CURSO DE BIOLOGÍA CELULAR 2021

Biología celular de la inmunidad - II

FACULTAD DE CIENCIAS
UDELAR fcien.edu.uy

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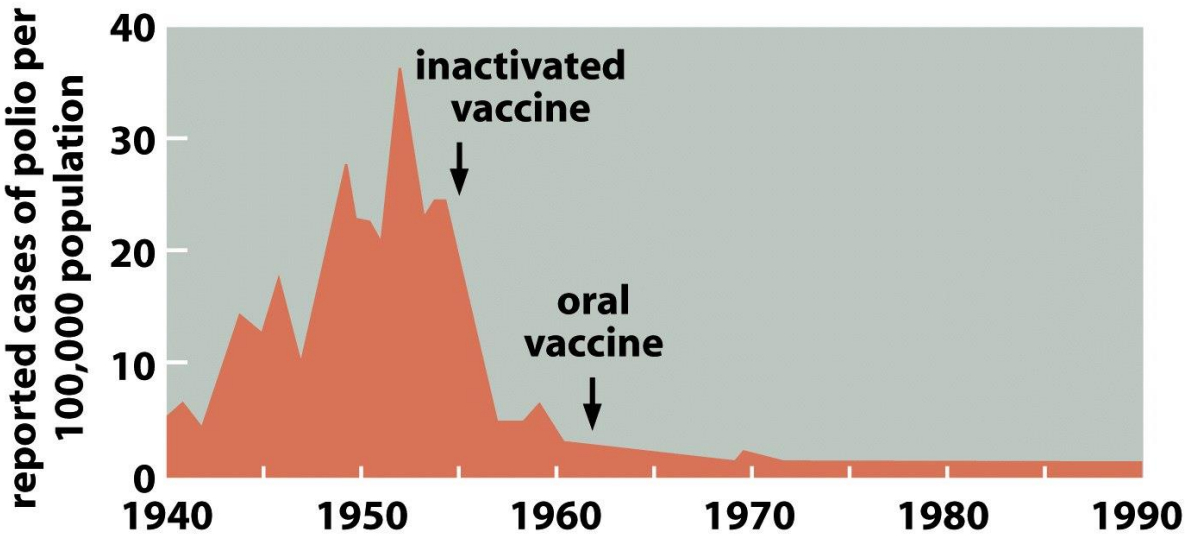
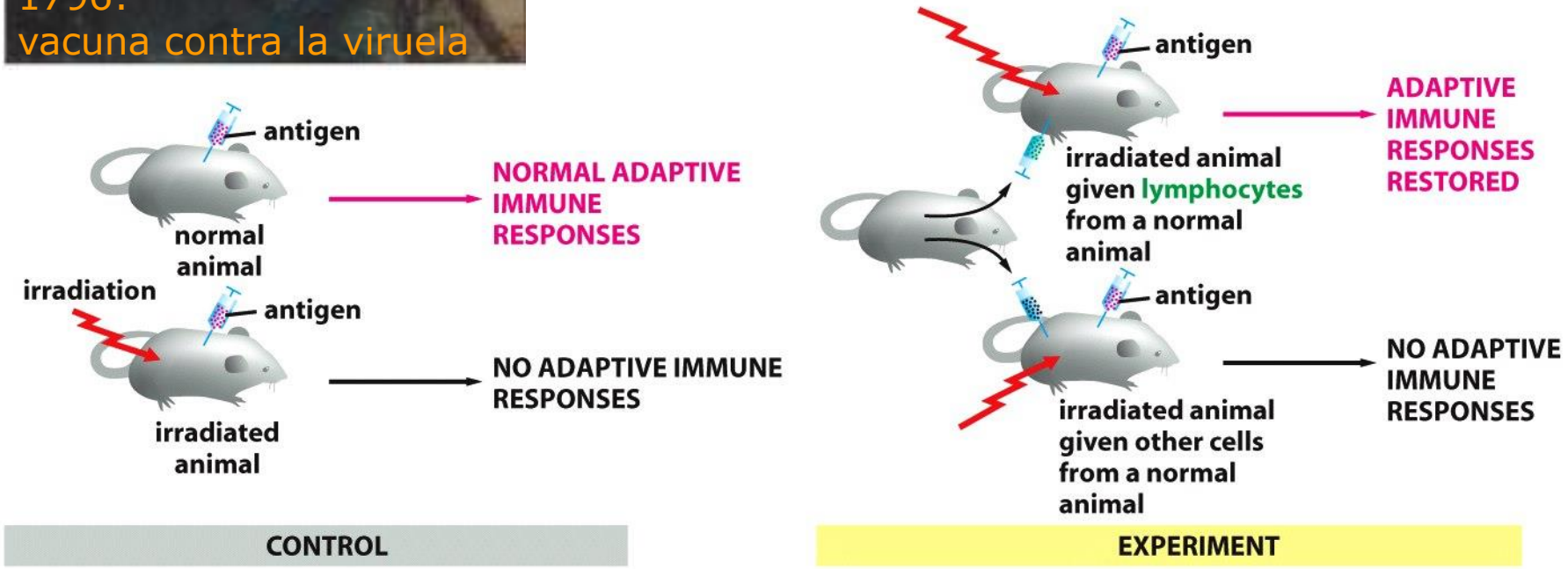
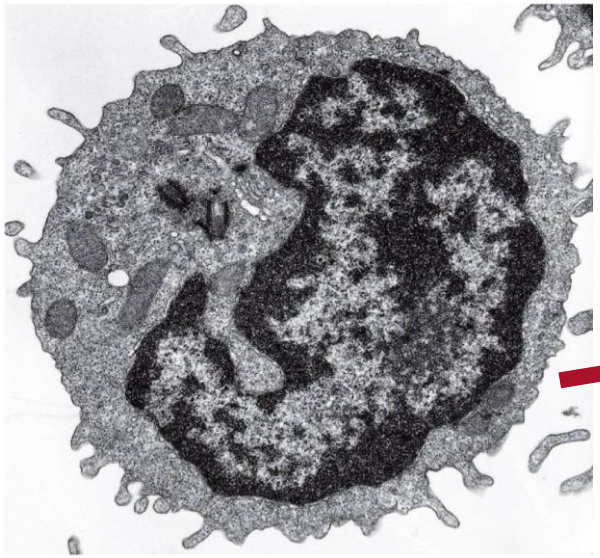
UNIVERSIDAD DE LA REPÚBLICA
URUGUAY

