Antigen Presentation

Breakout Session I

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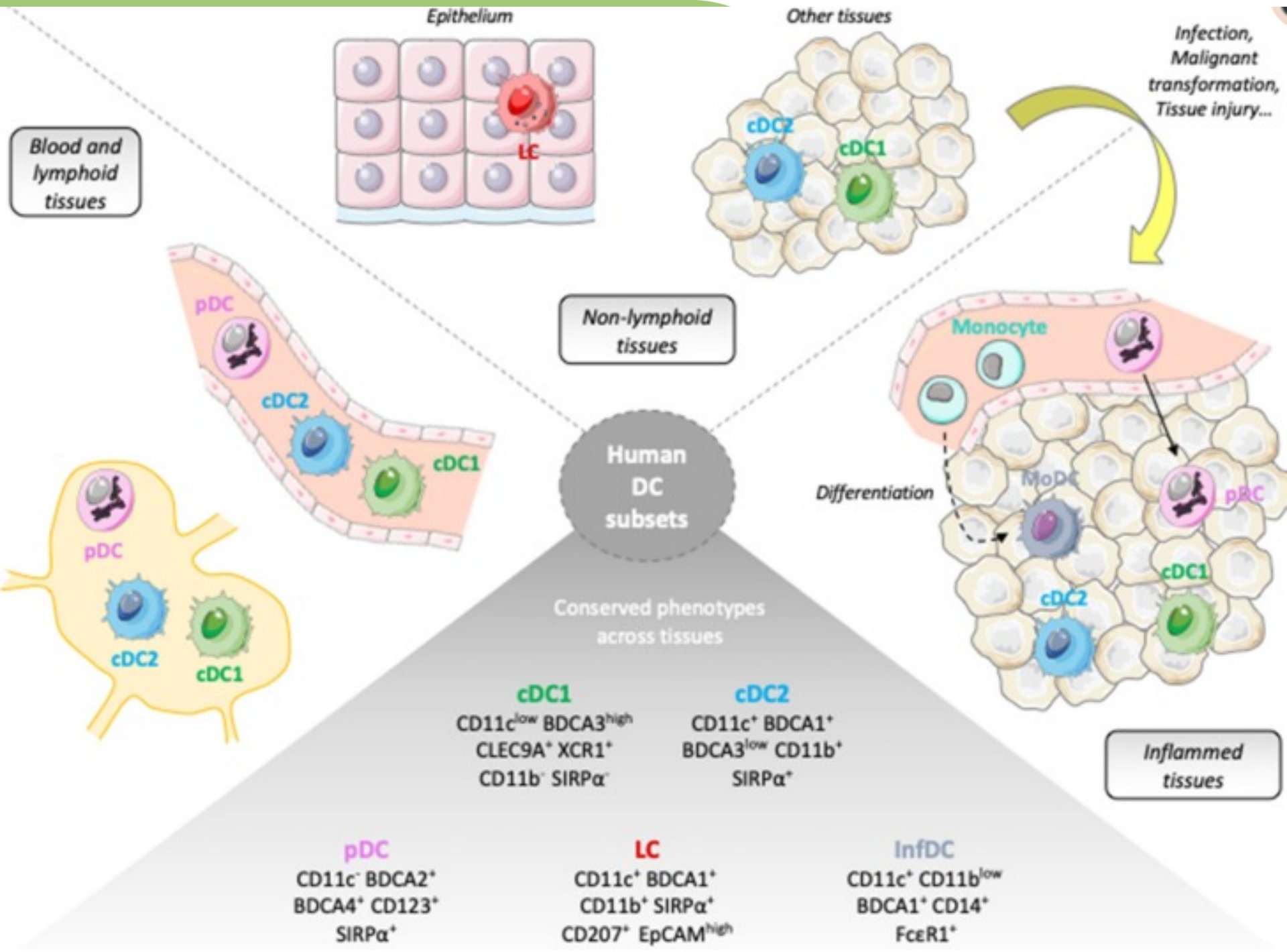
Epithelium
Other tissues
Infection, Malignant transformation, Tissue injury...
Blood and lymphoid tissues
LC
cDC2
cDC1
pDC
cDC2
cDC1
Non-lymphoid tissues
Monocyte
Human DC subsets
Differentiation
MoDC
pDC
cDC1
cDC2
pDC
cDC2
cDC1
Conserved phenotypes across tissues
cDC1
CD11c^low BDCA3^high
CLEC9A+ XCR1+
CD11b- SIRPα-
cDC2
CD11c+ BDCA1+
BDCA3^low CD11b+
SIRPα+
Inflammed tissues
pDC
CD11c- BDCA2+
BDCA4+ CD123+
SIRPα+
LC
CD11c+ BDCA1+
CD11b+ SIRPα+
CD207+ EpCAM^high
InfDC
CD11c+ CD11b^low
BDCA1+ CD14+
FcεR1+

What other cells present antigens?

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What other cells present antigens?

- Macrophages
- B cells
- Epithelial cells
- Endothelial cells
- Tumor cells
- T cells

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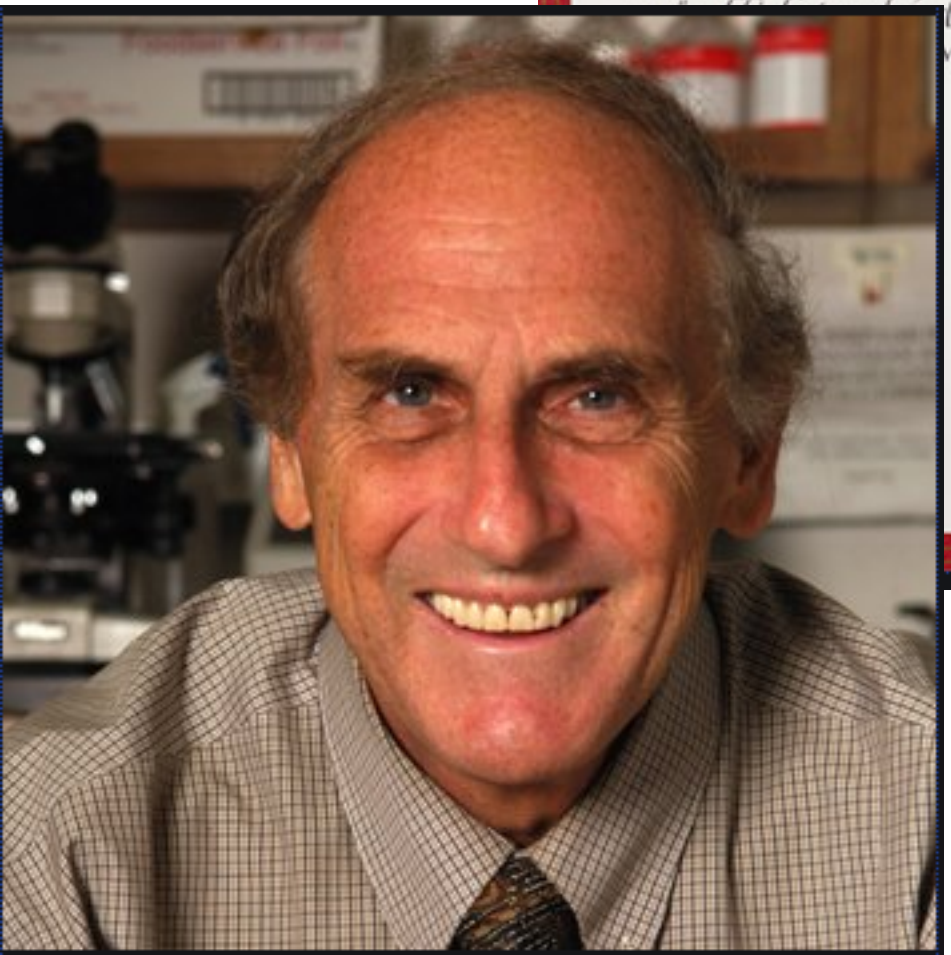


