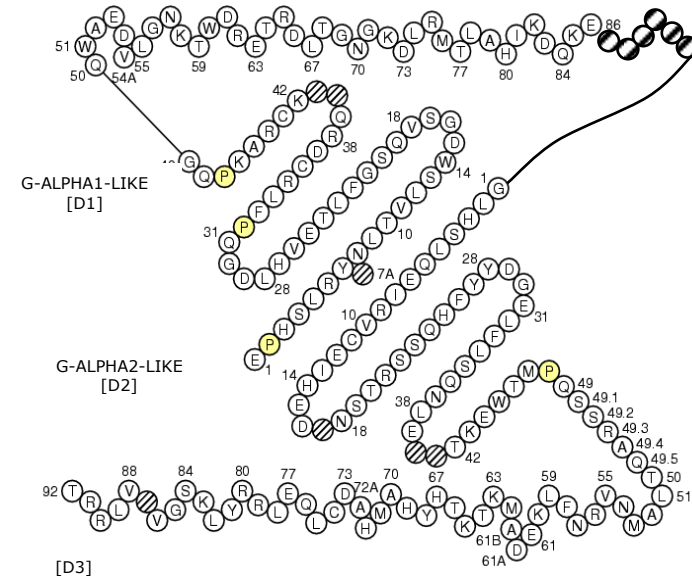
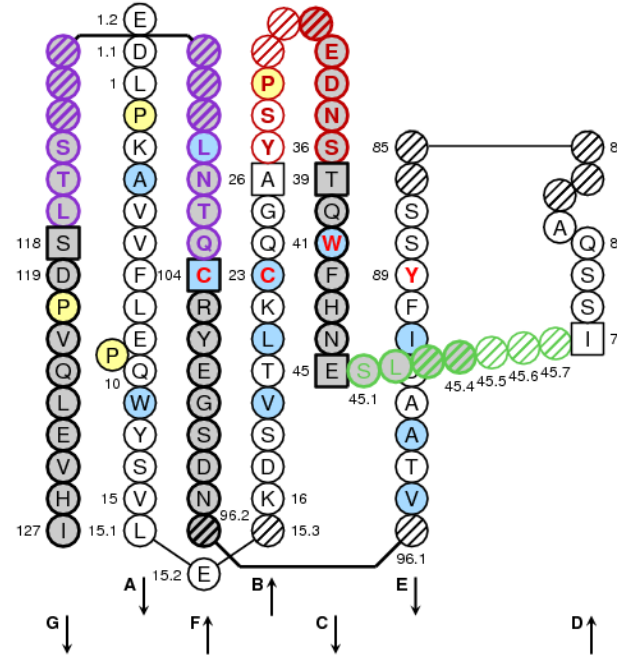
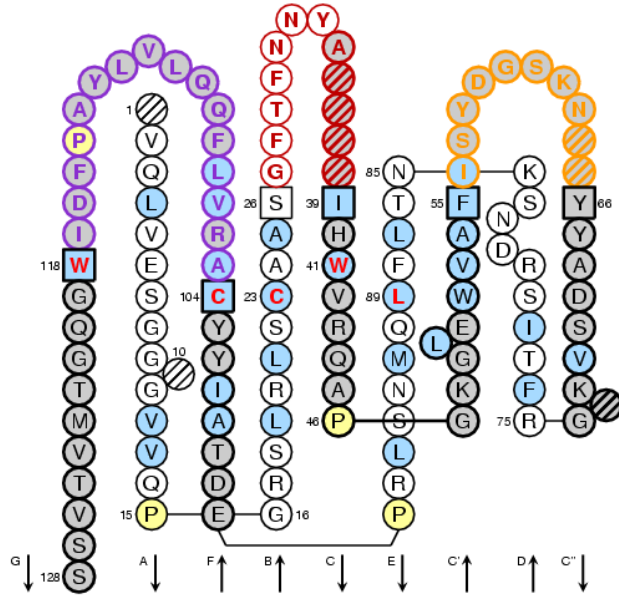
C-LIKE-DOMAIN