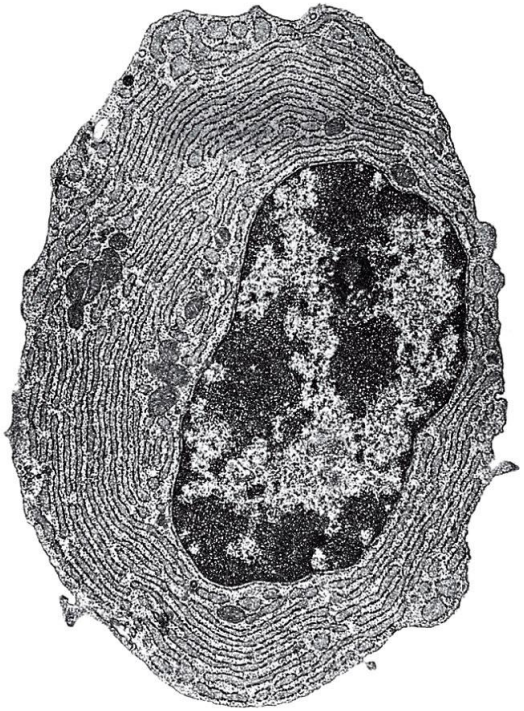
Inmunidad adaptativa





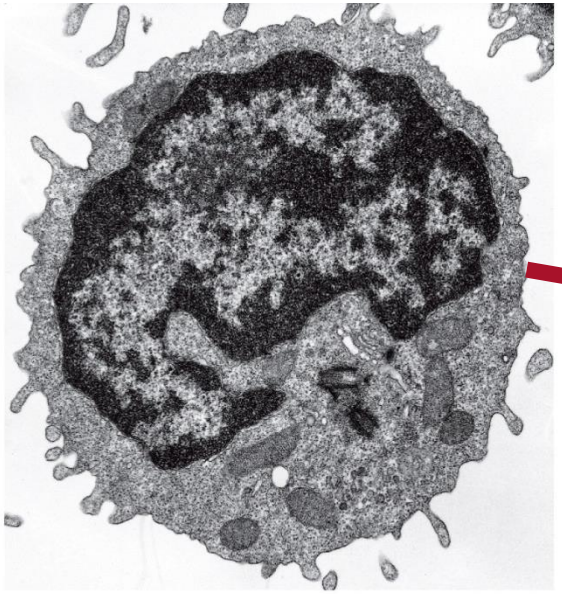
Inmunidad adaptativa: Linfocitos





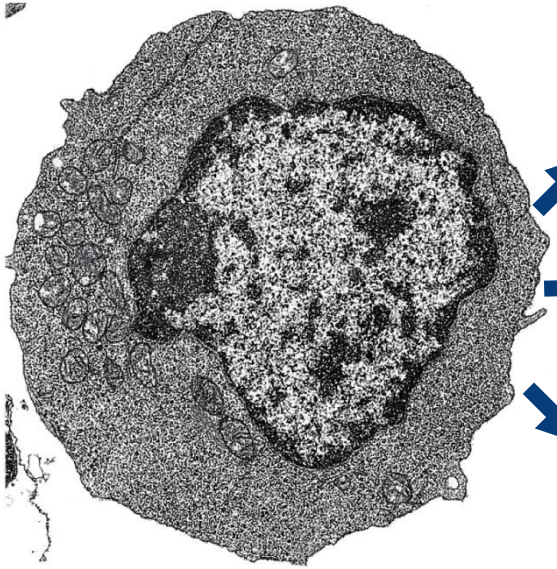
effector B cell (plasma cell)

