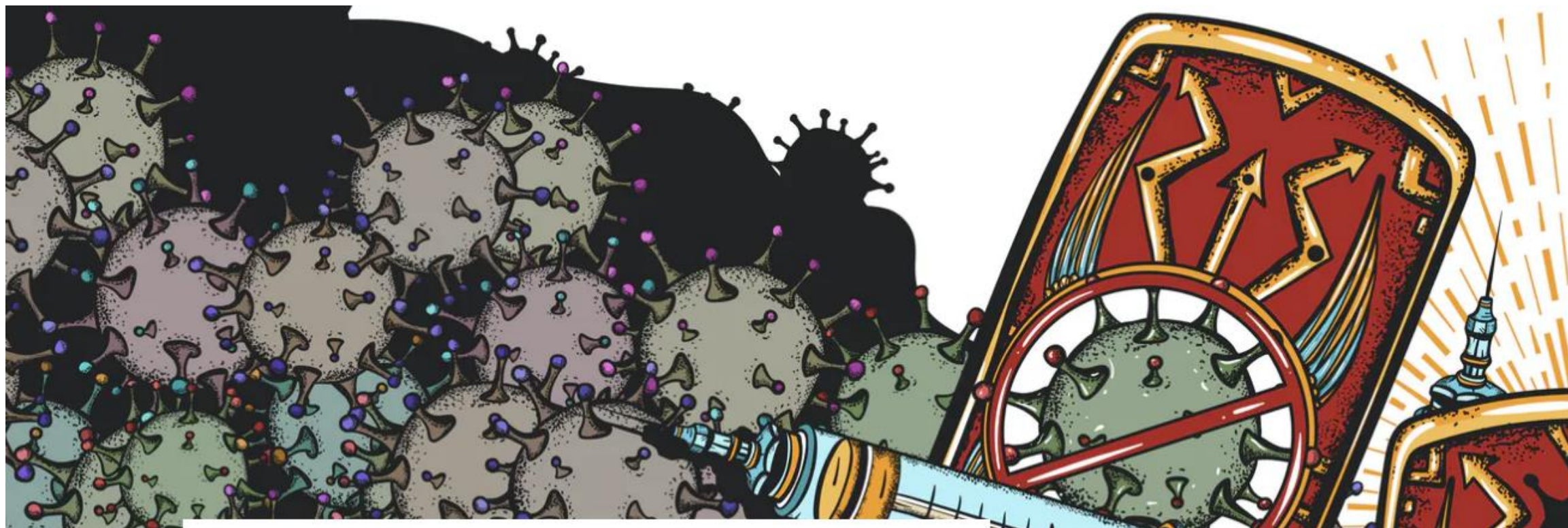


Inmunología aplicada a la vacunación



IdAB

Instituto de Agrobiotecnología
Agrobioteknologiako Institutua



CSIC

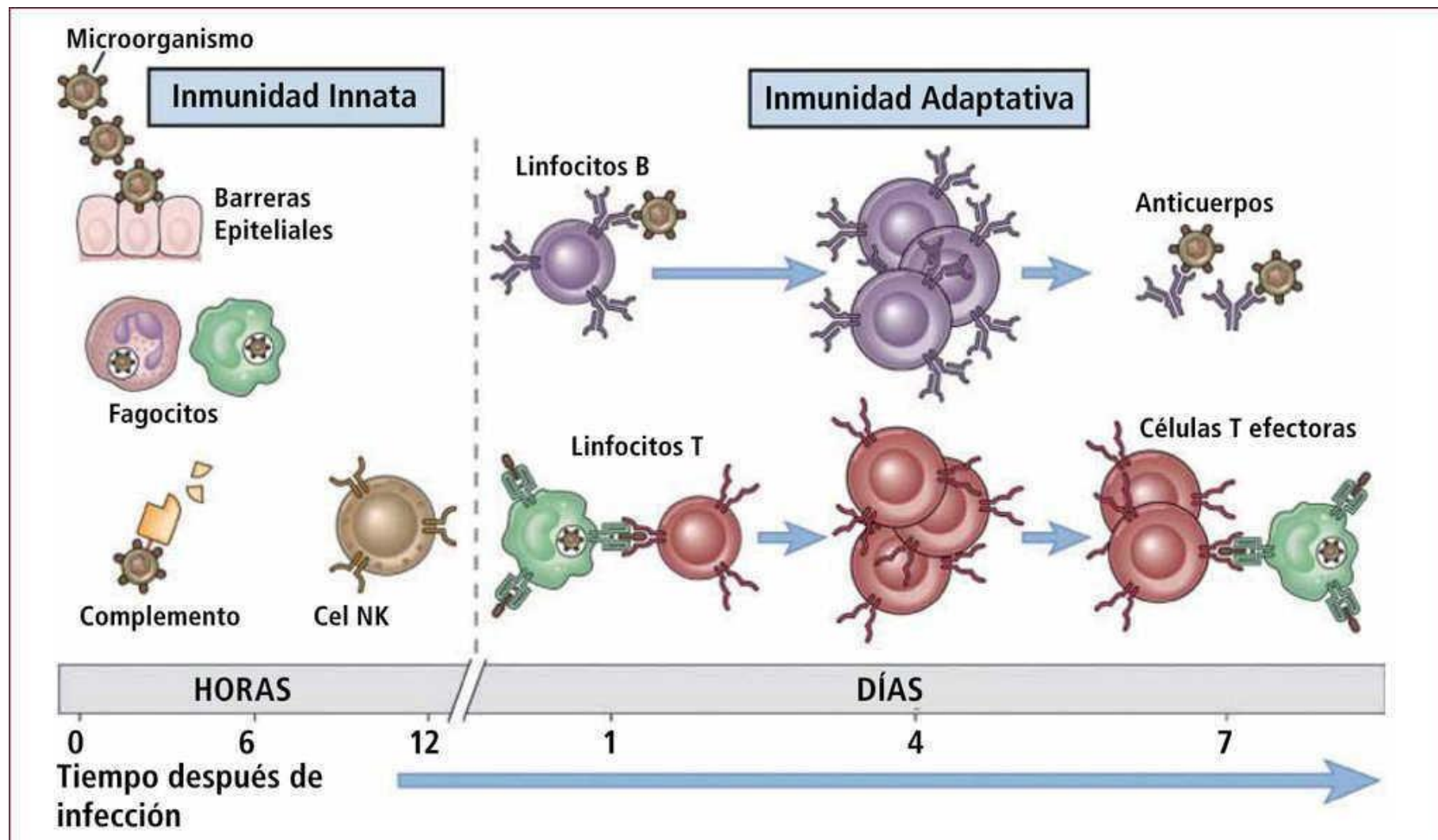
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