G-LIKE-DOMAIN

MOG

FCGR3B

MICA



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

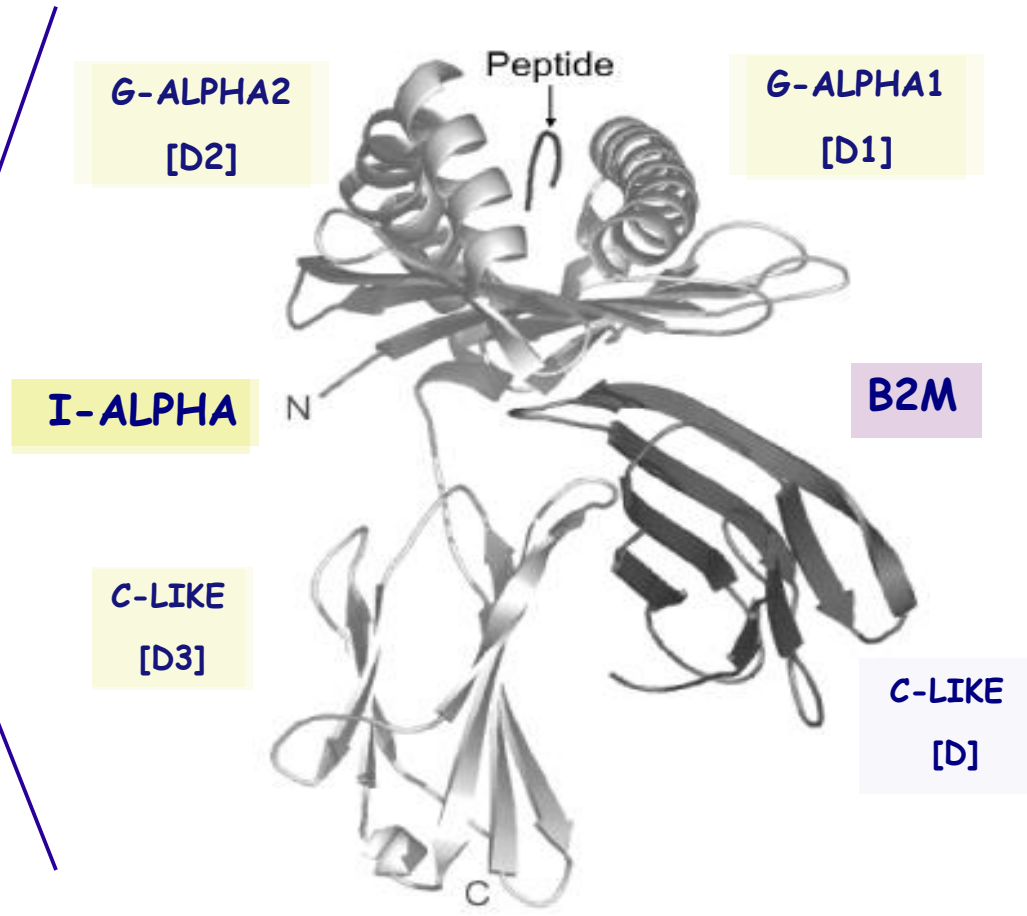
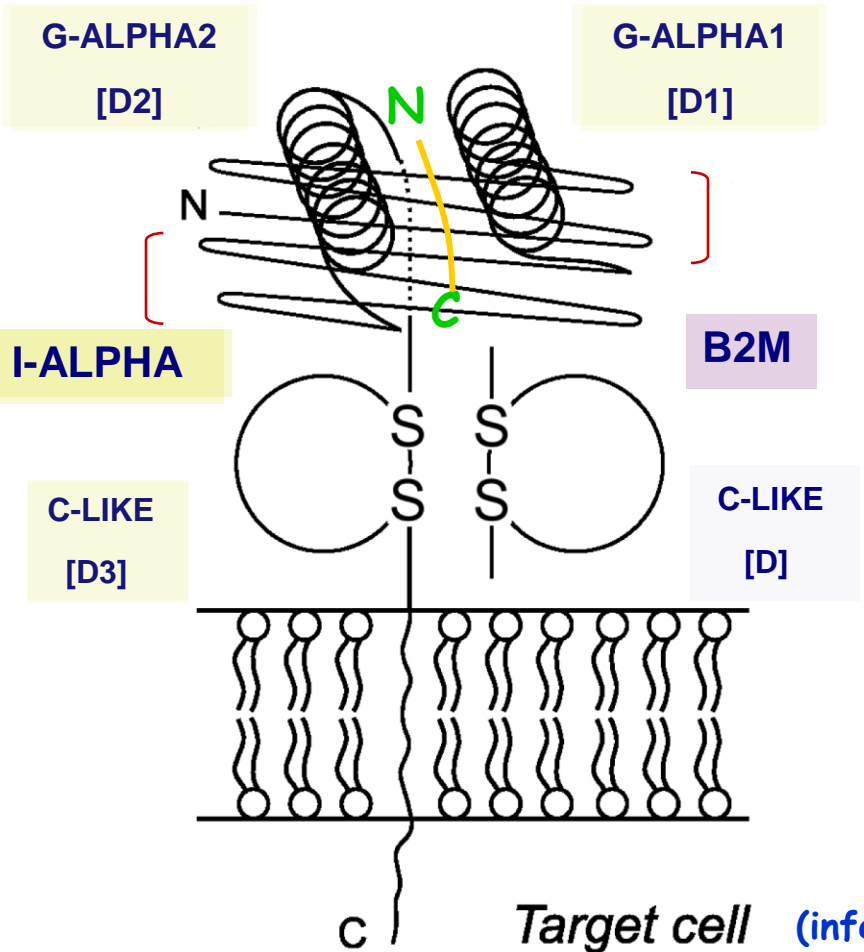
Bertrand, G. et al., *Tissue Antigens*, 64, 119-131 (2004)