1 µm



resting T or B cell

1 µm

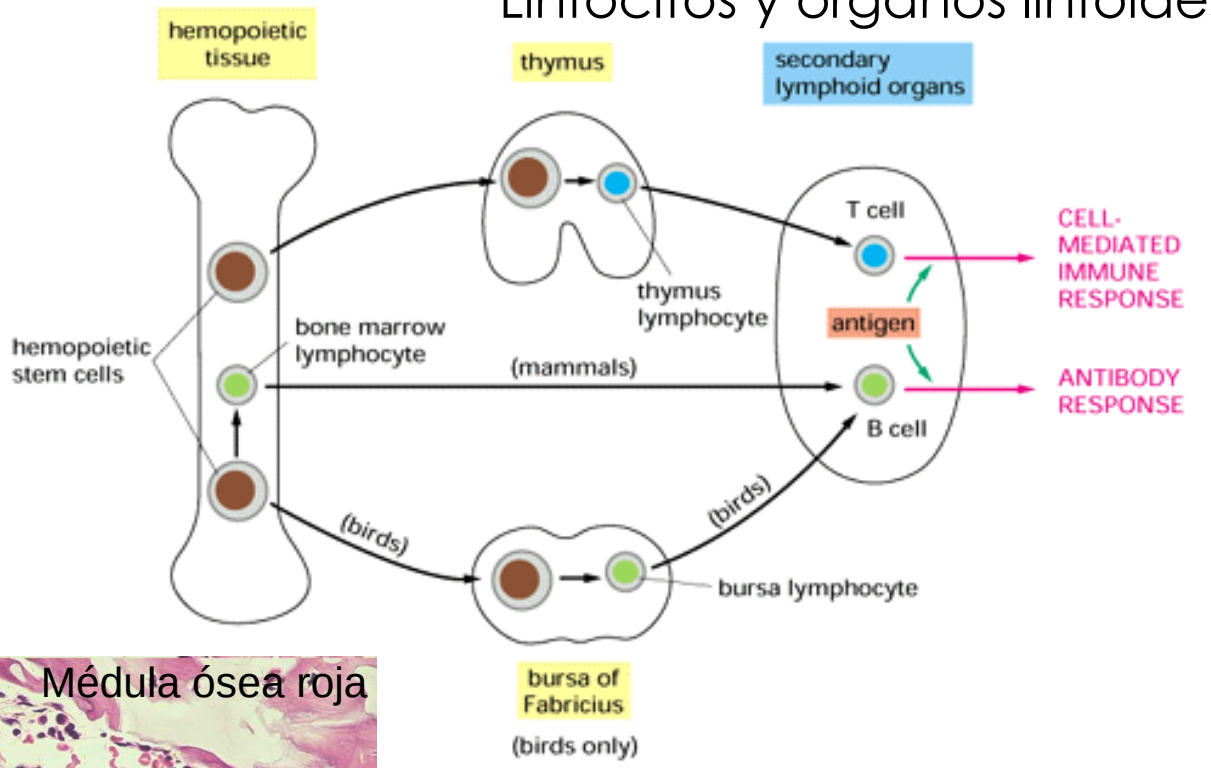


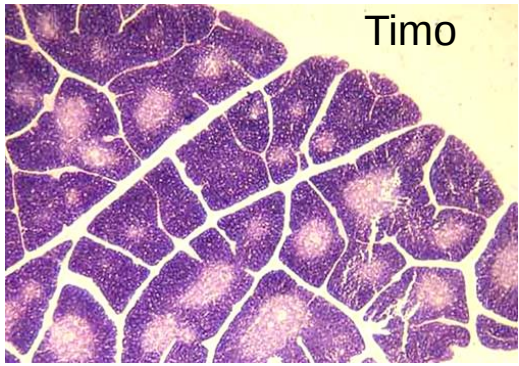
effector T cell

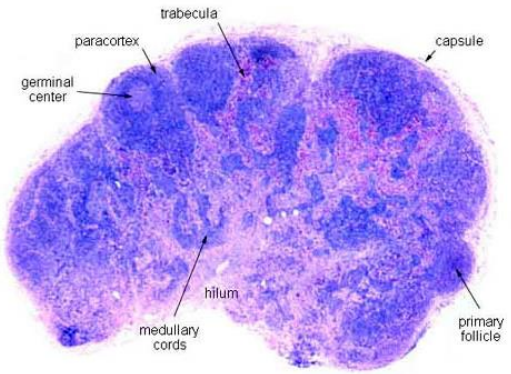
1 µm

- Citotóxicos
- Colaboradores
- Reguladores (supresores)