Nafarroako
Gobernua

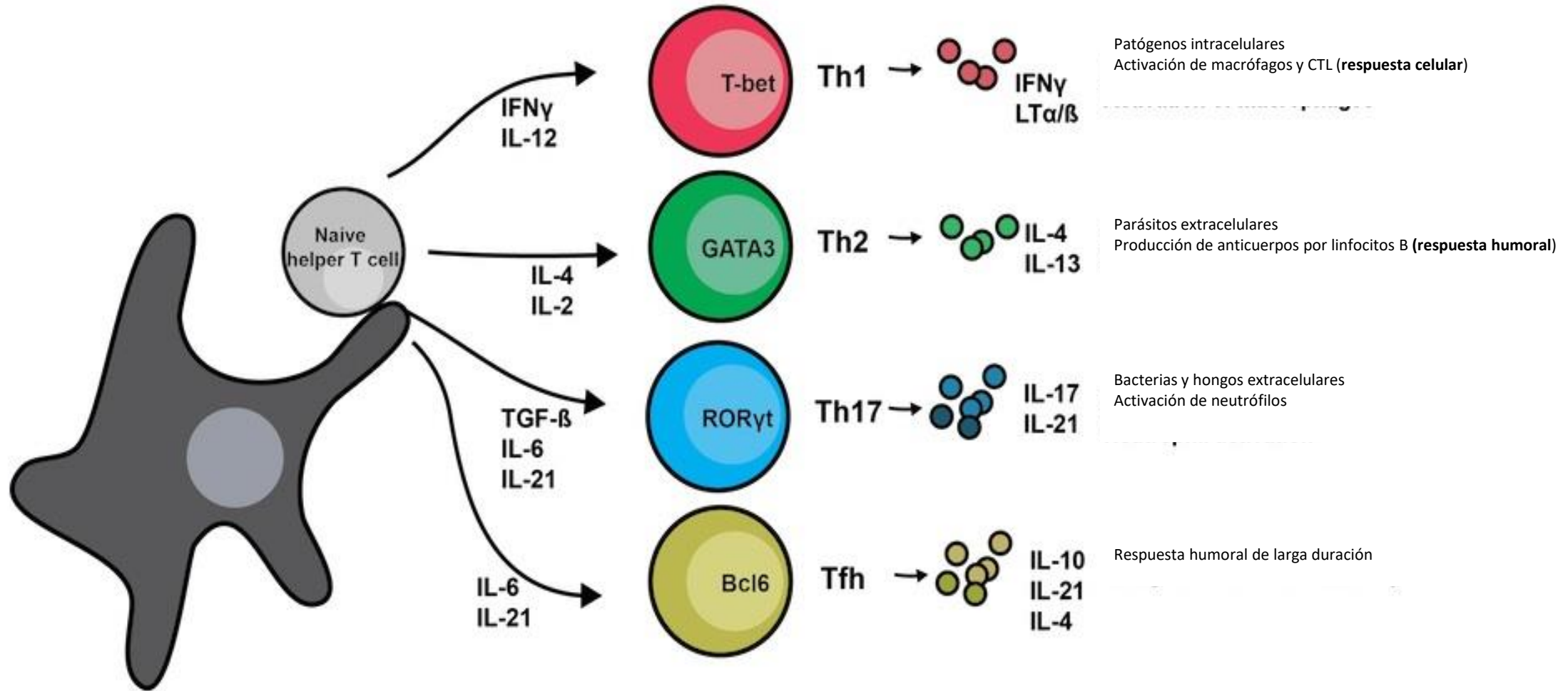


Gobierno
de Navarra

ramses.reina@csic.es

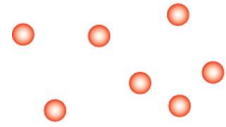


Transición entre inmunidad innata y adaptativa

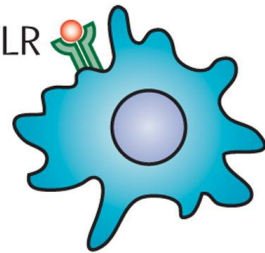


**Innate immunity
(non-specific)**

PAMP, synthetic
TLR agonists



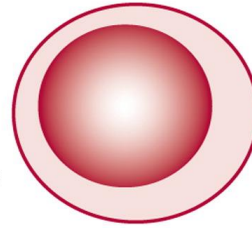
TLR



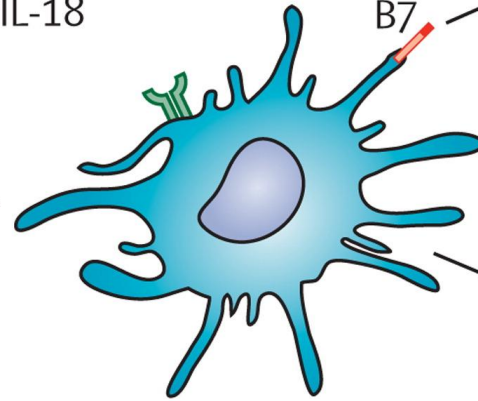
Immature dendritic
cell

Adaptive immunity

NK activation



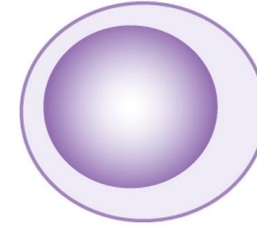
IL-12/IL-18



Mature dendritic cell

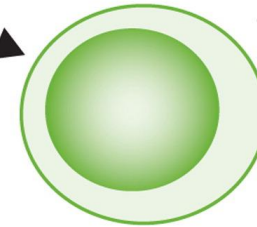
B7

CD8 T cell



CTL

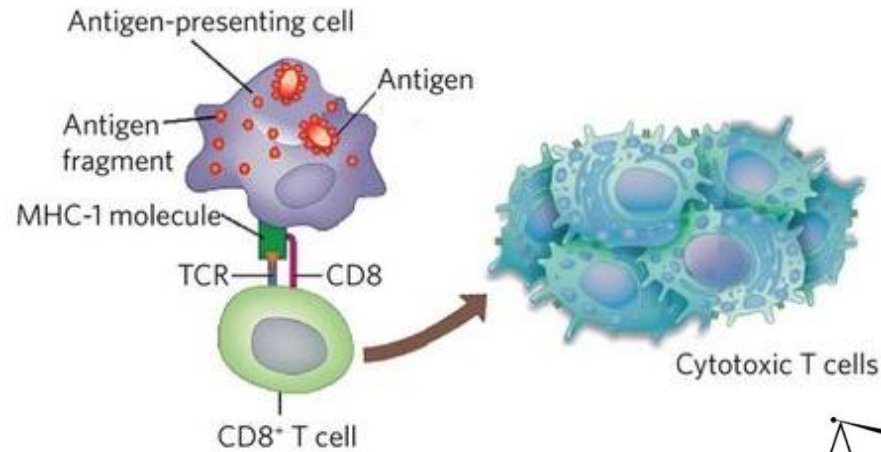
Th1



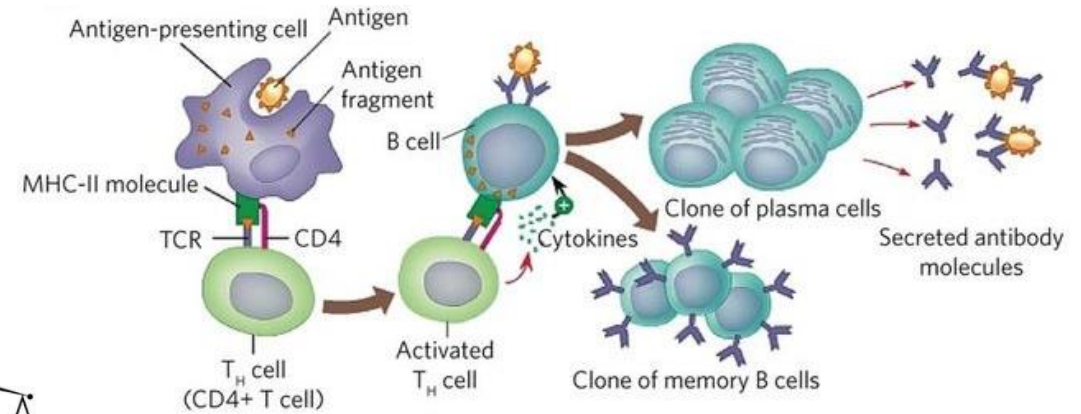
CD4 T cell

Interferon α ,
interferon β ,
cytokines,
chemokines

Presentación antigénica



- Antígeno endógeno (infección viral)
- MHC-I
- CD8-T (CTL)



- Antígeno exógeno (vacuna) o fagocitosis
- MHC-II
- CD4-T (Th1/Th2)

Cross-presentation



Autofagia



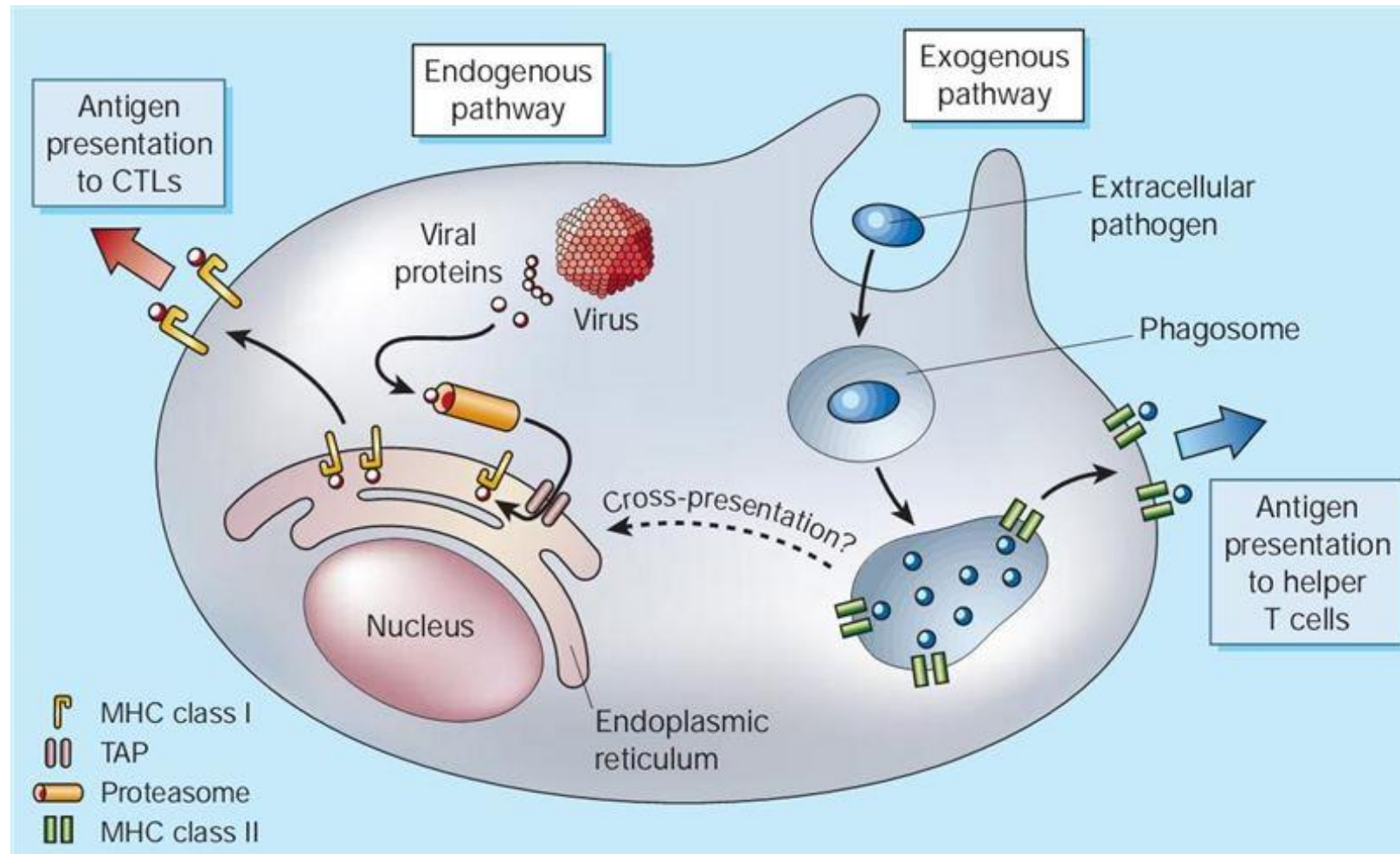
Tissue	MHC class I	MHC class II
Lymphoid tissues		
T cells	+++	+*
B cells	+++	+++
Macrophages	+++	++
Other antigen-presenting cells (eg Langerhans' cells)	+++	+++
Epithelial cells of the thymus	+	+++
Other nucleated cells		
Neutrophils	+++	-
Hepatocytes	+	-
Kidney	+	-
Brain	+	- †
Non-nucleated cells		
Red blood cells	-	-

Figure 3-19 Immunobiology, 6/e. (© Garland Science 2005)

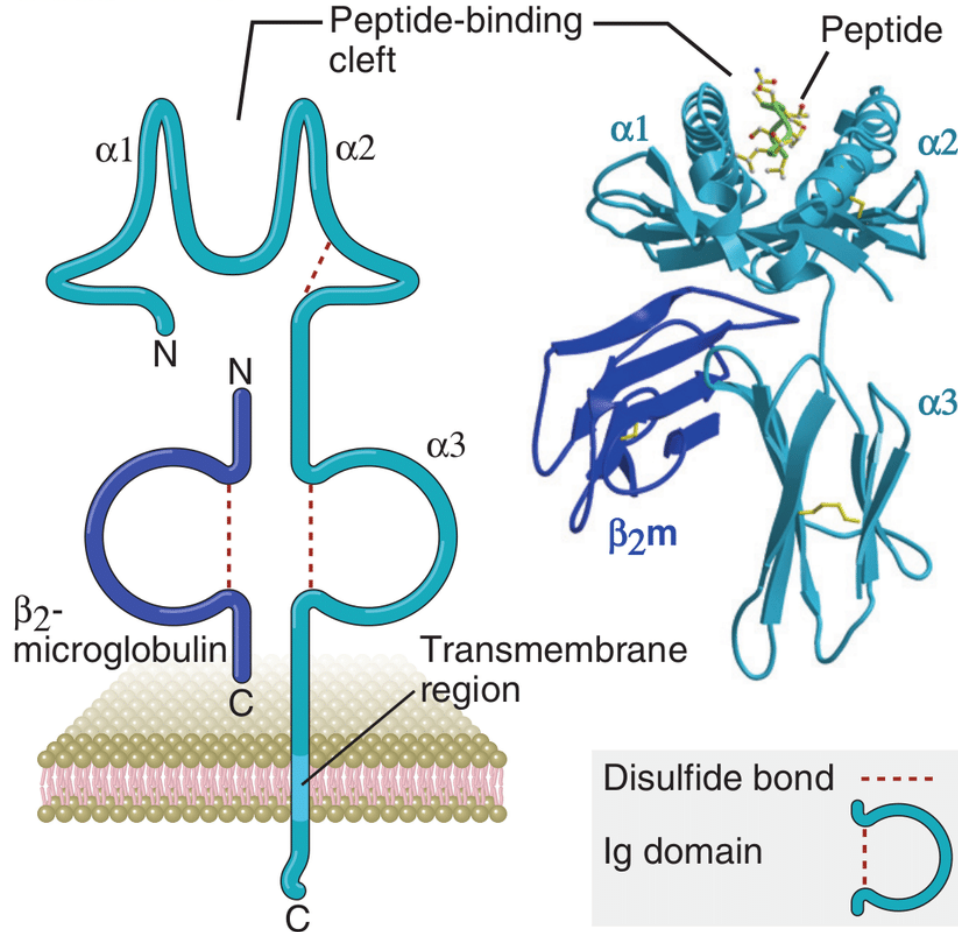
	Cell-mediated immunity		Humoral immunity
Typical pathogens	Vaccinia virus Influenza virus Rabies virus <i>Listeria</i>	<i>Mycobacterium tuberculosis</i> <i>Mycobacterium leprae</i> <i>Leishmania donovani</i> <i>Pneumocystis carinii</i>	<i>Clostridium tetani</i> <i>Staphylococcus aureus</i> <i>Streptococcus pneumoniae</i> Polio virus <i>Pneumocystis carinii</i> <i>Trichinella spiralis</i>
Location	Cytosol	Macrophage vesicles	Extracellular fluid
Effector T cell	Cytotoxic CD8 T cell	T _H 1 cell	T _H 1 and T _H 2 cells
Antigen recognition	Peptide:MHC class I complex on infected cell	Peptide:MHC class II complex on infected macrophage	Peptide:MHC class II complex on antigen-specific B cell
Effector action	Killing of infected cell	Activation of infected macrophages	Activation of specific B cell to make antibody

Figure 8-1 Immunobiology, 6/e. (© Garland Science 2005)