Åt dem som har gjort
första nyttа
MENTE

NOBELFÖRSAMLINGEN
KAROLINSKA INSTITUTET
har beslutat att 2011 års

NOBELPRIS

i fysiologi eller medicin
skall tillerkännas och med
ena hälften utgå till

Ralph M. Steinman

för hans upptäckt av
dendritcellen och dess roll vid
förvärvad immunitet
och med andra hälften
gemensamt till

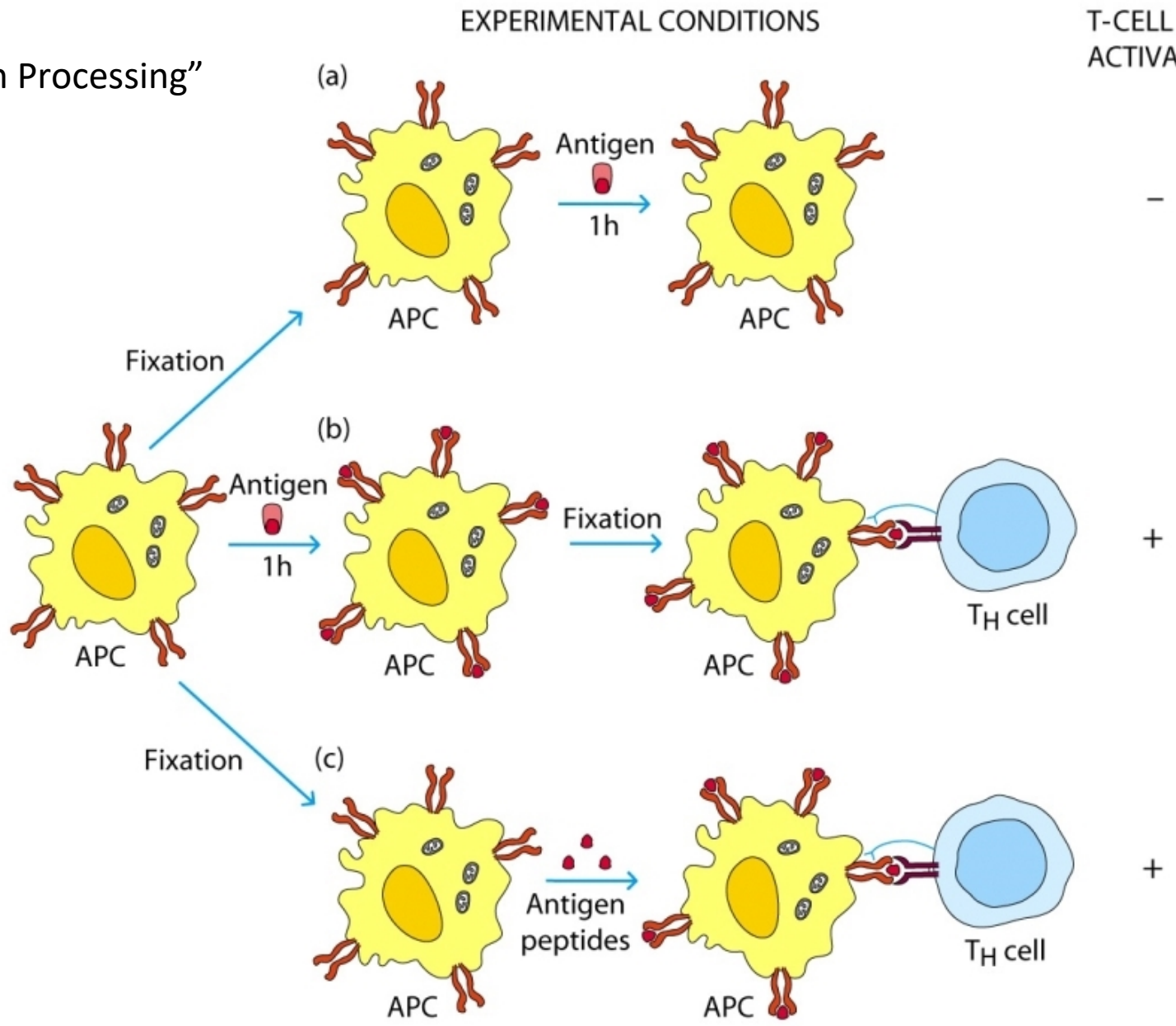
JULES A. HOFFMANN OCH