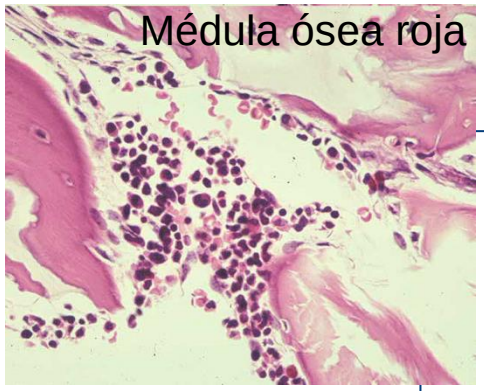
Linfocitos y órganos linfoides

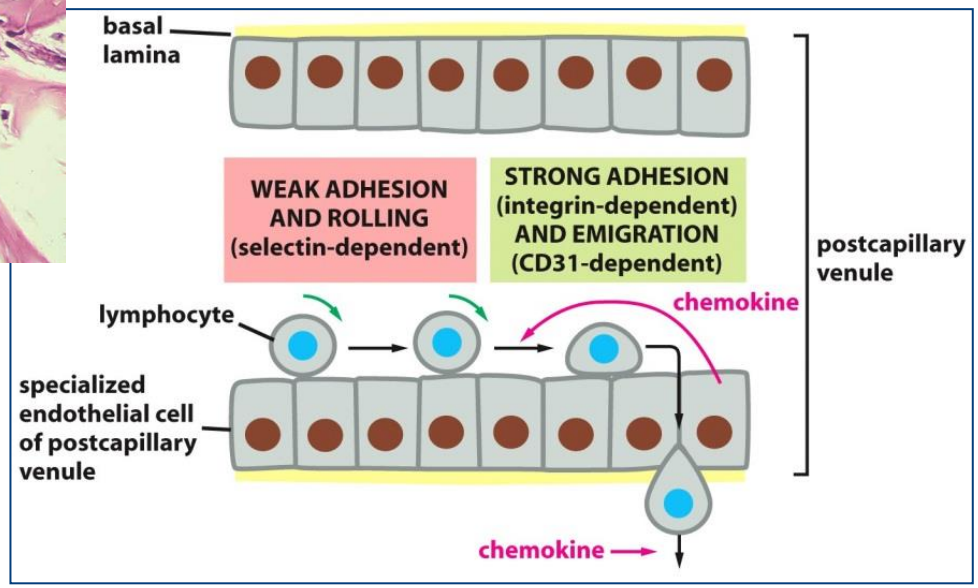




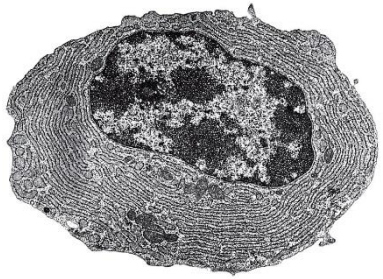


Ganglio linfático





Estructura de los anticuerpos



Unión al antígeno

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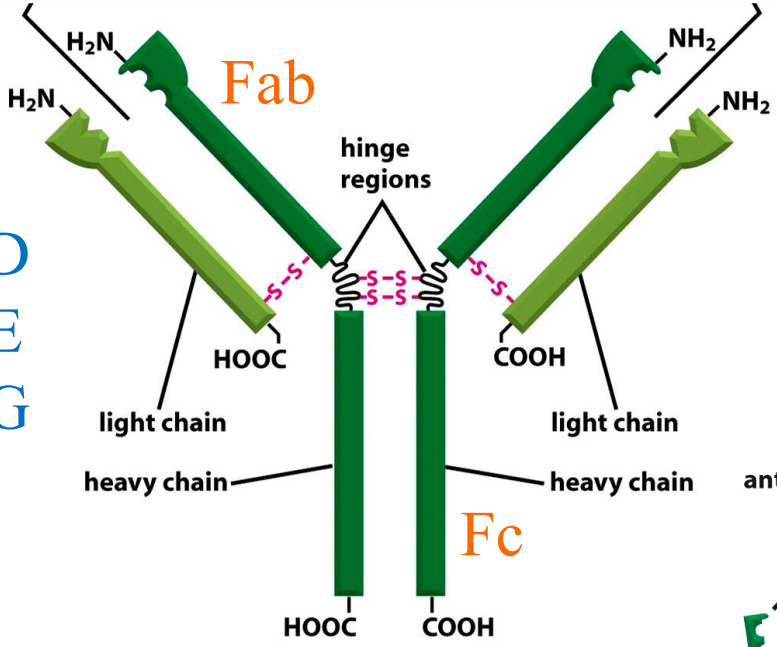


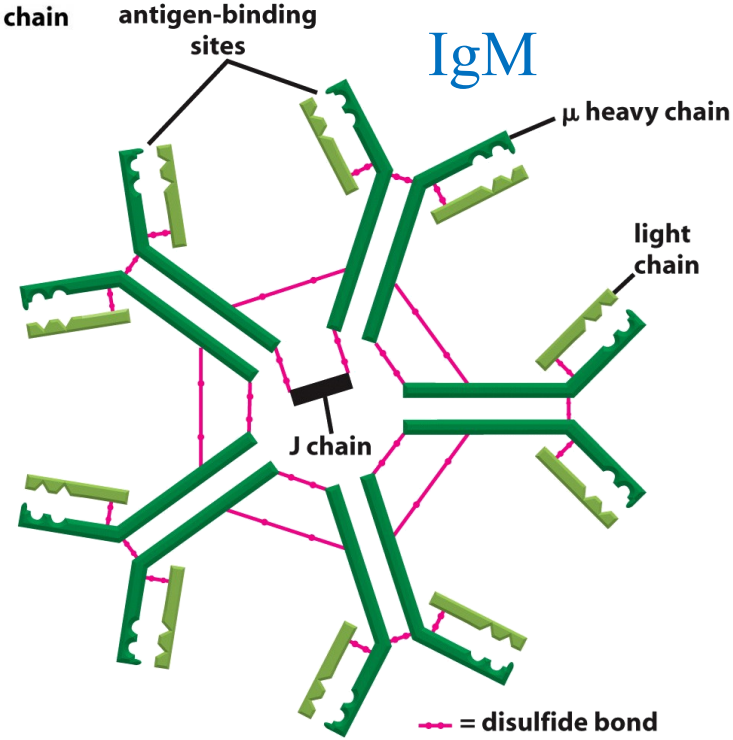
Cadenas pesadas: (locus único)
IgA--α
IgD--δ
IgE--ε
IgG--γ
IgM--μ