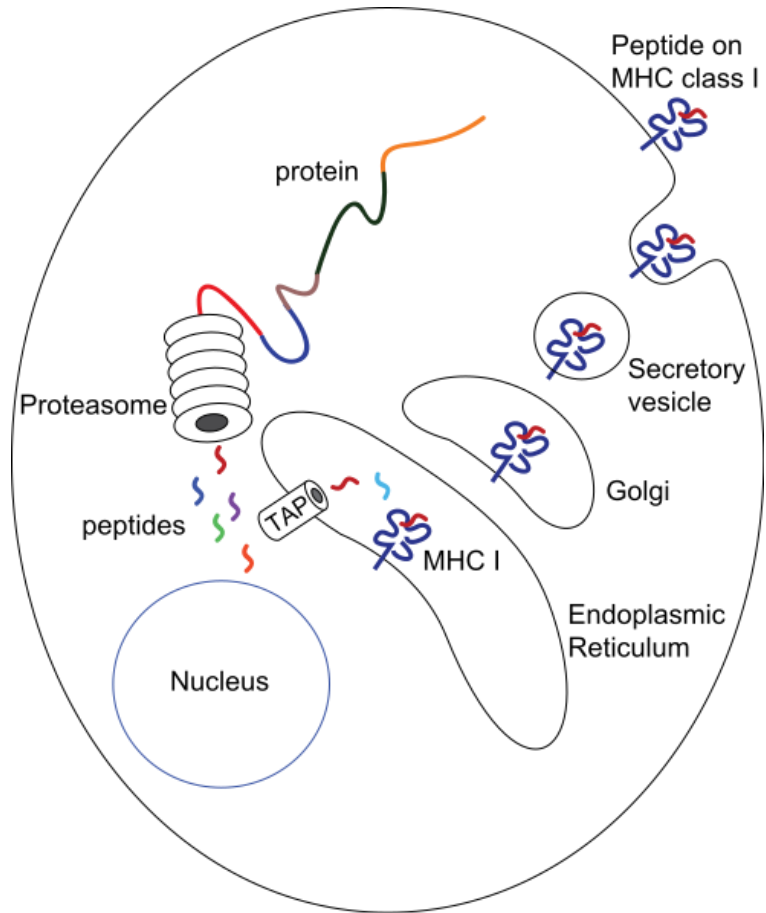


Class I MHC



- Altamente polimórfico
- RER de todas las células
- Rechazo a trasplantes
- Inhibe NK
- Interacción con TCR
- Al menos 8-10 aminoácidos
- Ag intracelulares extraños
- Ag propios alterados

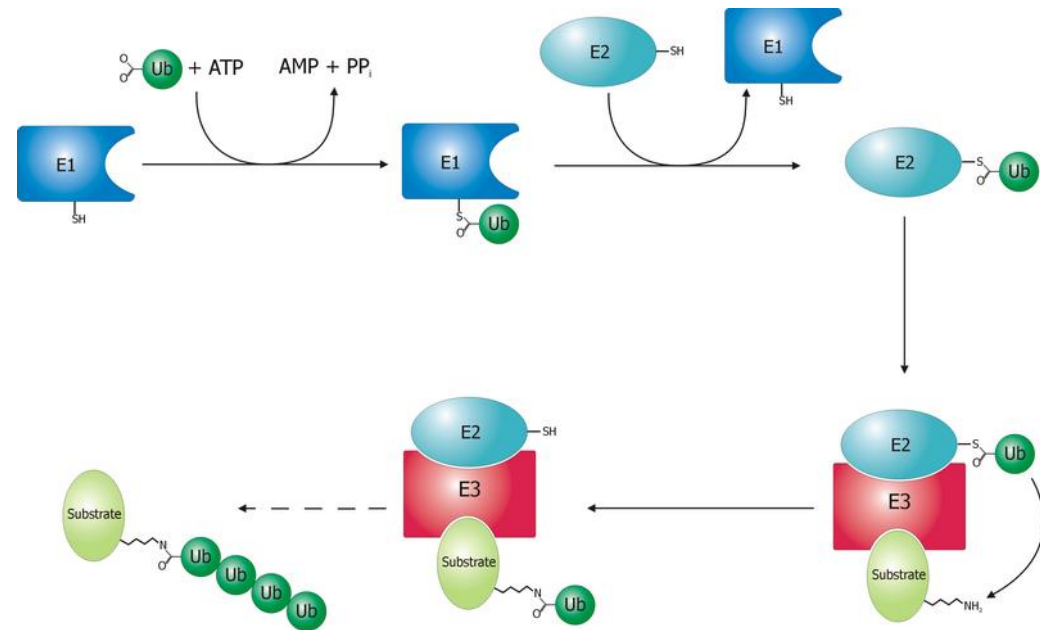
Presentación de antígenos endógenos

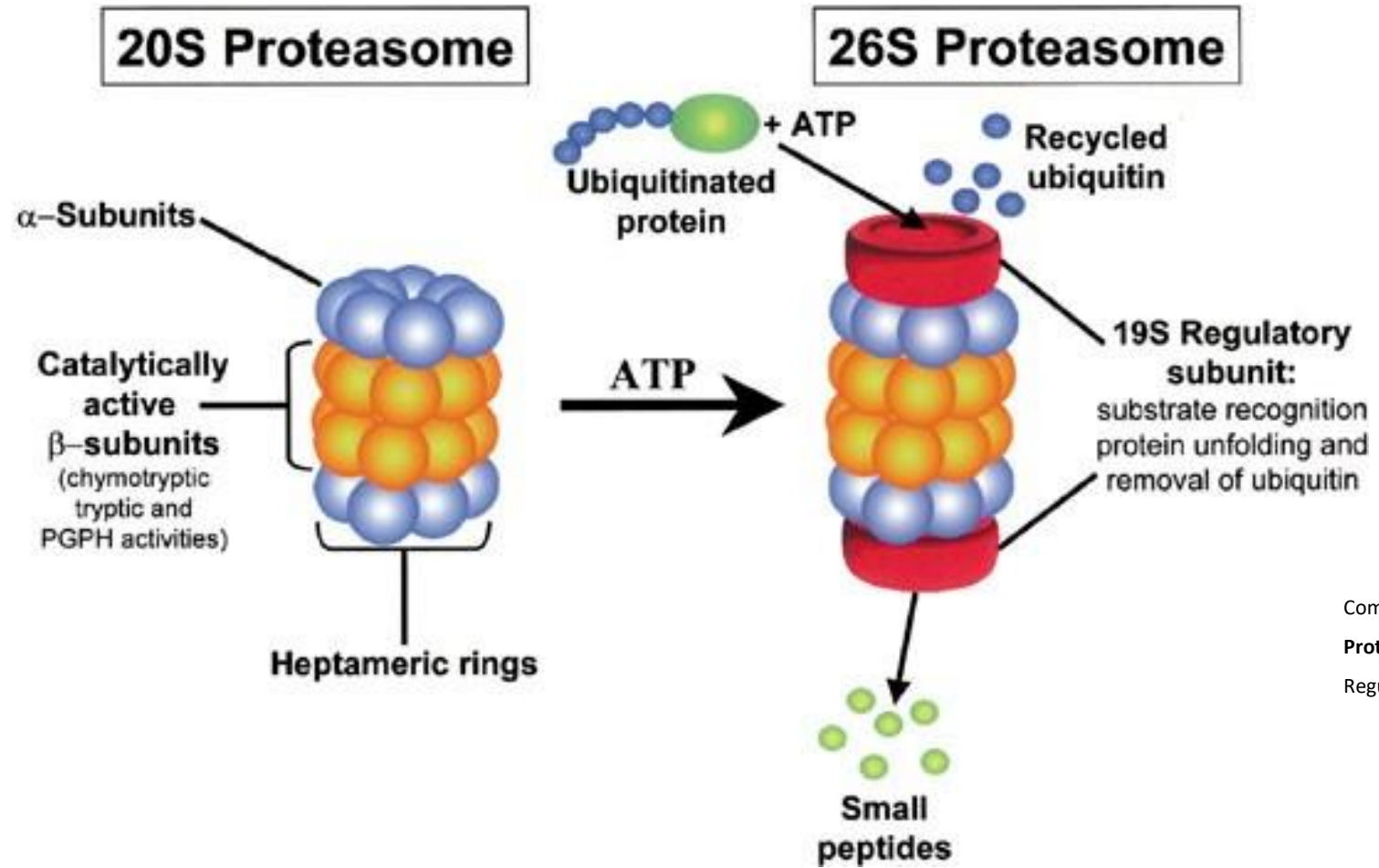


MHC-I presenta proteínas citosólicas a los CTLs

Su ausencia activa NK

Proteasoma: complejo proteico (UPS) que degrada proteínas **no necesarias, dañadas** o **extrañas** tras el etiquetado con *ubiquitina*