BRUCE A. BEUTLER

för deras upptäckter rörande
aktivering av medfödd
immunitet

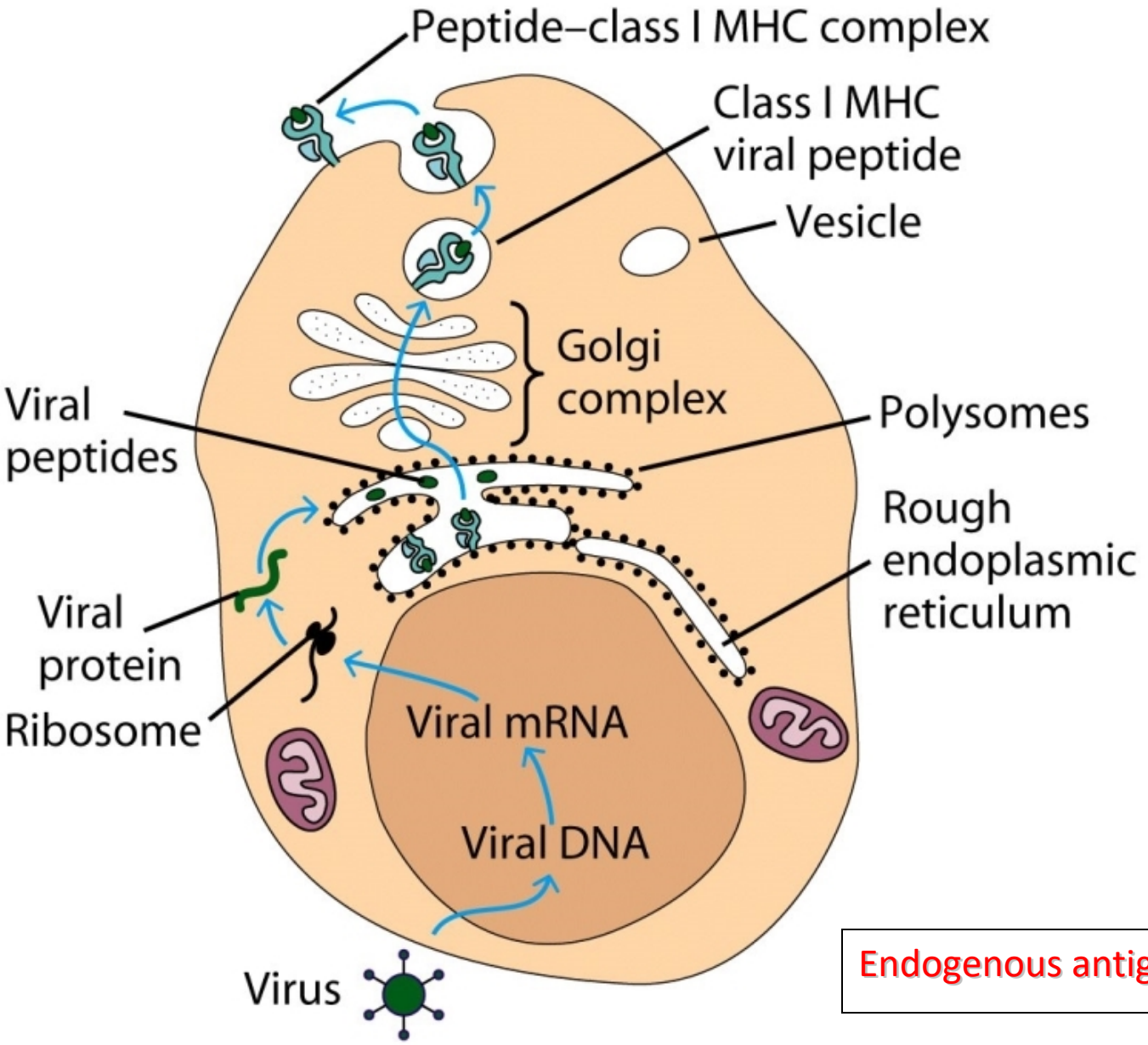
STOCKHOLM DEN 10 DECEMBER 2011

Antigen processing and presentation requires live DC

"Antigen Processing"

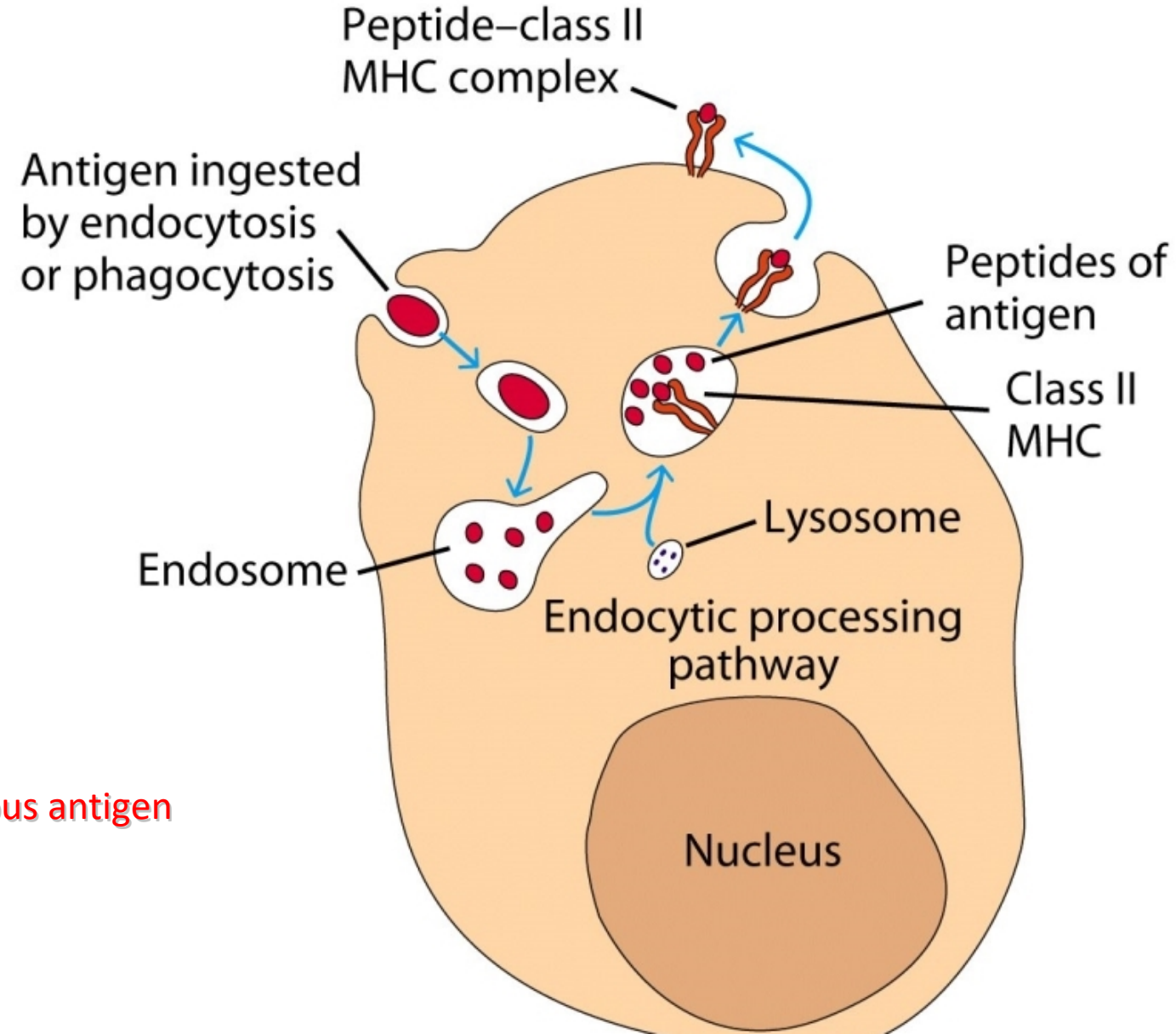


Cytosolic pathway (for CD8 T cells)



Endogenous antigens

Endocytic pathway (for CD4 T cells)