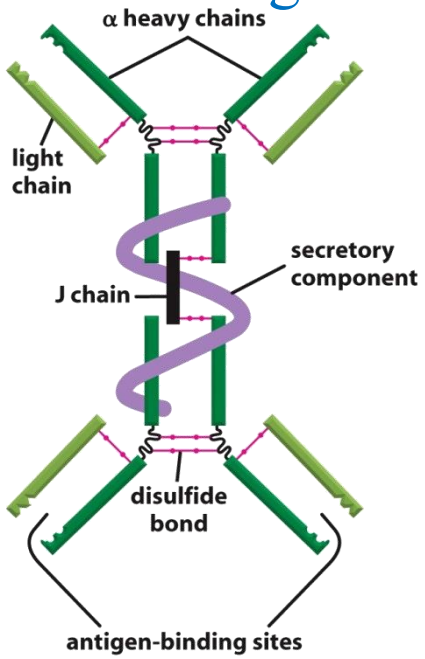
Cadenas livianas: (locus separados)
κ
λ

Nobel, 1972

Gerald M. Edelman
(1929 - 2014)

Rodney R. Porter
(1917 - 1985)





SCIENCE ADVANCES | RESEARCH ARTICLE Sci. Adv. 2018; 4 : eaau1199 10 October 2018

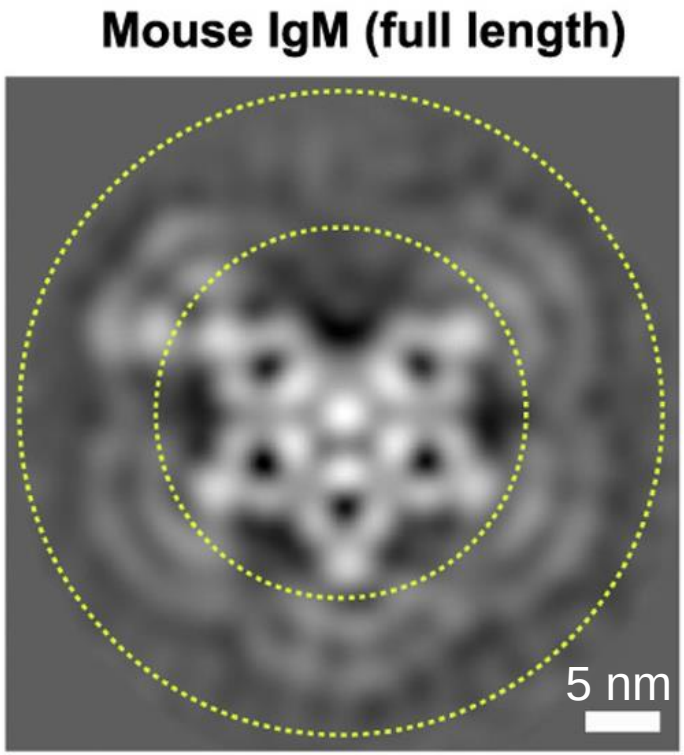
BIOCHEMISTRY

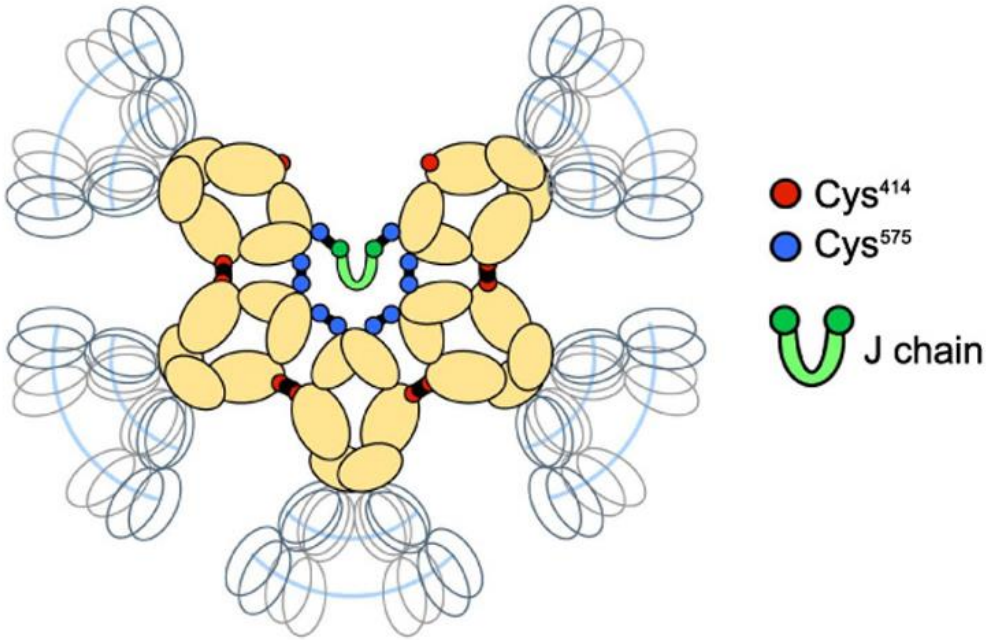
The IgM pentamer is an asymmetric pentagon with an open groove that binds the AIM protein