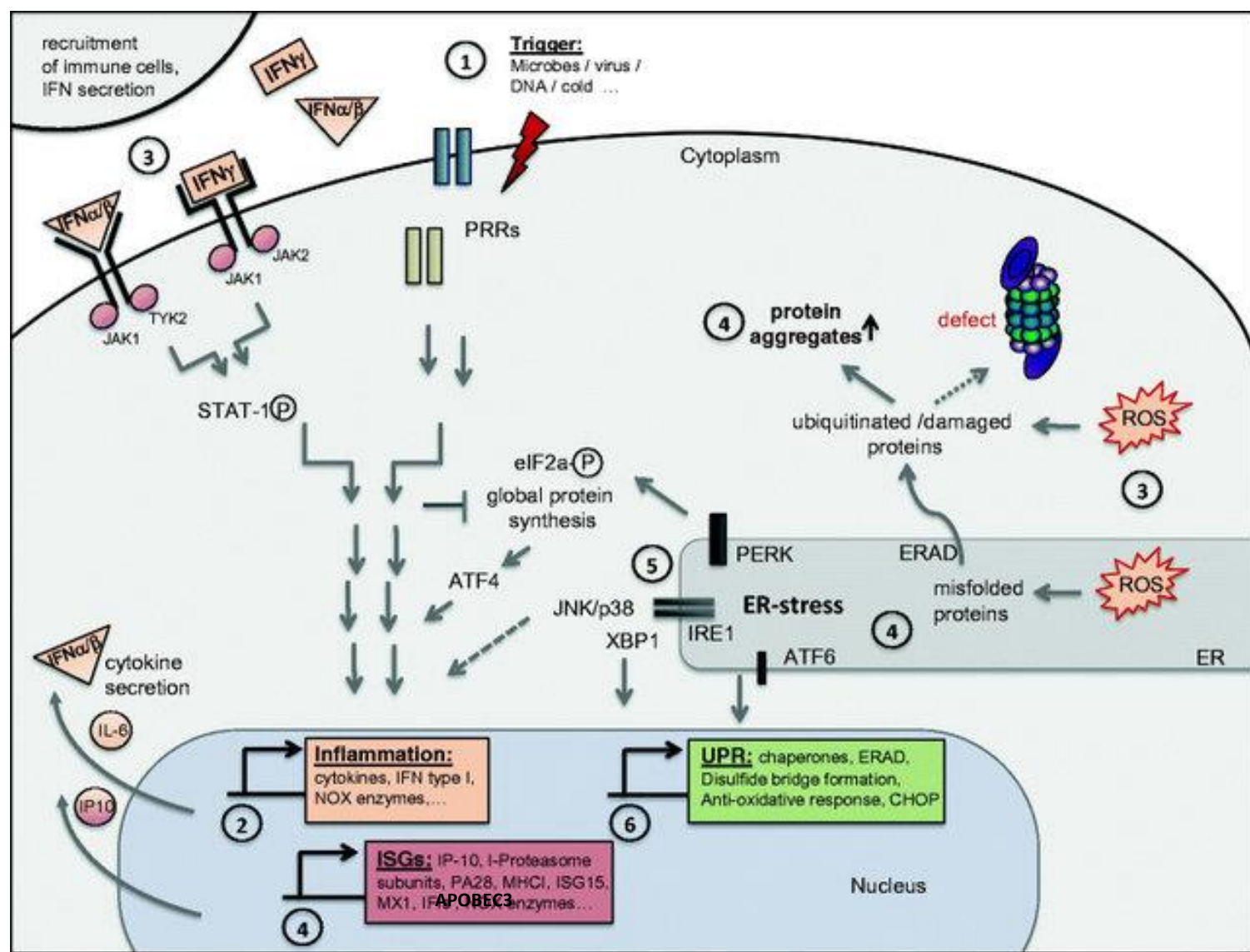


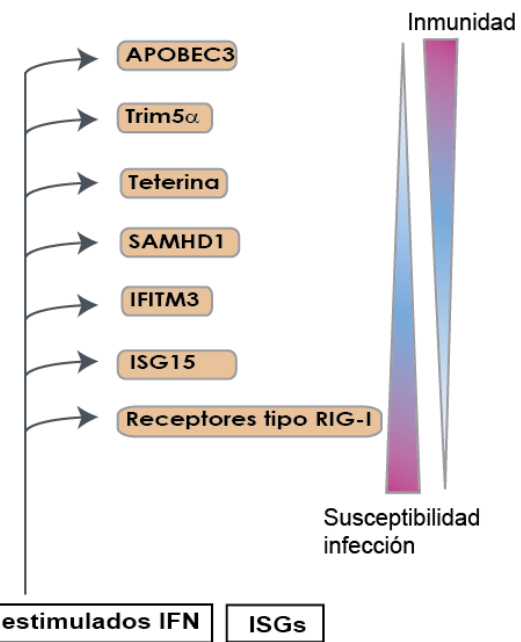
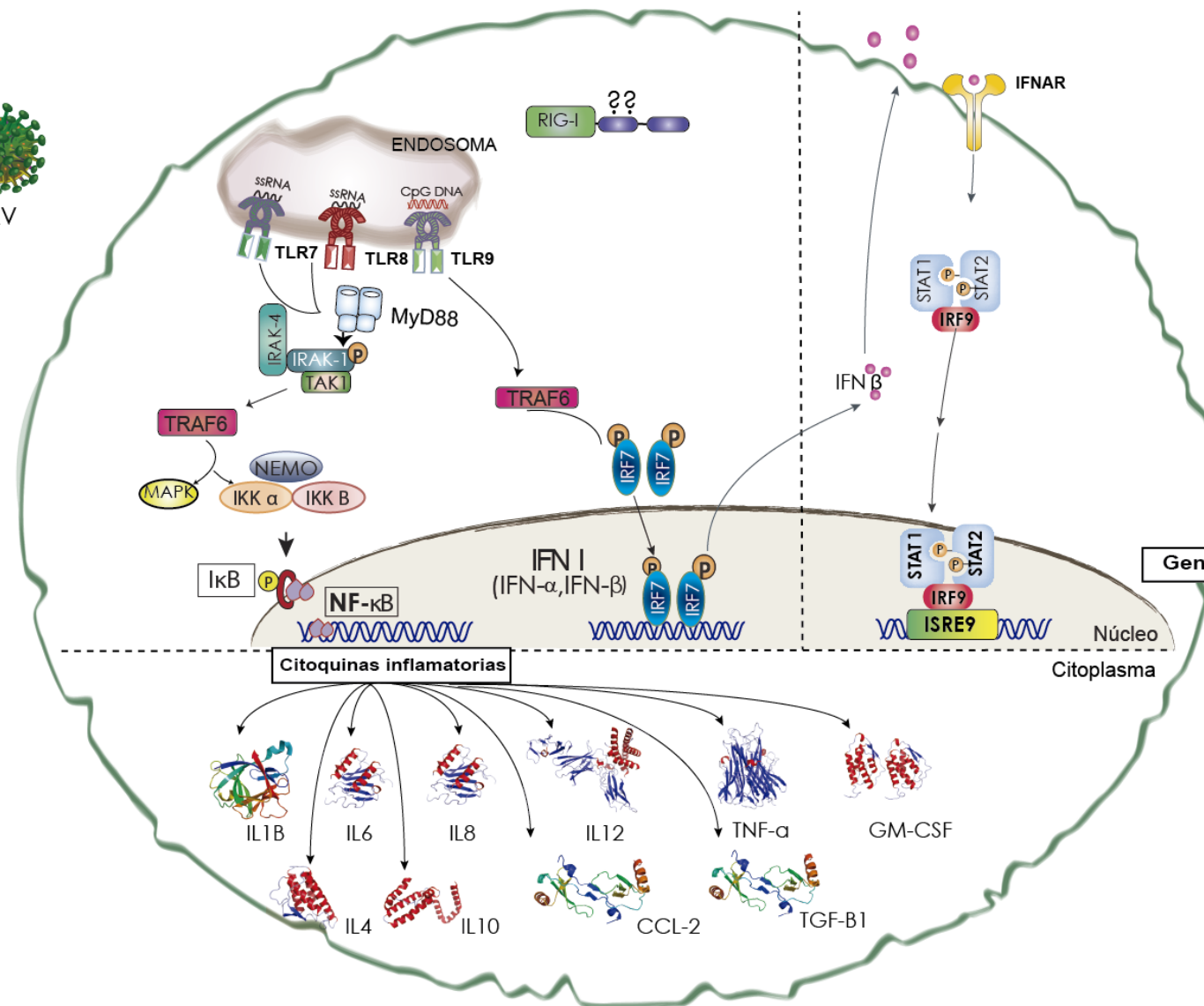


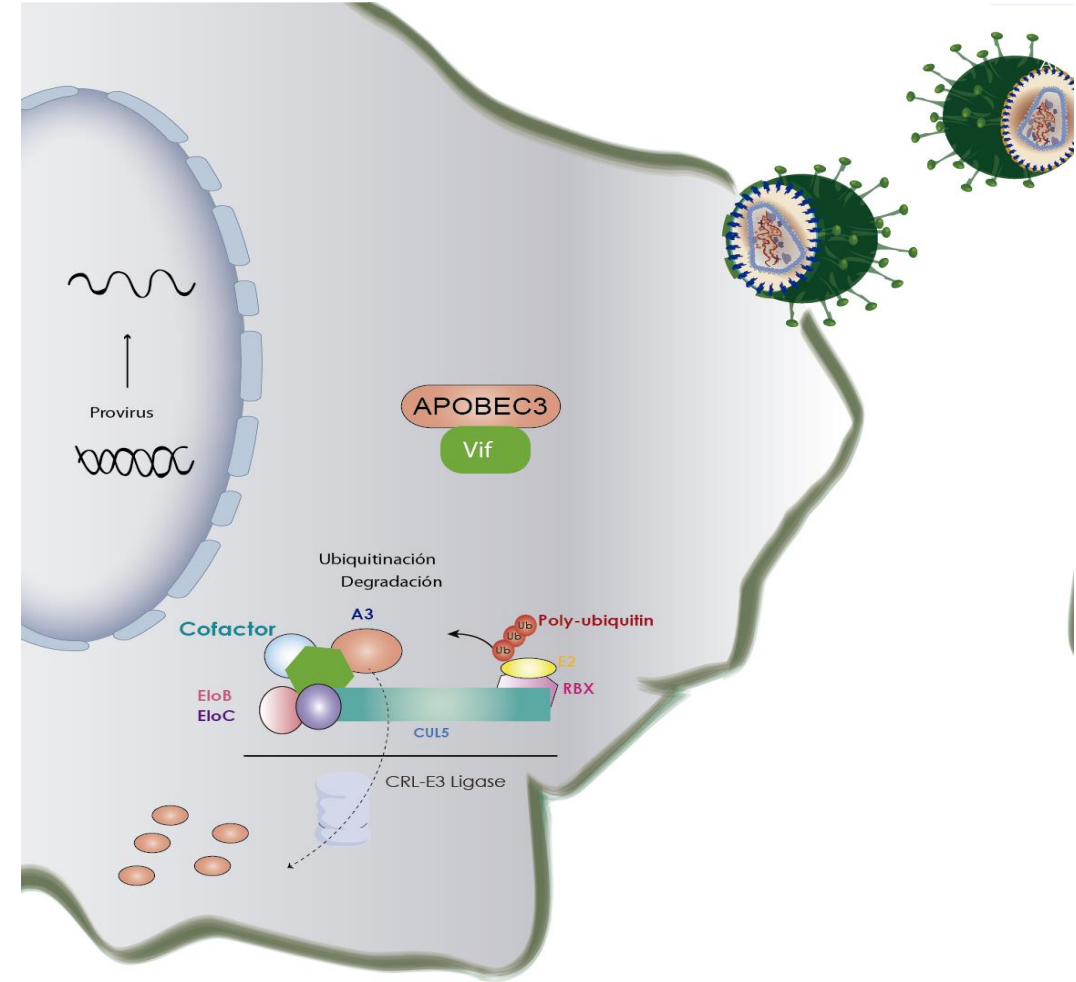
Complejo proteico

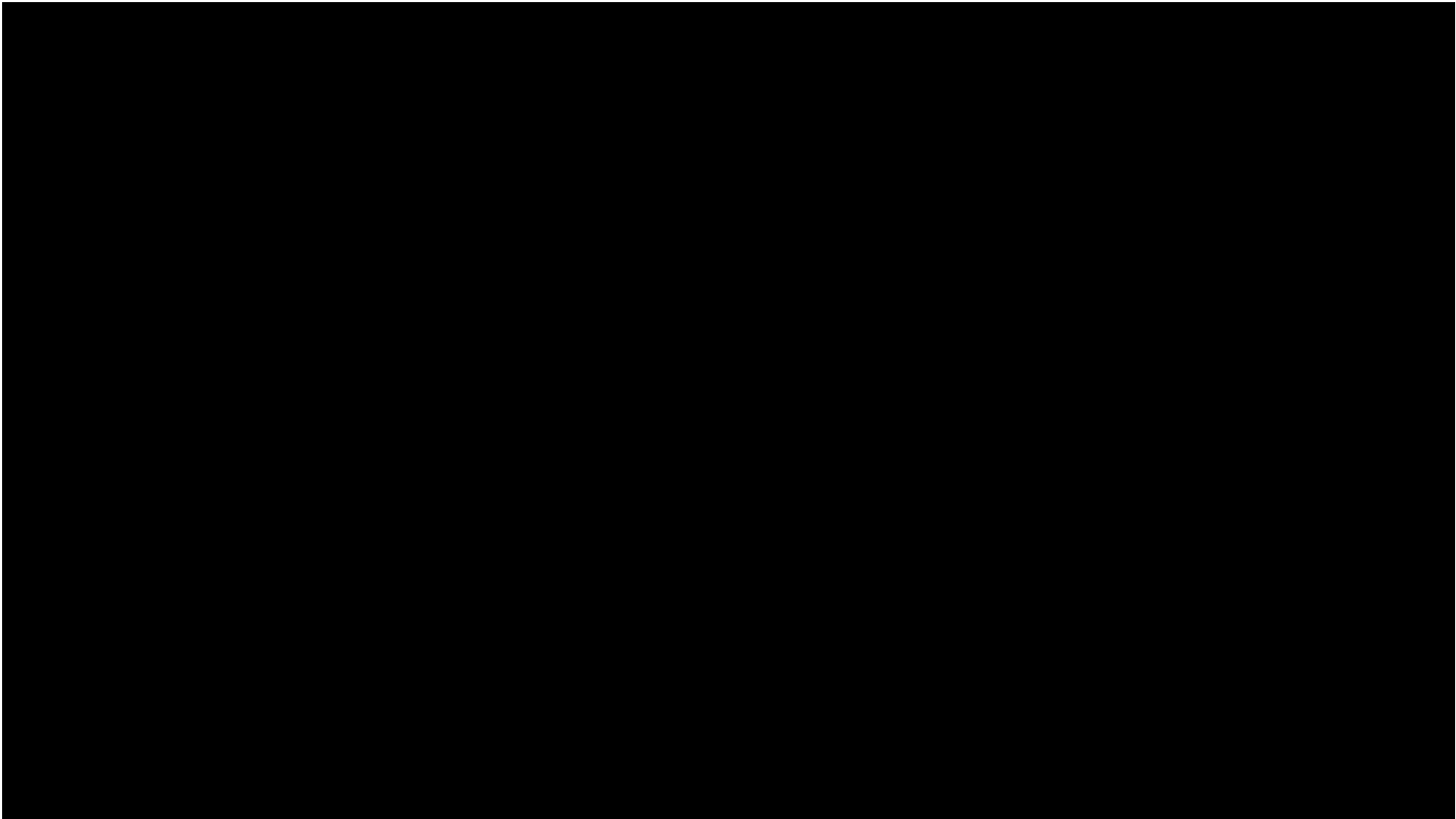
Proteolisis que rompe enlaces peptídicos (proteasas)