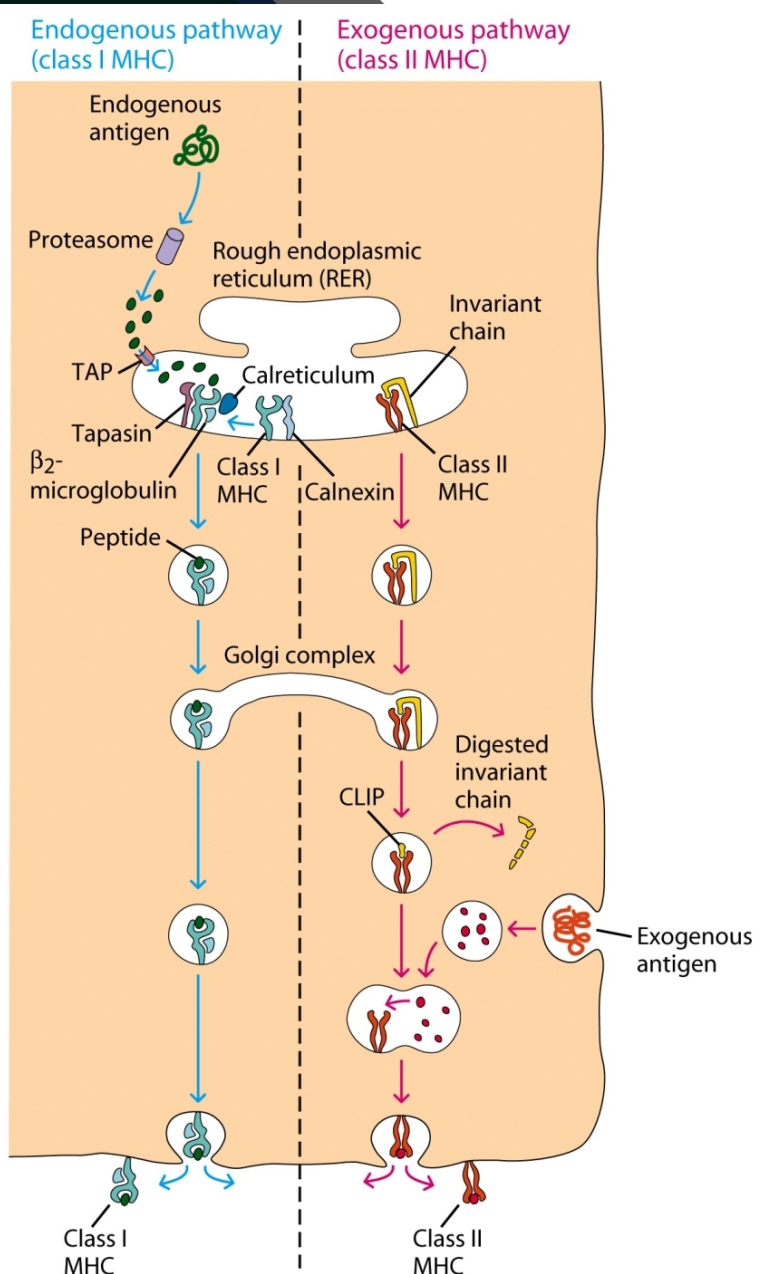


Exogenous antigen

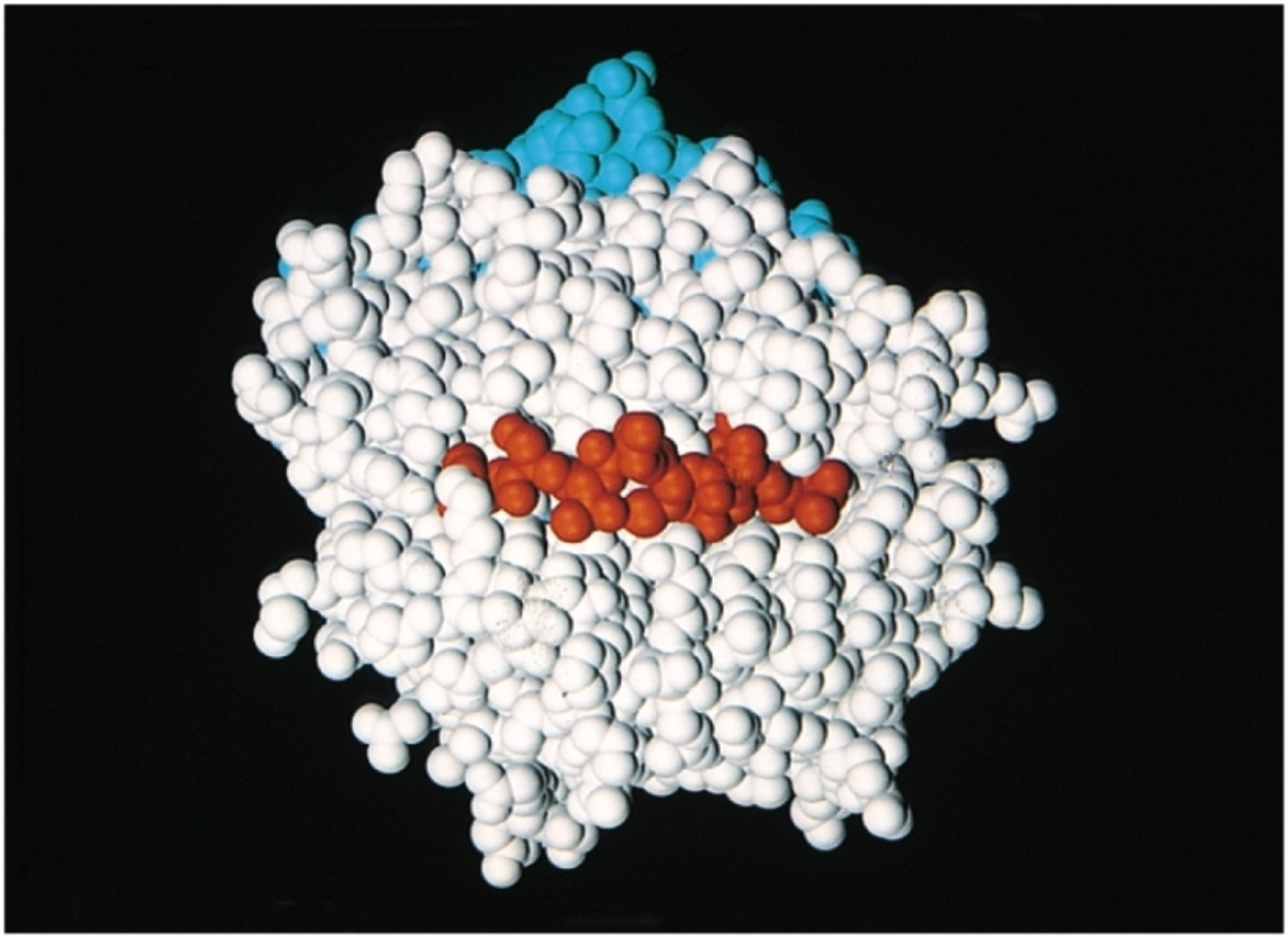
Cytosolic (endogenous) pathway constitutive in all cells

Exogenous pathway in APC

In DC there is cross-over known as “cross-presentation”