Emiri Hiramoto[1], Akihisa Tsutsumi[2], Risa Suzuki[1], Shigeru Matsuoka[1]*, Satoko Arai[1†], Masahide Kikkawa[2], Toru Miyazaki[1,3,4†]

https://advances.sciencemag.org/content/4/10/eaau1199

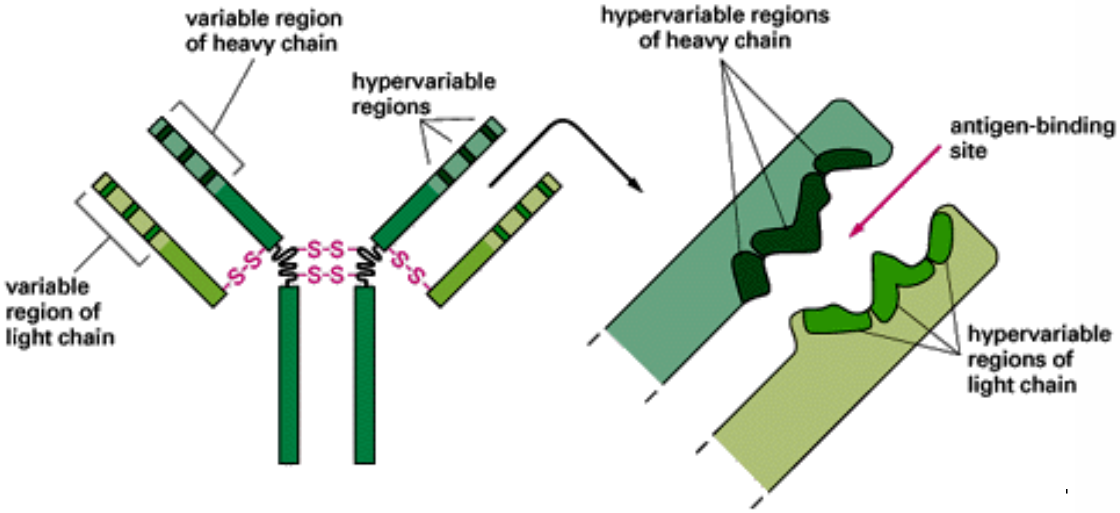