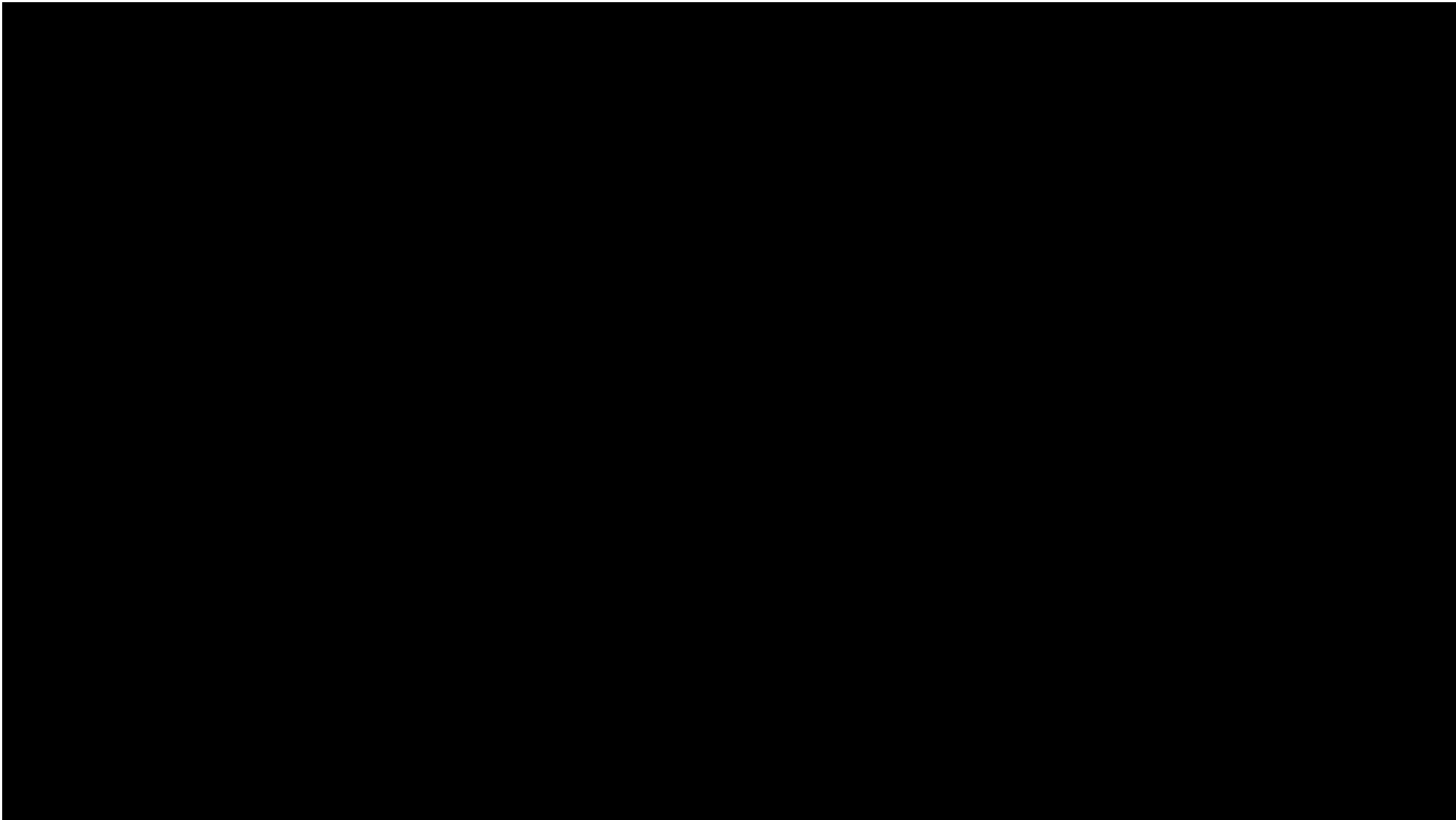
Regulan y reciclan



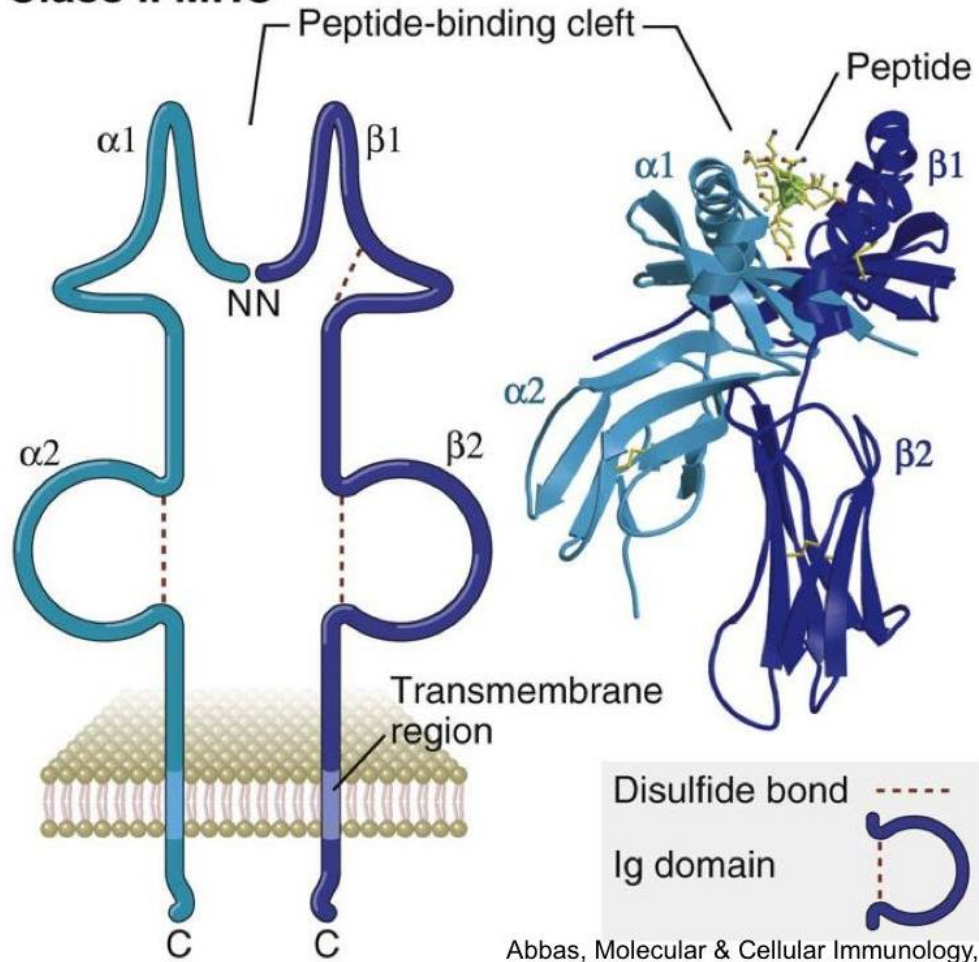








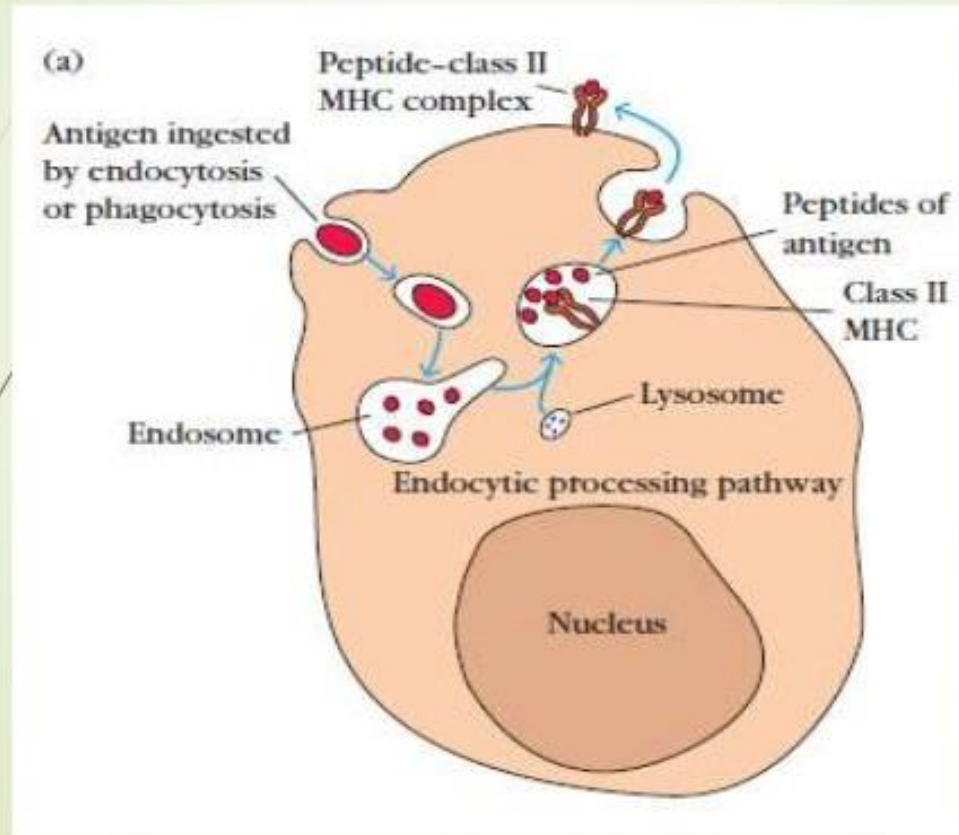
Class II MHC

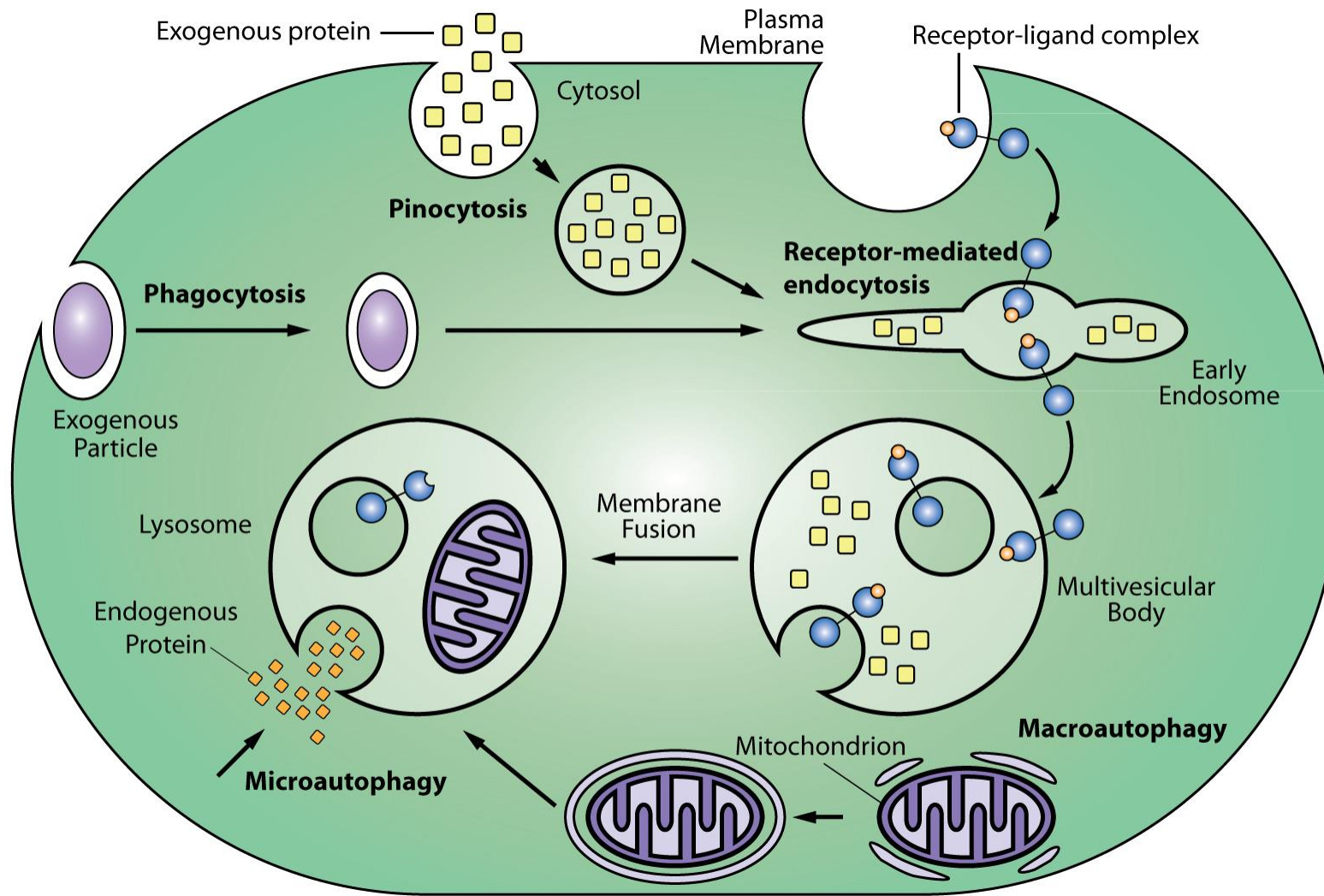