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

MHC-I chains and domains

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

MHC-I-ALPHA_B2M



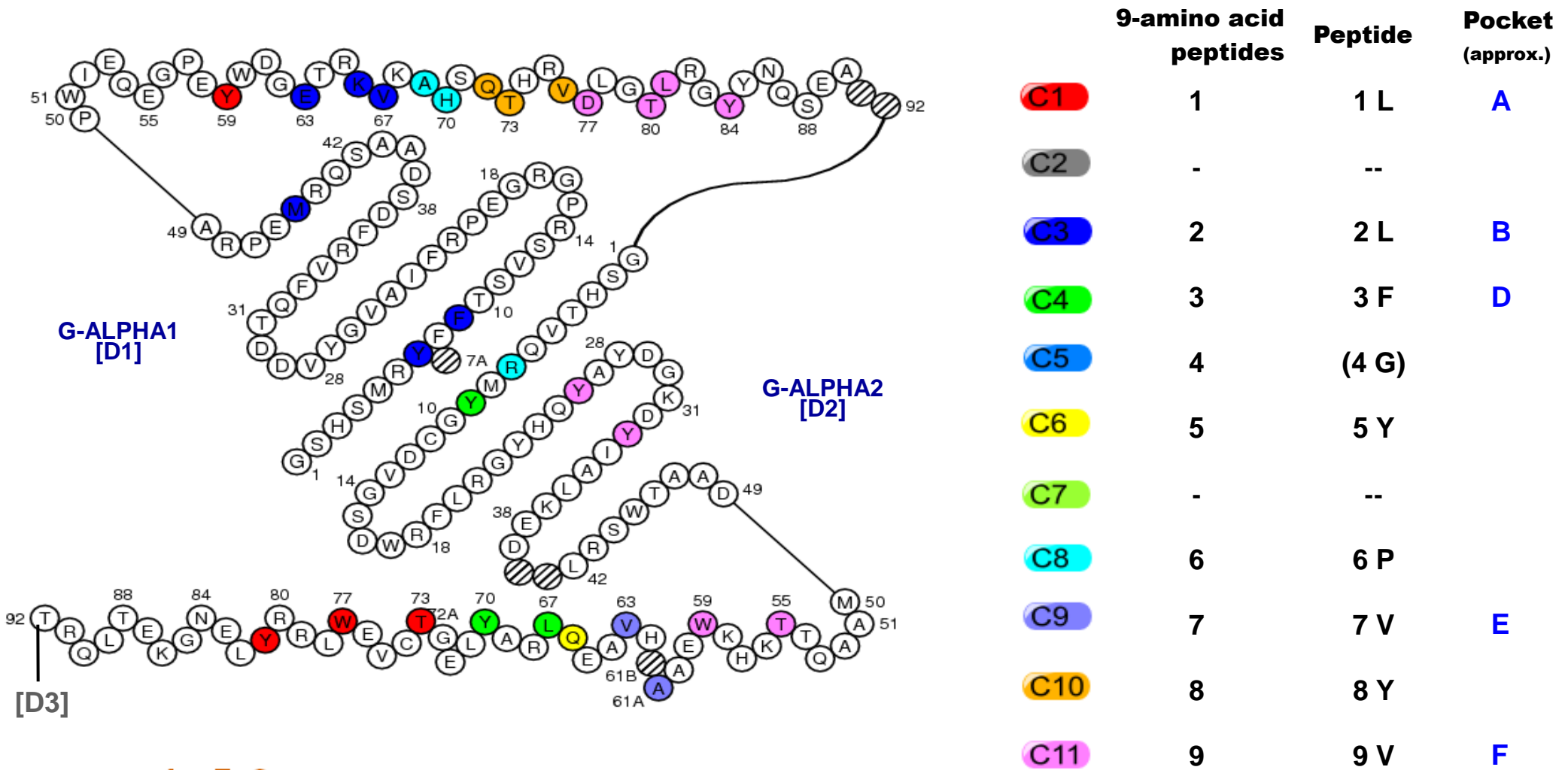
Peptide alignment

	Number of residues	Peptide sequence														
MHC-I	8 amino acids 1jtr_Q	E	-	Q	Y	(K)	F	-	-	Y	S	V				
	9 amino acids 1ao7_C	L	-	L	F	(G)	Y	-	P	V	Y	V				
	10 amino acids 1bii_P	R	-	G	P	(G)	R	A	F	V	T	I				
IMGT pMHC contact sites		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11				