D

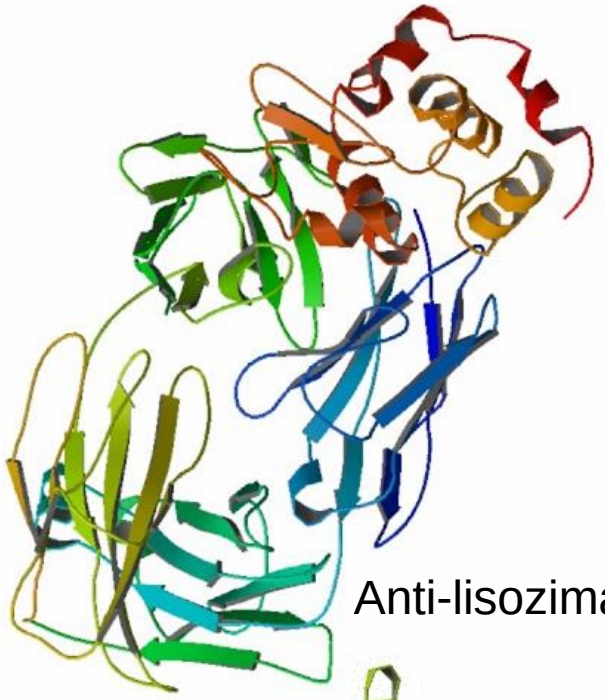




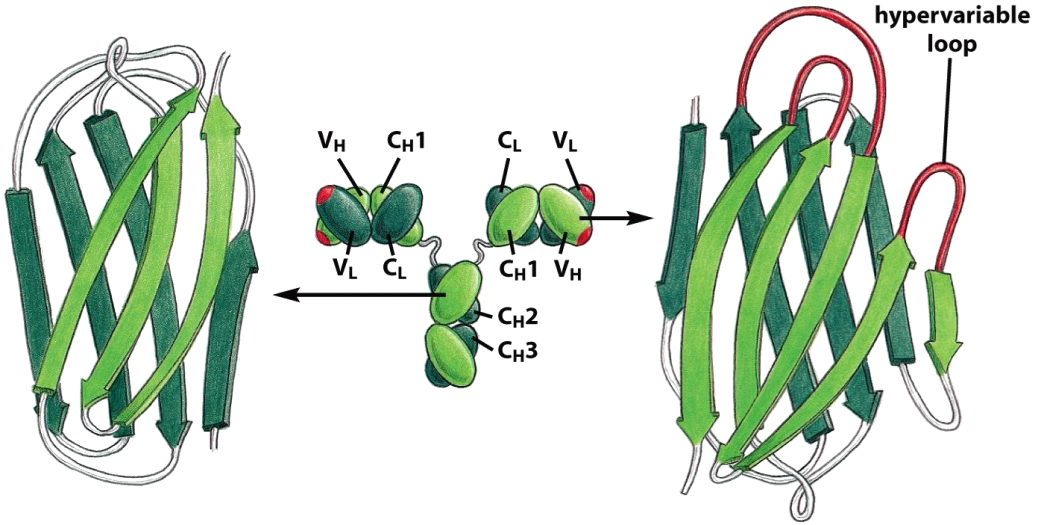
Tinción negativa - MET

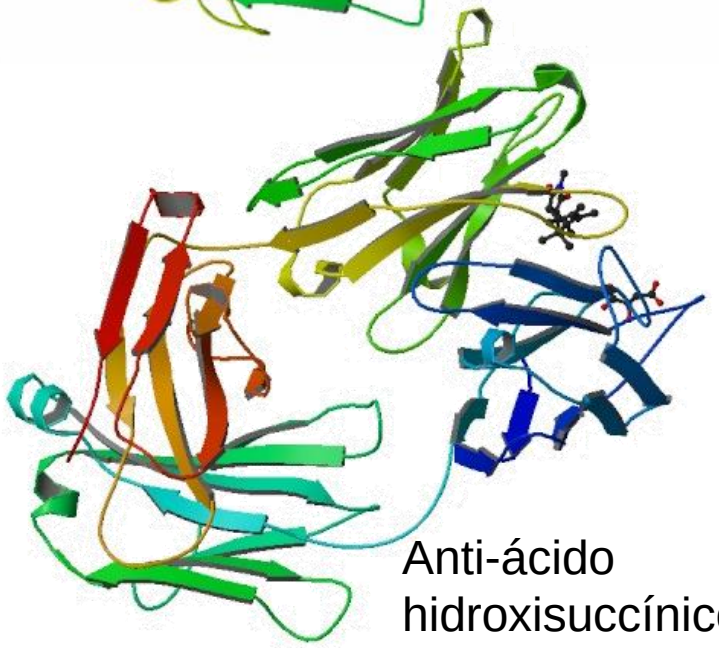
Estructura de los anticuerpos





Anti-lisozima