(a) Class I MHC



sitc
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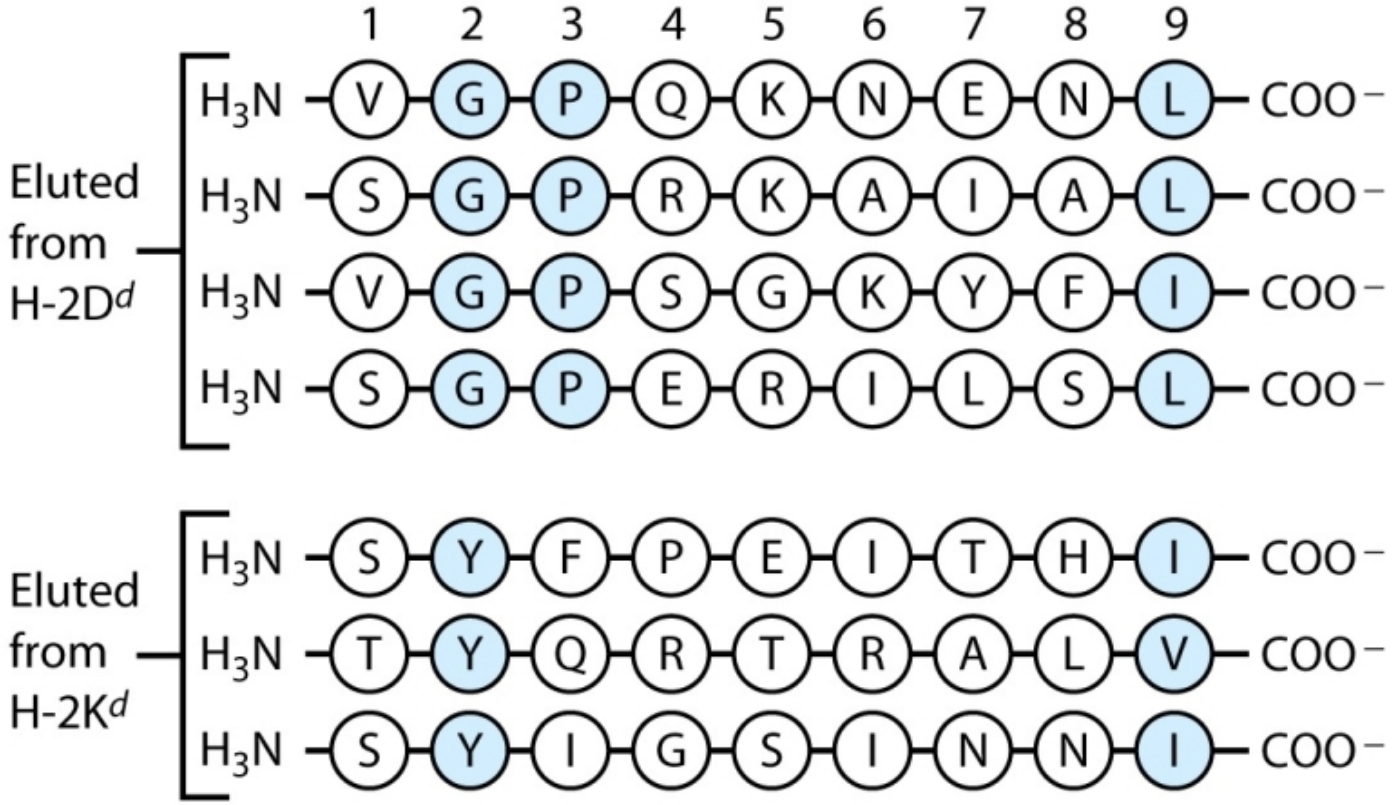
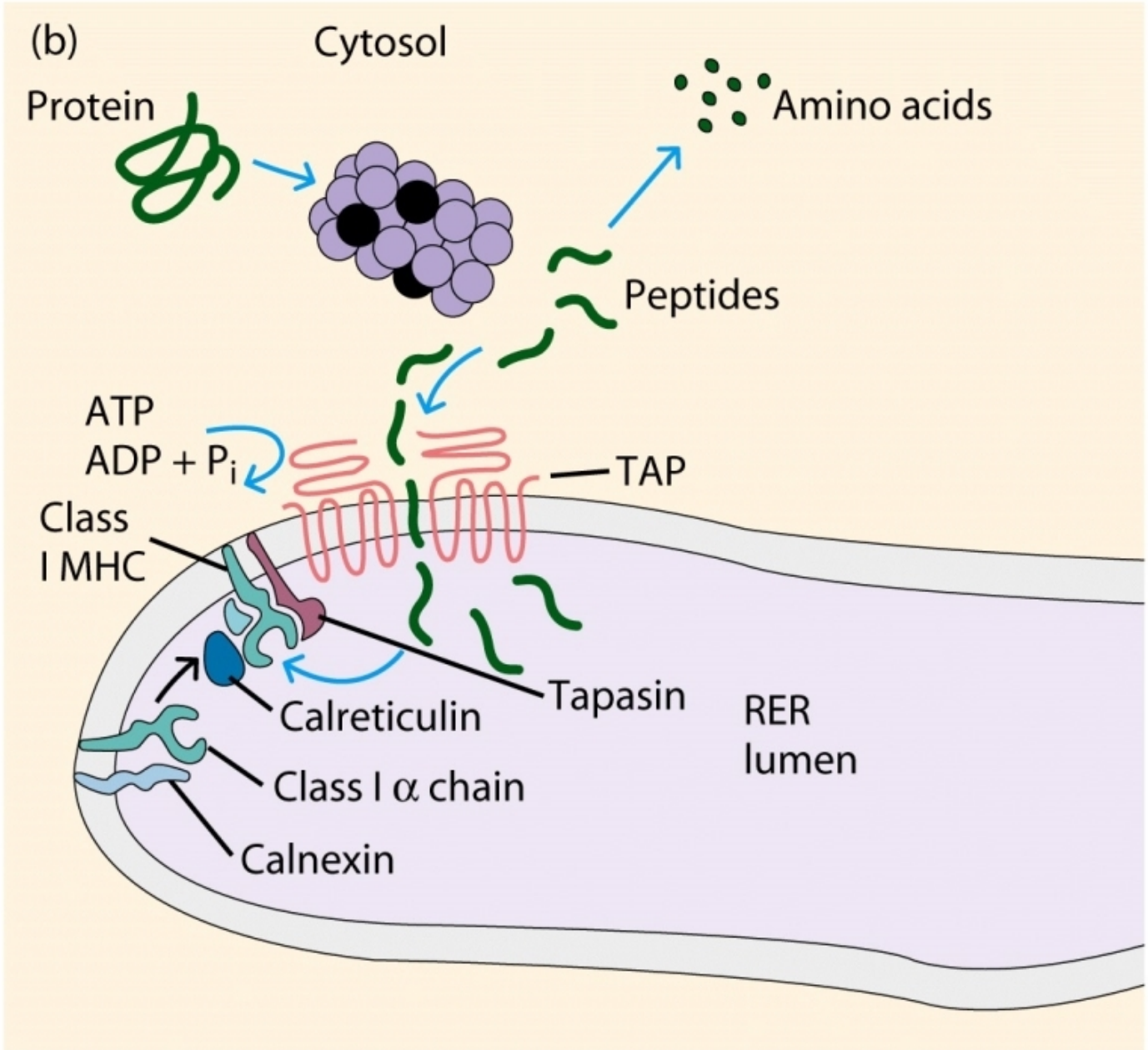
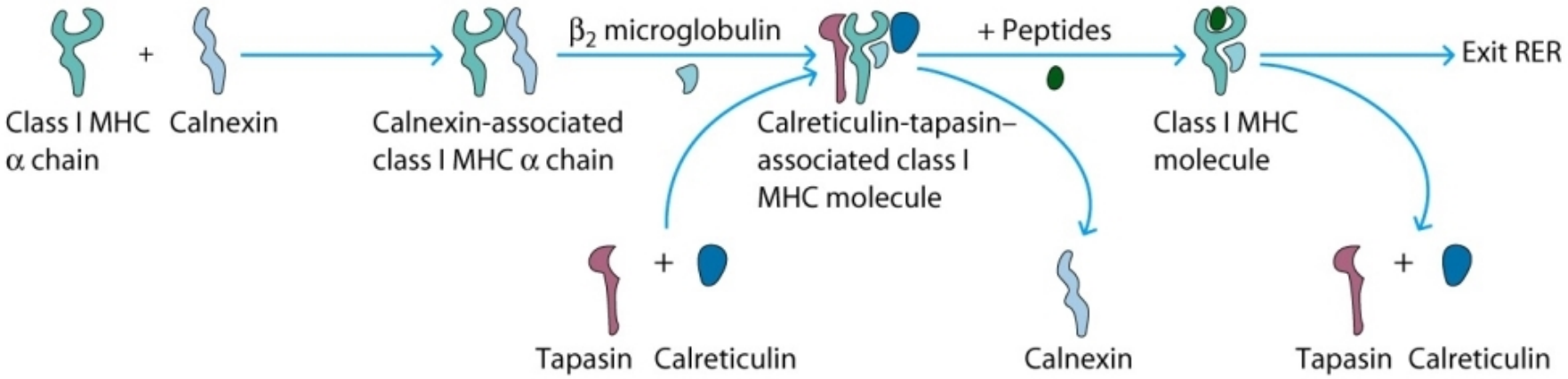