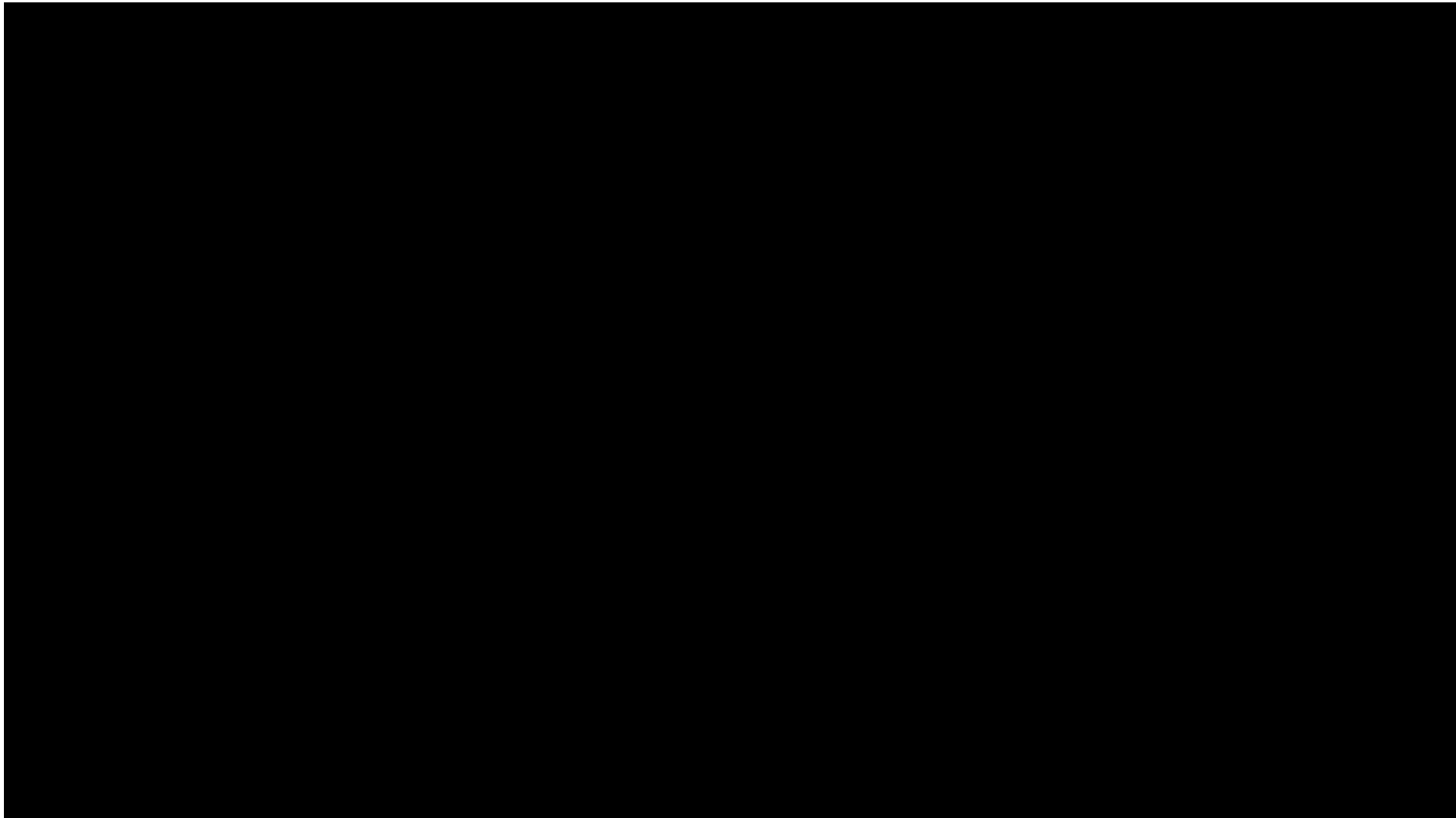
Abbas, Molecular & Cellular Immunology, 7th Ed, 2012

- Sólo APCs
- Vesículas especializadas
- Interacción con TCR (CD4)
- Al menos 14-18 aminoácidos
- Ag extracelulares extraños
- Autofagia