MHC-II	13 amino acids 1j8h_C	P	K	Y	V	K	Q	(N)	T	-	-	L	K	L	A	T

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

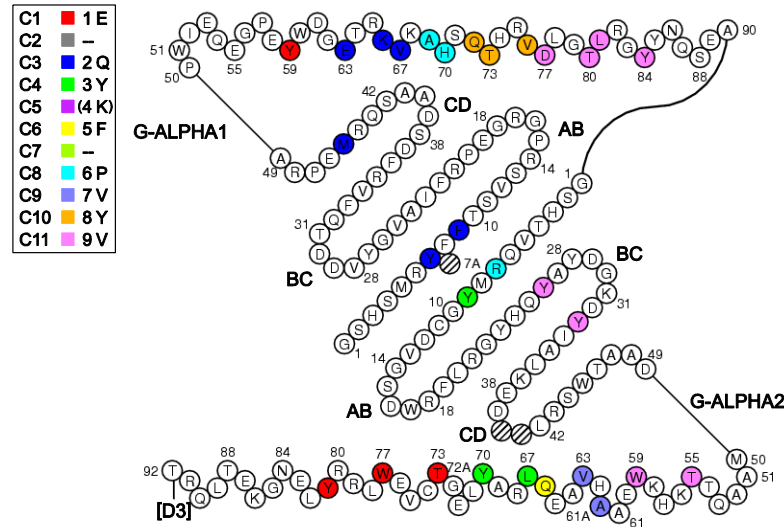
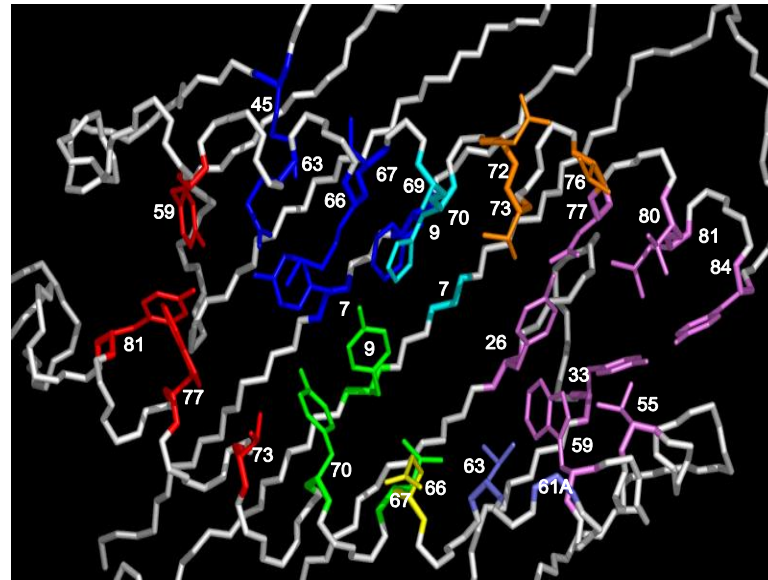
IMGT Collier de Perles pMHC contact sites

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



Peptide chain: **1ao7_C**
MHC chain: **1ao7_A**

IMGT Collier de Perles pMHC contact sites



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).