A = alanine	K = lysine	R = arginine
E = glutamic acid	L = leucine	S = serine
F = phenylalanine	N = asparagine	T = threonine
G = glycine	P = proline	V = valine
H = histidine	Q = glutamine	Y = tyrosine
I = isoleucine		


(b)
Cytosol
Protein
Amino acids
Peptides
ATP
ADP + P_i
TAP
Class
I MHC
Tapasin
Calreticulin
RER
lumen
Class I α chain
Calnexin


Class I MHC α chain
+
Calnexin
Calnexin-associated class I MHC α chain
β2 microglobulin
Calreticulin-tapasin–associated class I MHC molecule
+ Peptides
Class I MHC molecule
Exit RER
Tapasin
+
Calreticulin
Calnexin
Tapasin
+
Calreticulin

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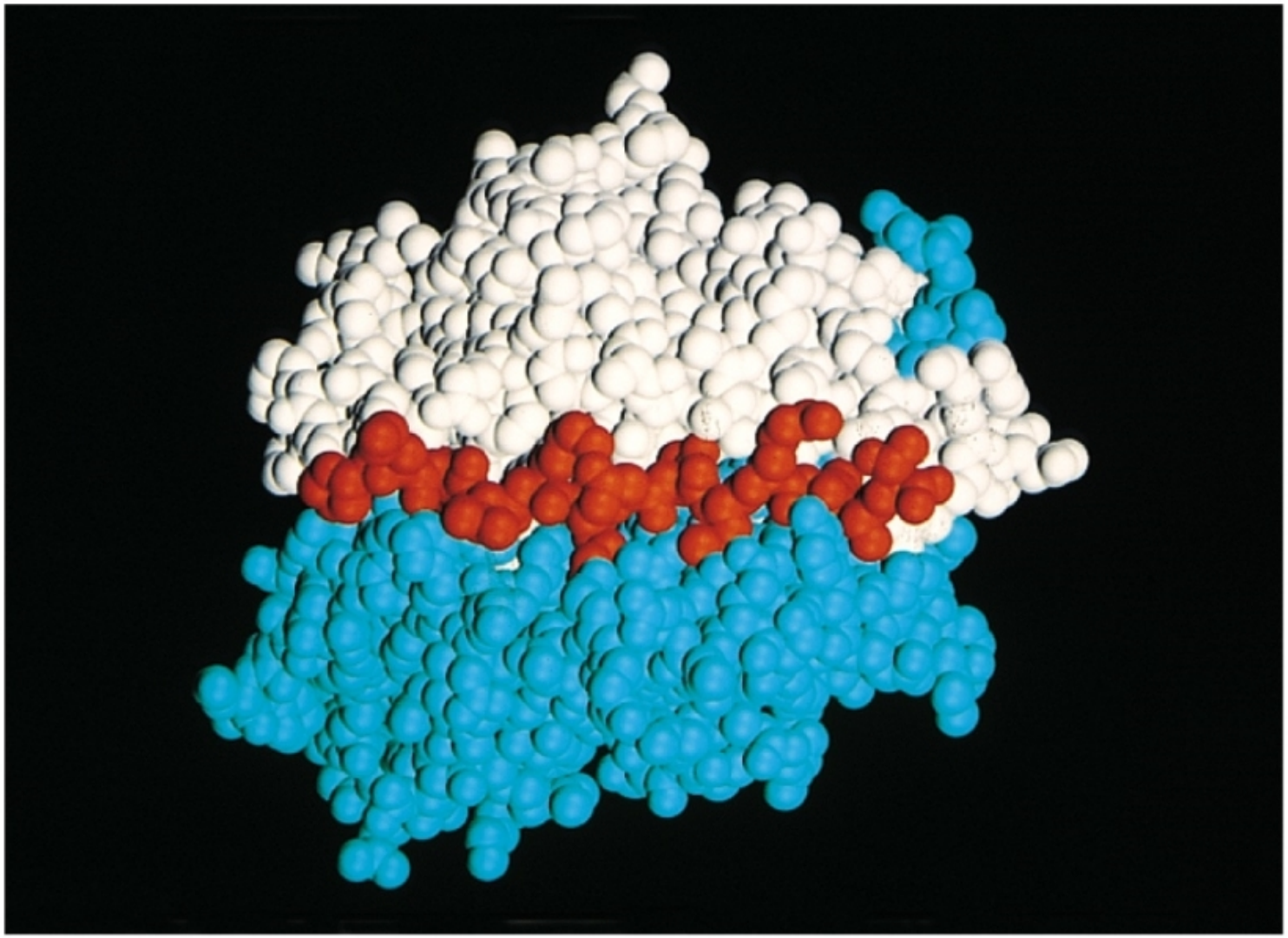
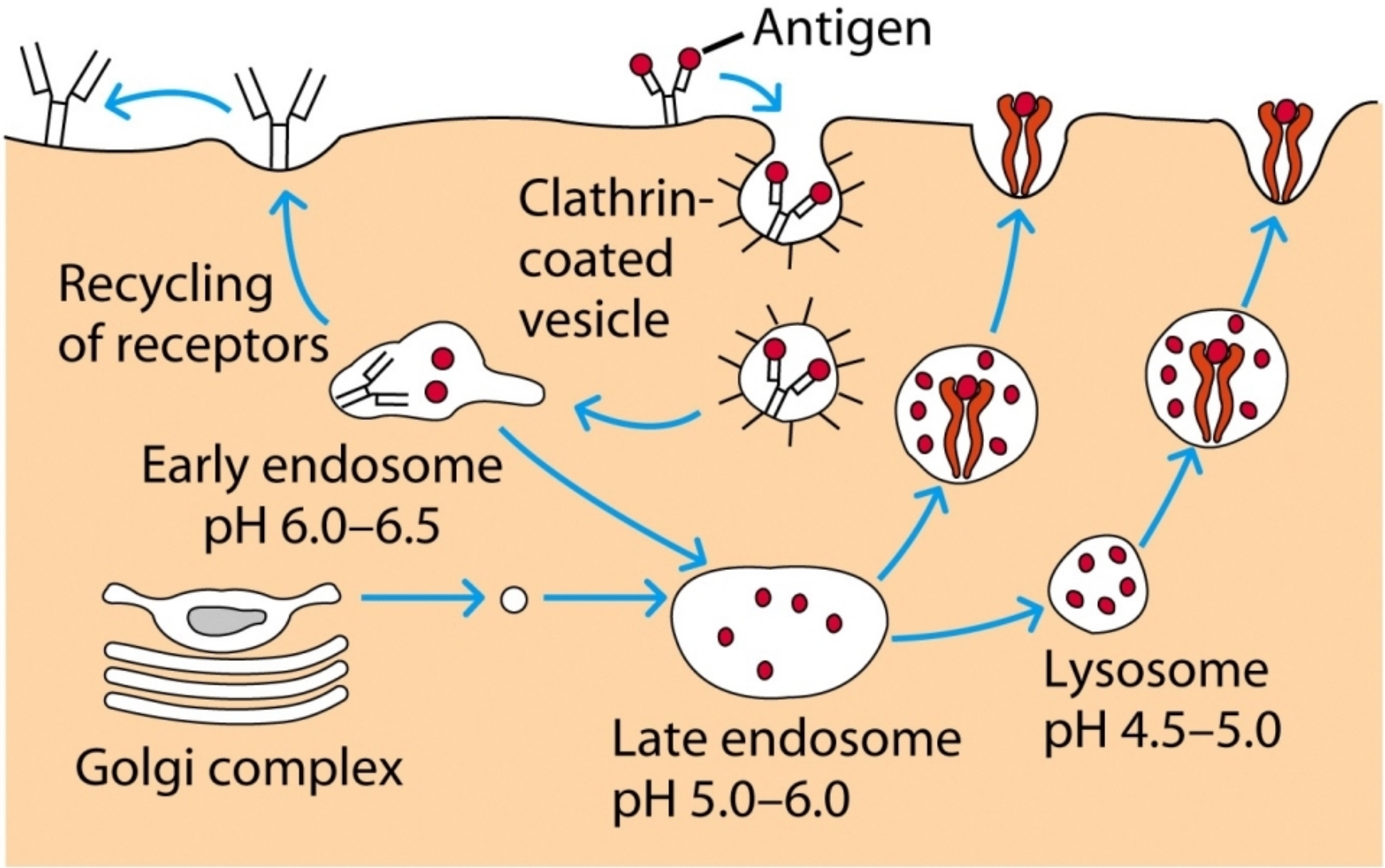
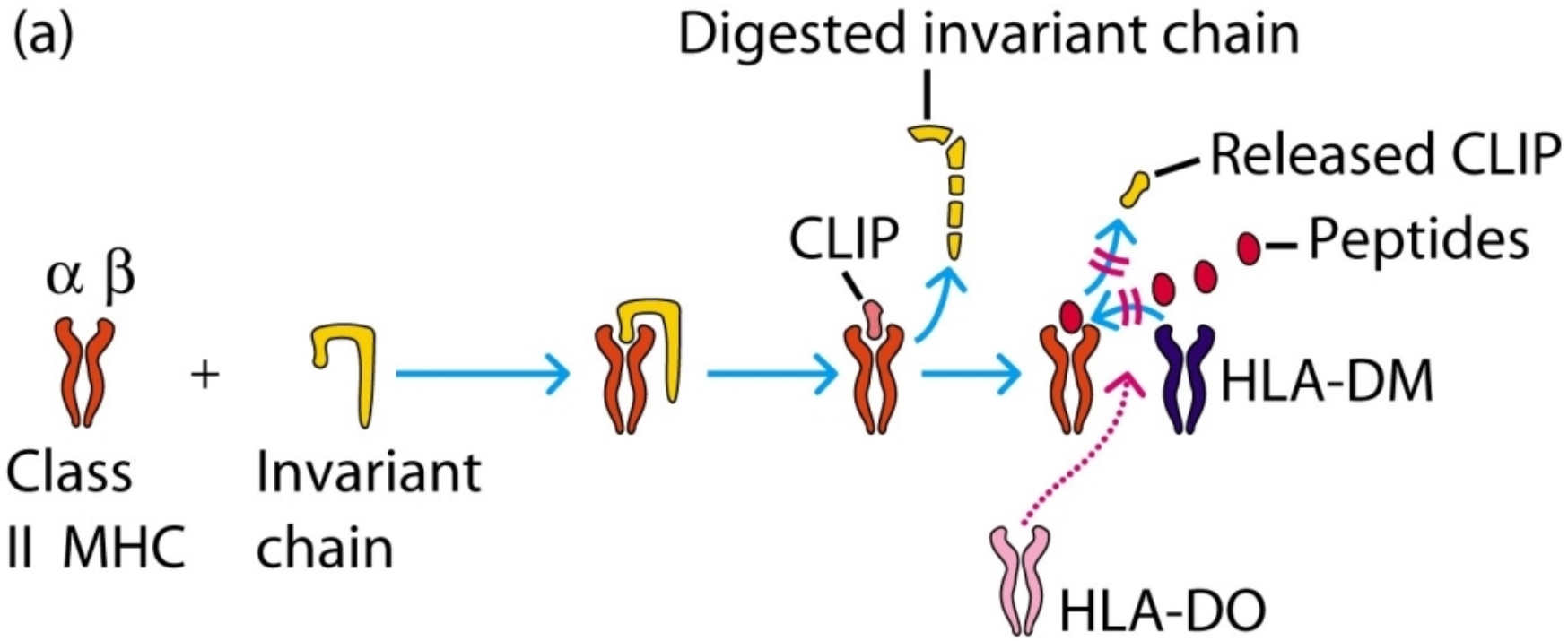
(b) **Class II MHC**