Processing of Exogenous Antigen

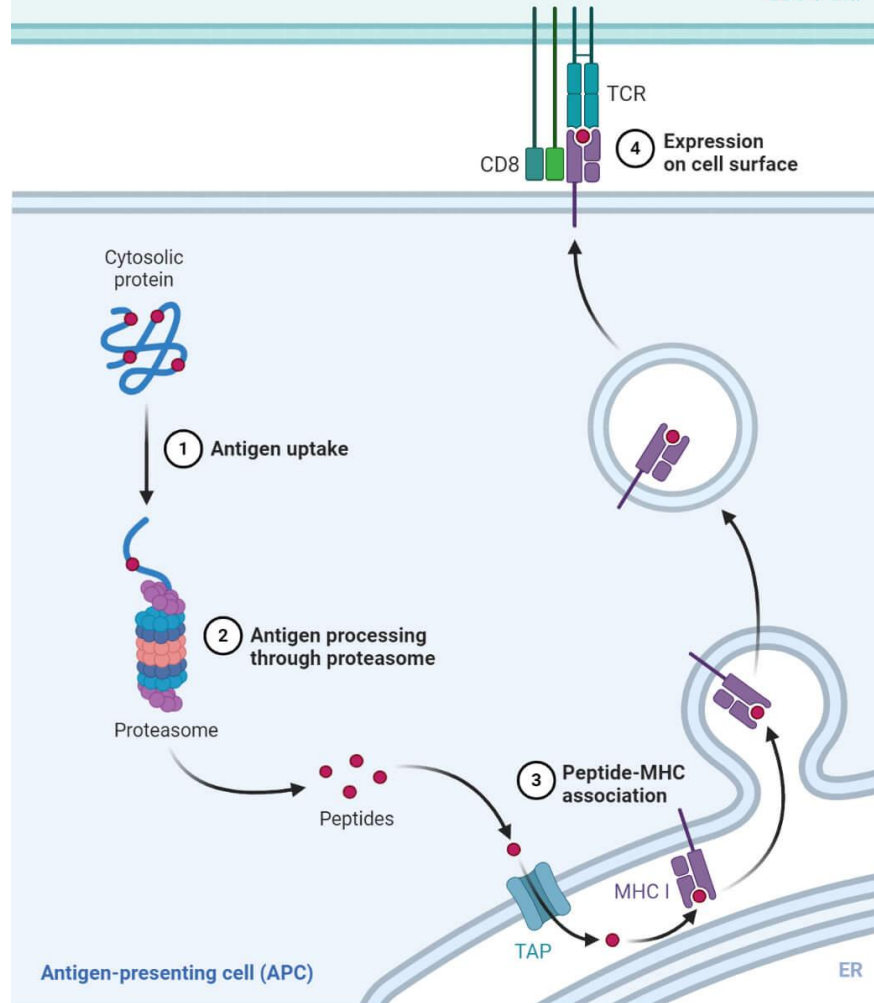






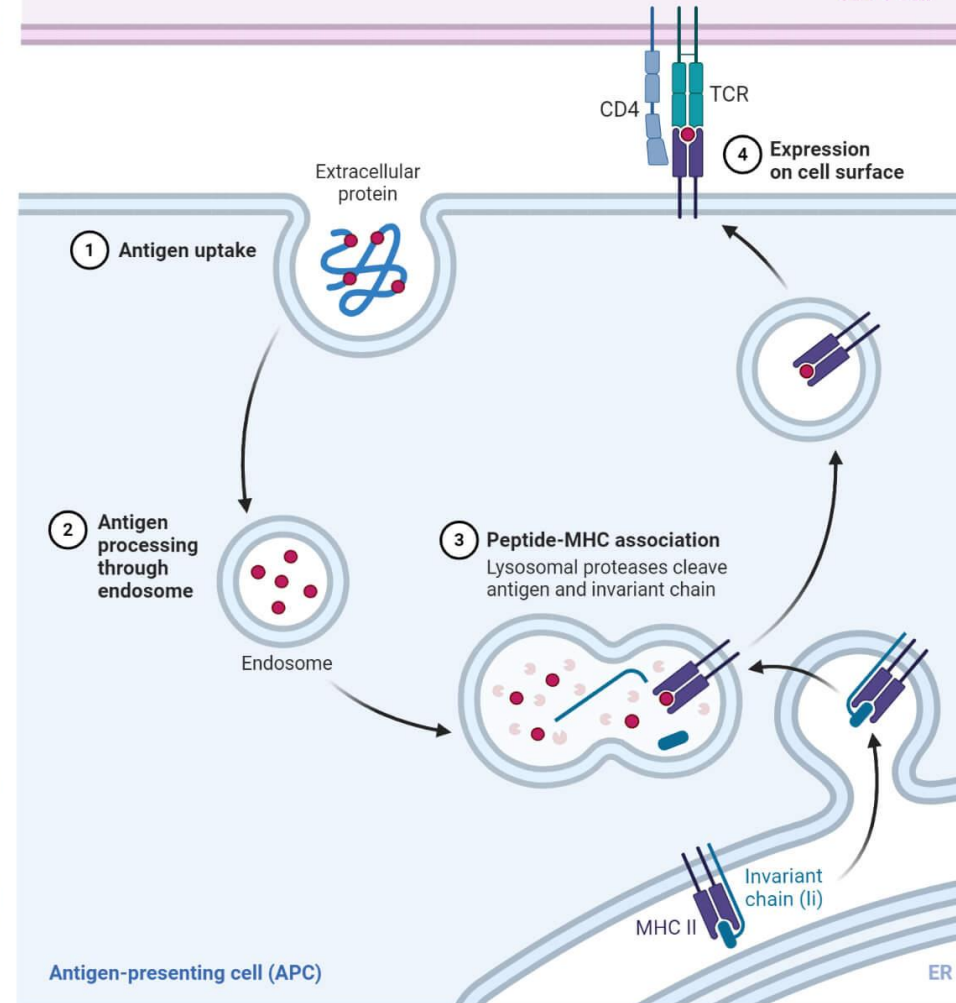
MHC Class I Pathway

CD8 T cell

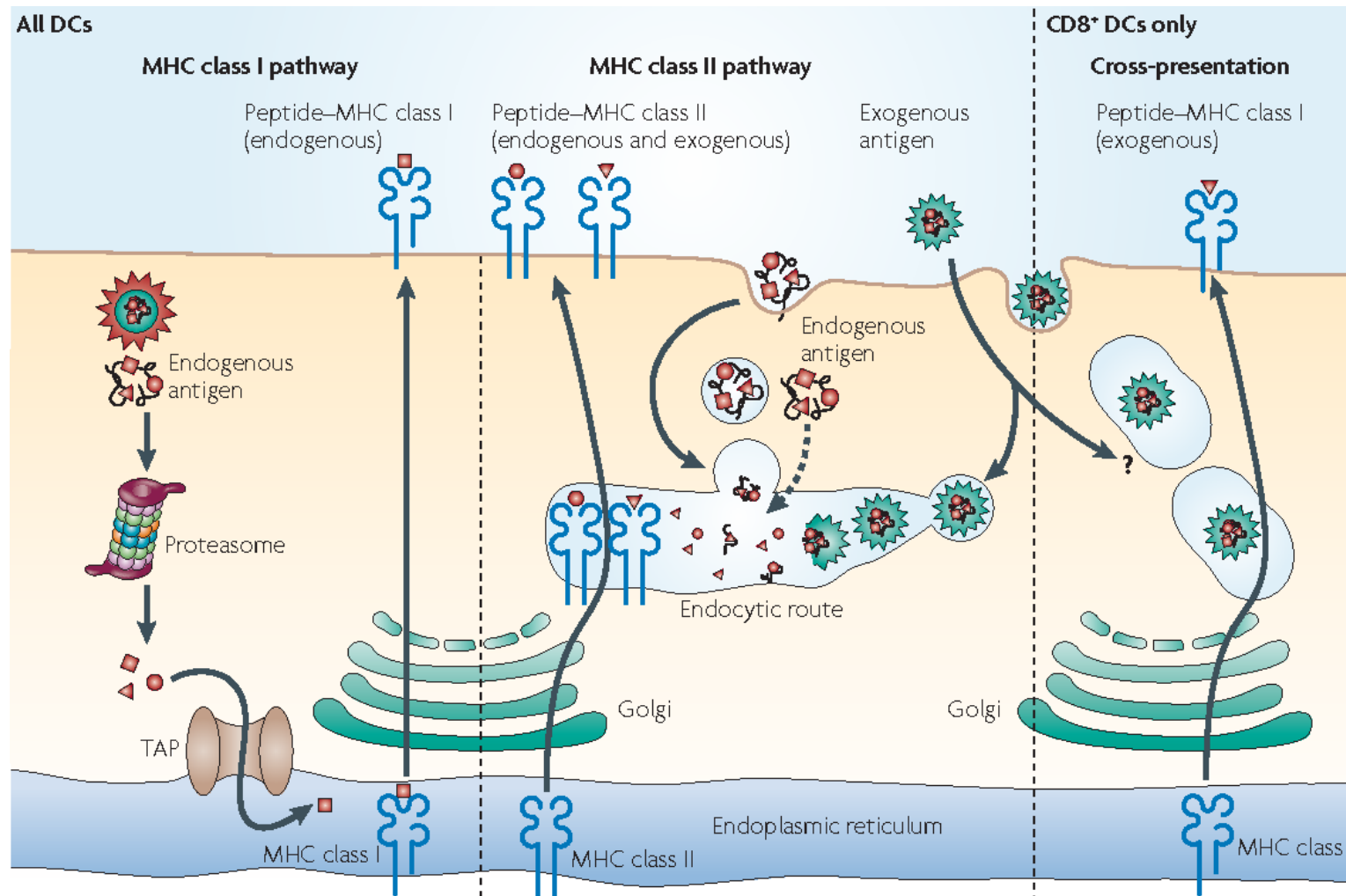


MHC Class II Pathway

CD4 T cell

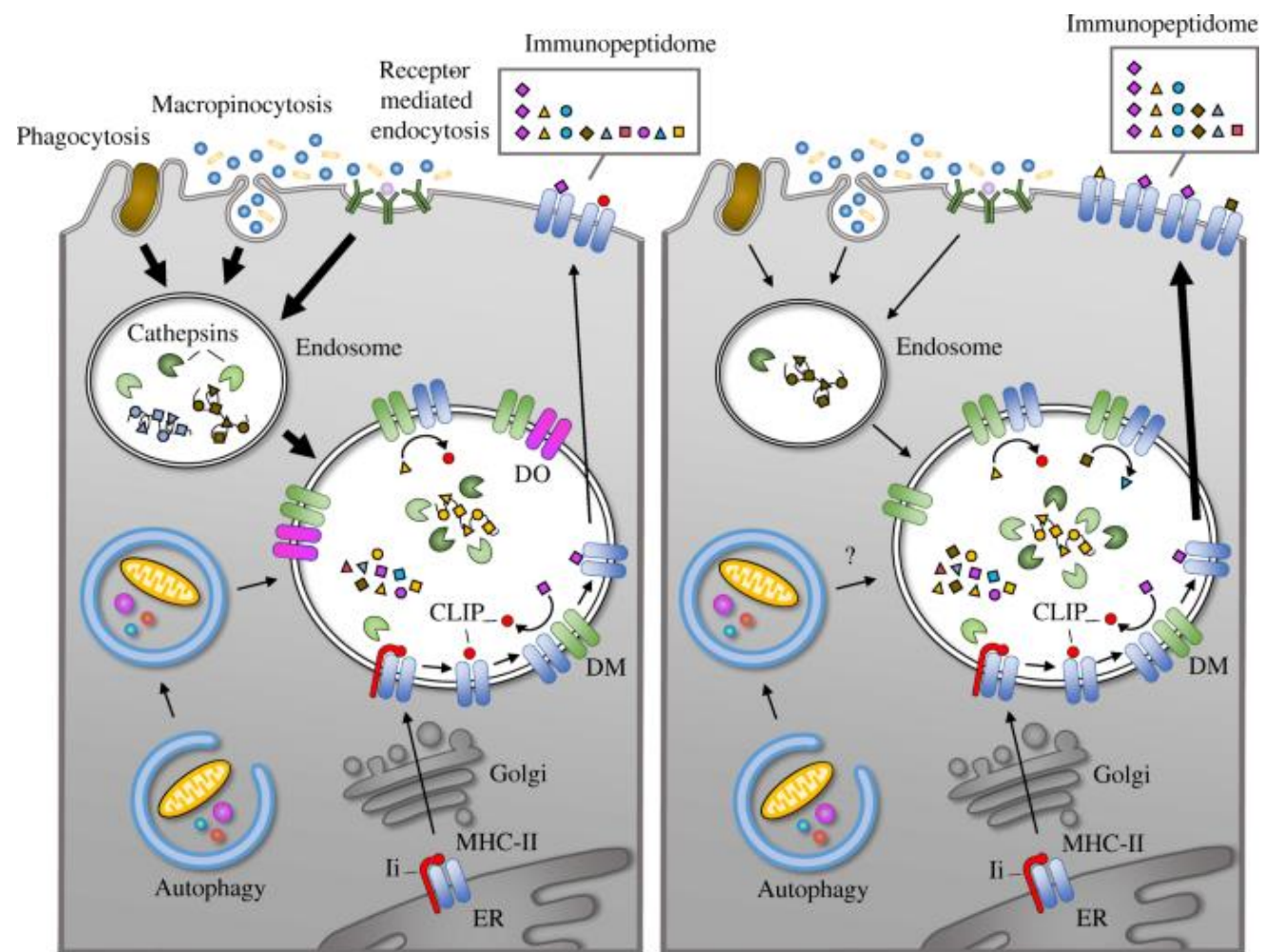


	<u>Vacunas vivas</u>	<u>Vacunas proteicas</u>	<u>Vacunas ADN</u>
Antígeno	Endógeno	Exógeno	Endógeno
Presentación	MHC-I	MHC-II	MHC-I
Respuesta	Th1	Th2	Th2



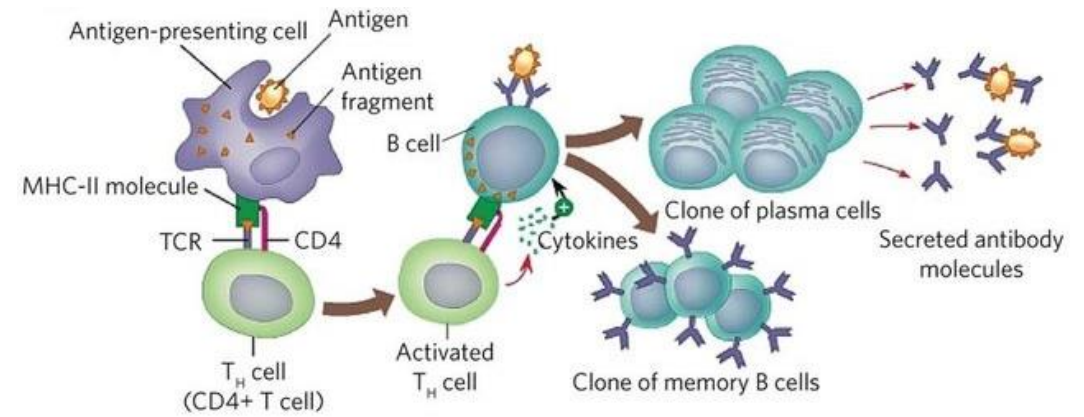
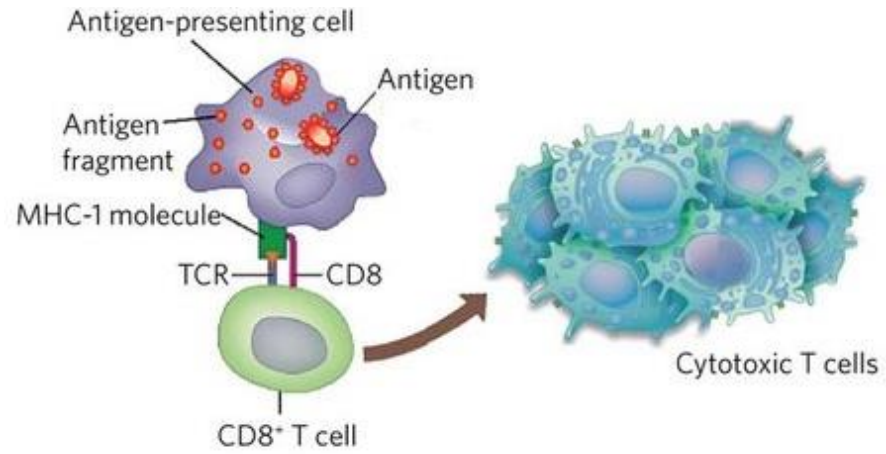
- Inmunidad frente a tumores
- Infecciones virales de DCs
- Generación de Th1 tras vacunación con proteína

Figure 2 | **The antigen-presentation pathways in dendritic cells.** All dendritic cells (DCs) have functional MHC class I