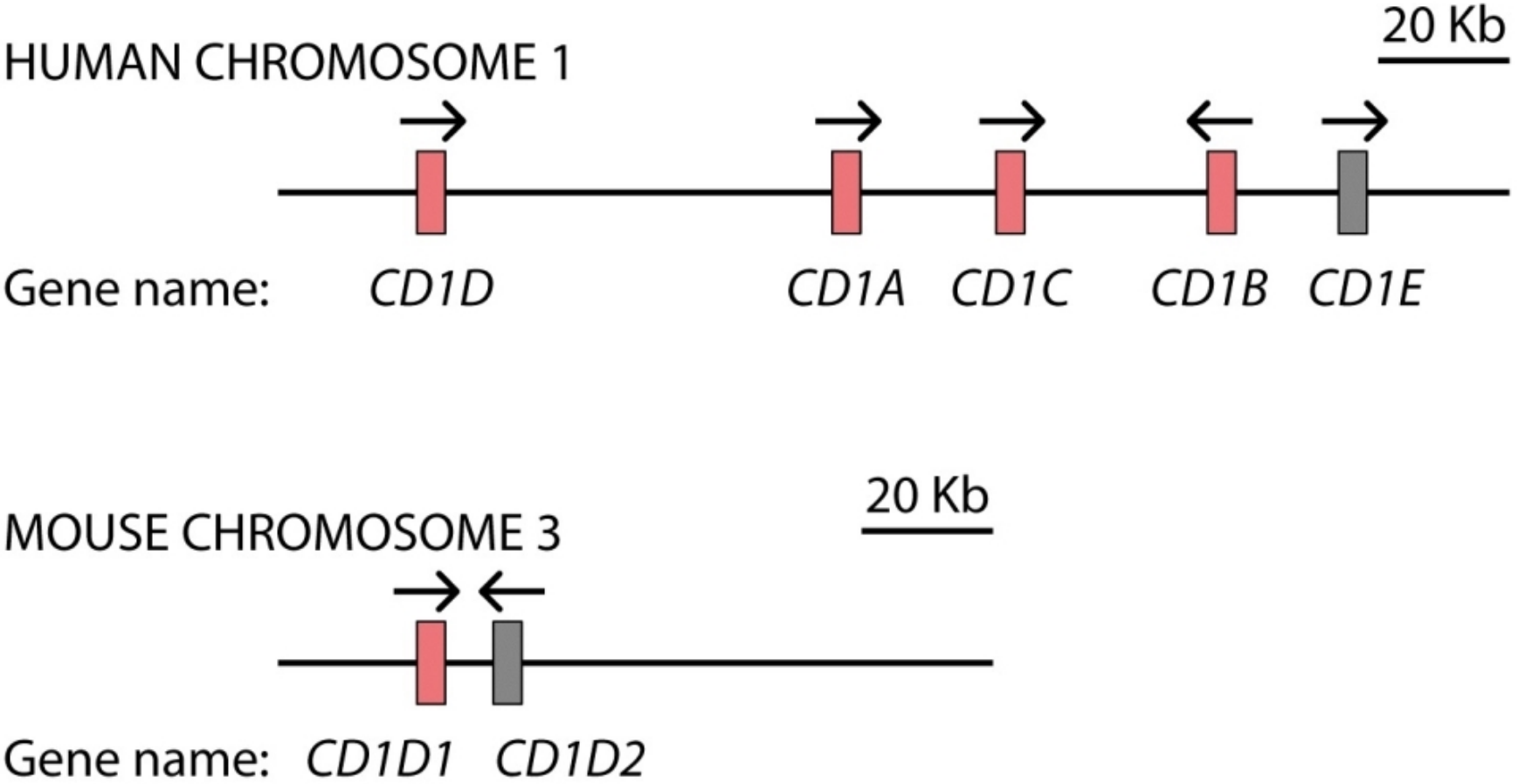

Antigen
Clathrin-coated vesicle
Recycling of receptors
Early endosome pH 6.0–6.5
Golgi complex
Late endosome pH 5.0–6.0
Lysosome pH 4.5–5.0


(a)
Digested invariant chain
Released CLIP
CLIP
Peptides
α β
+
HLA-DM
Class
II MHC
Invariant
chain
HLA-DO

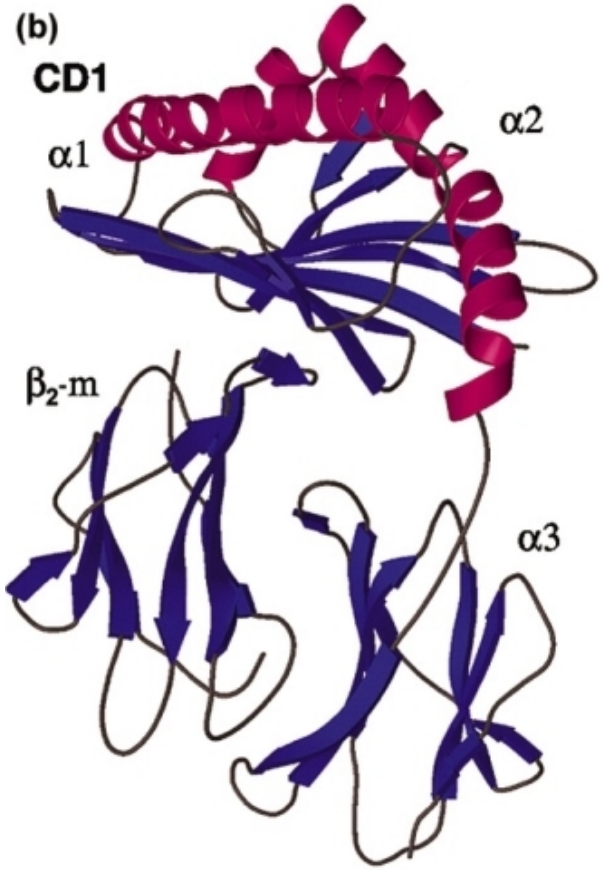
In addition to “classical” MHC-Class I molecules there are “non-classical” Class I molecules

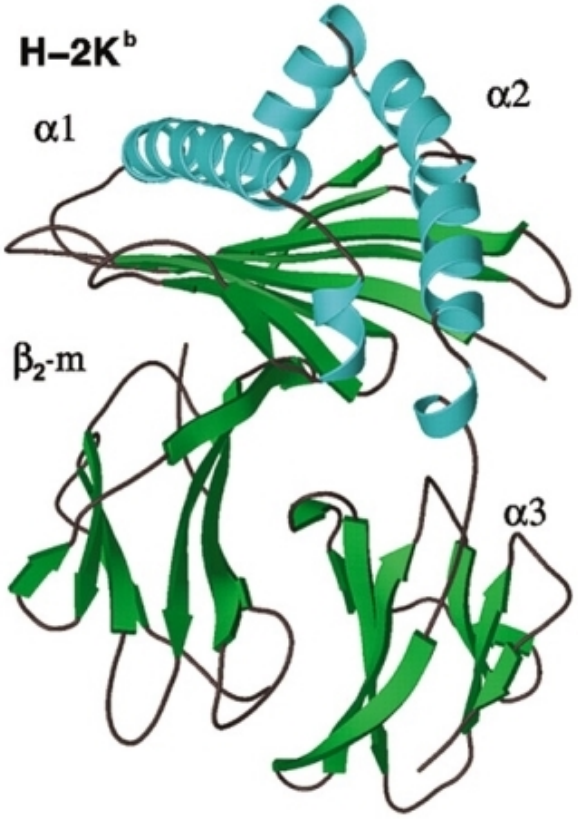
CD1

Not encoded in the MHC



Not as polymorphic as MHC-Class I





Not encoded in the MHC

Present glycolipids

Encoded on the MHC

Present peptides

Associated with β2-m

Recommended reading

- Hilligan KL and Ronchese F. Antigen presentation by dendritic cells and their instruction of CD4 T helper cell responses. Cell Mol Immunol 2020. 17:587-599.

- Hua Z and Hou B. The role of B cell antigen presentation in the initiation of CD4+ T cell responses. Immunol Rev 2020. 296:24-35.

- Kotsias F, Cebrian I, Alloatti A. Antigen processing and presentation 2019. 348:69-121.