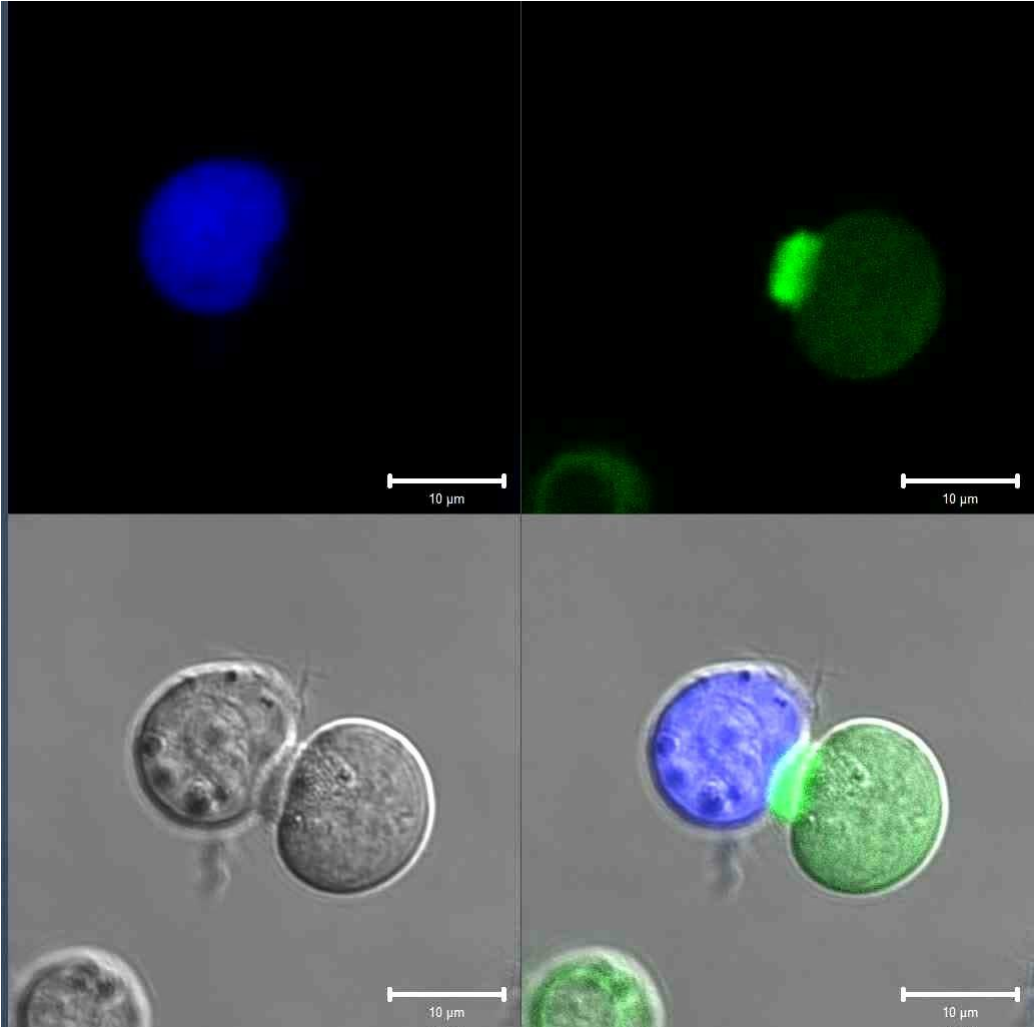
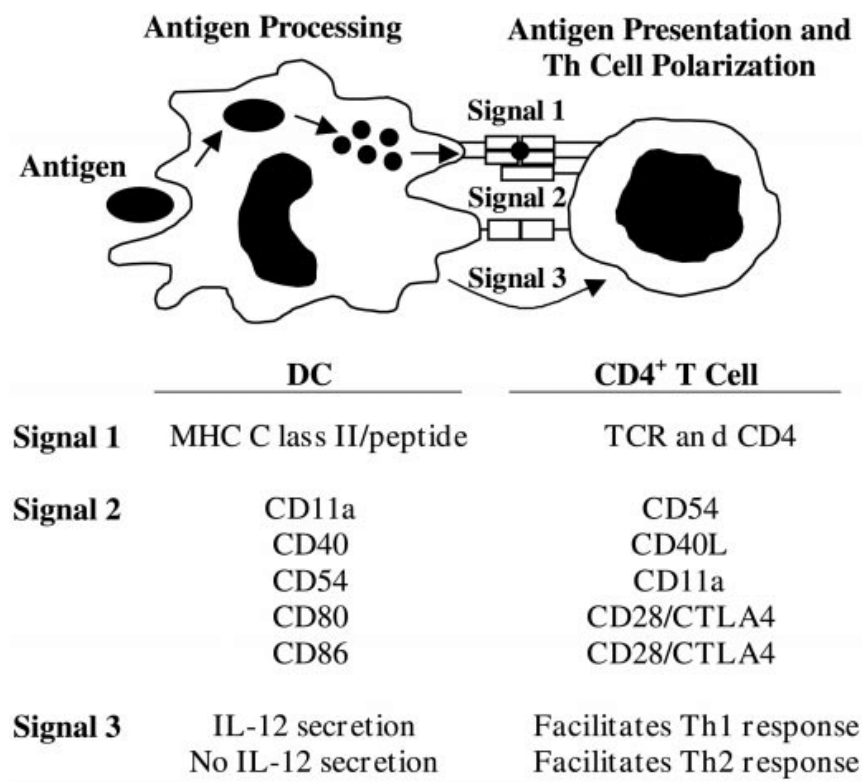


Antigen processing in
tolerance (noninflammatory)

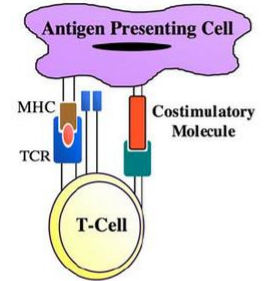
Antigen processing during
inflammation



Immunological synapse

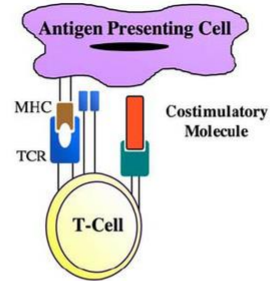


Signal 1 + Signal 2



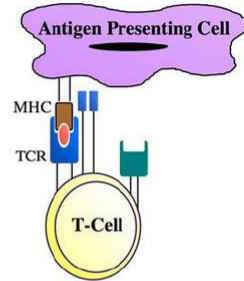
Activation of
Antigen-Specific
T-cells

No Signal 1

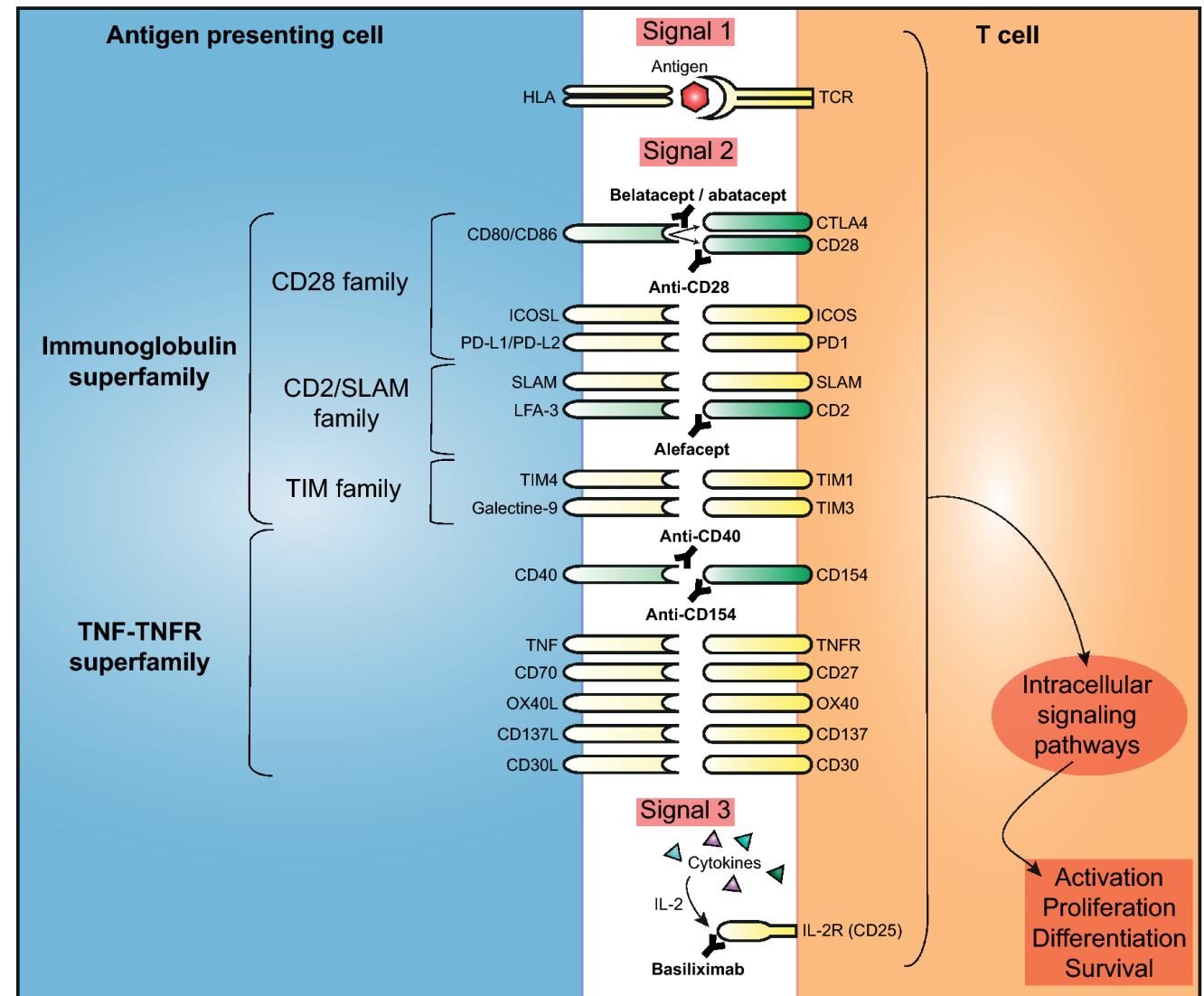
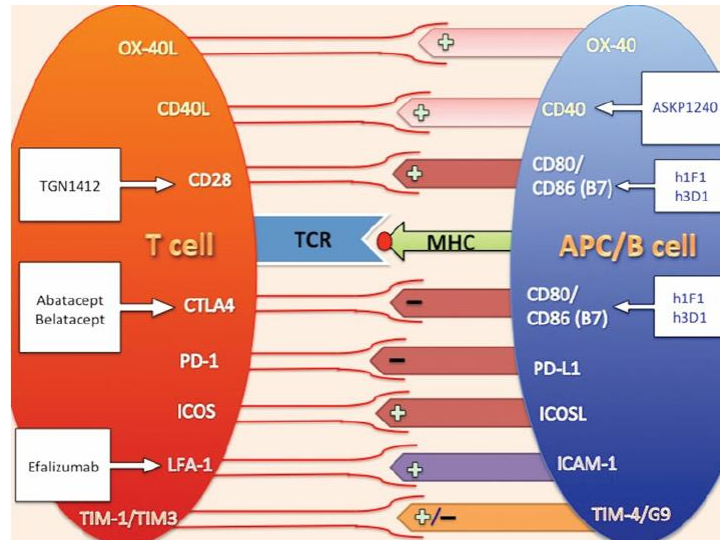


Clonal Anergy
Apoptosis
Ignorance

No Signal 2



Clonal Anergy
Apoptosis
Ignorance



Viral strategy	Specific mechanism	Result	Virus examples
Blocking of antigen processing and presentation	Inhibition of MHC class I expression	Impairs recognition of infected cells by cytotoxic T cells	Herpes simplex Cytomegalovirus
	Inhibition of peptide transport by TAP	Blocks peptide association with MHC class I	Herpes simplex
Immunosuppression of host	Virally encoded cytokine homolog of IL-10	Inhibits T _H 1 lymphocytes Reduces interferon- γ production	Epstein-Barr virus

Figure 11-5 part 3 of 3 Immunobiology, 6/e. (© Garland Science 2005)