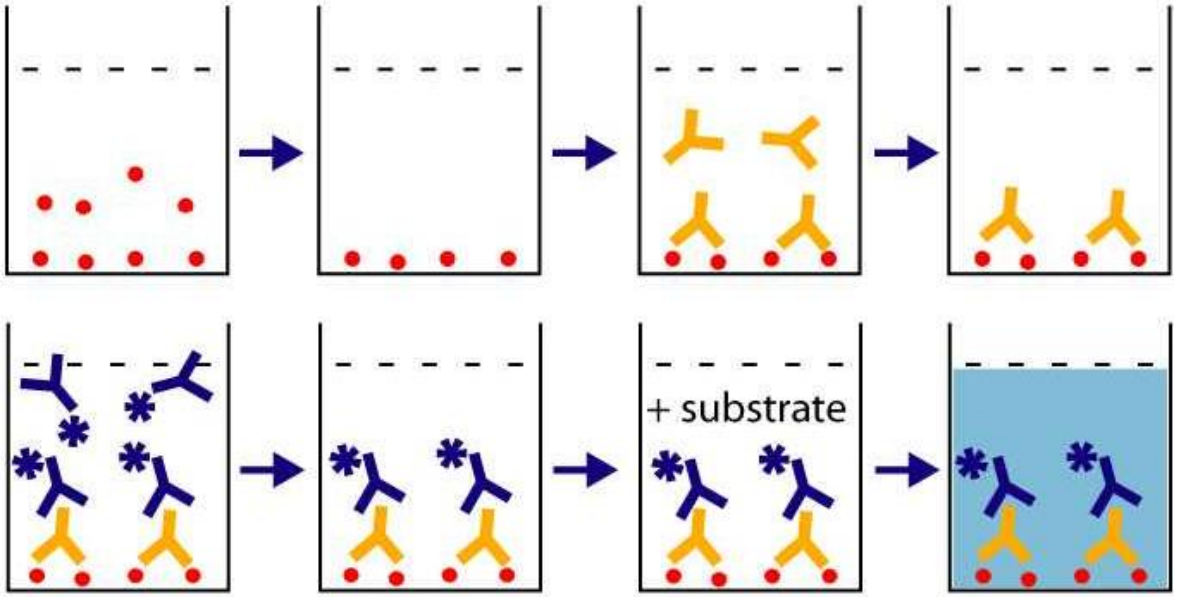


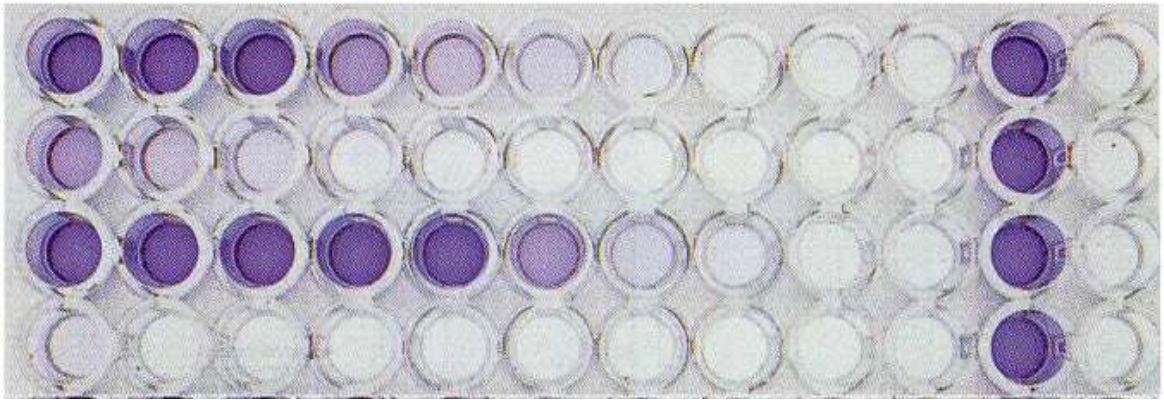


Anti-ácido hidroxisuccínico

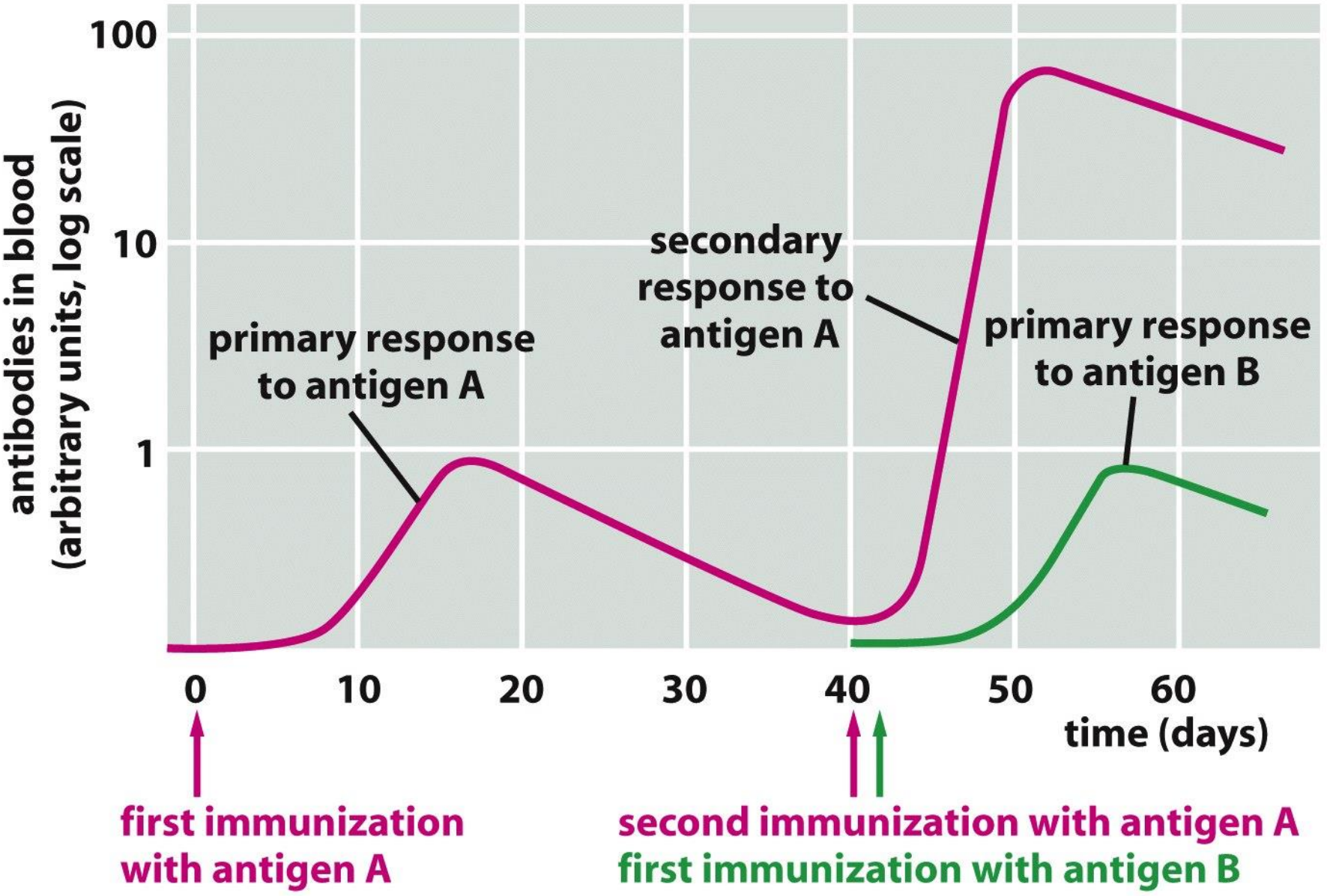
Cuantificación de anticuerpos: ELISA

("Enzyme-Linked ImmunoSorbent Assay")

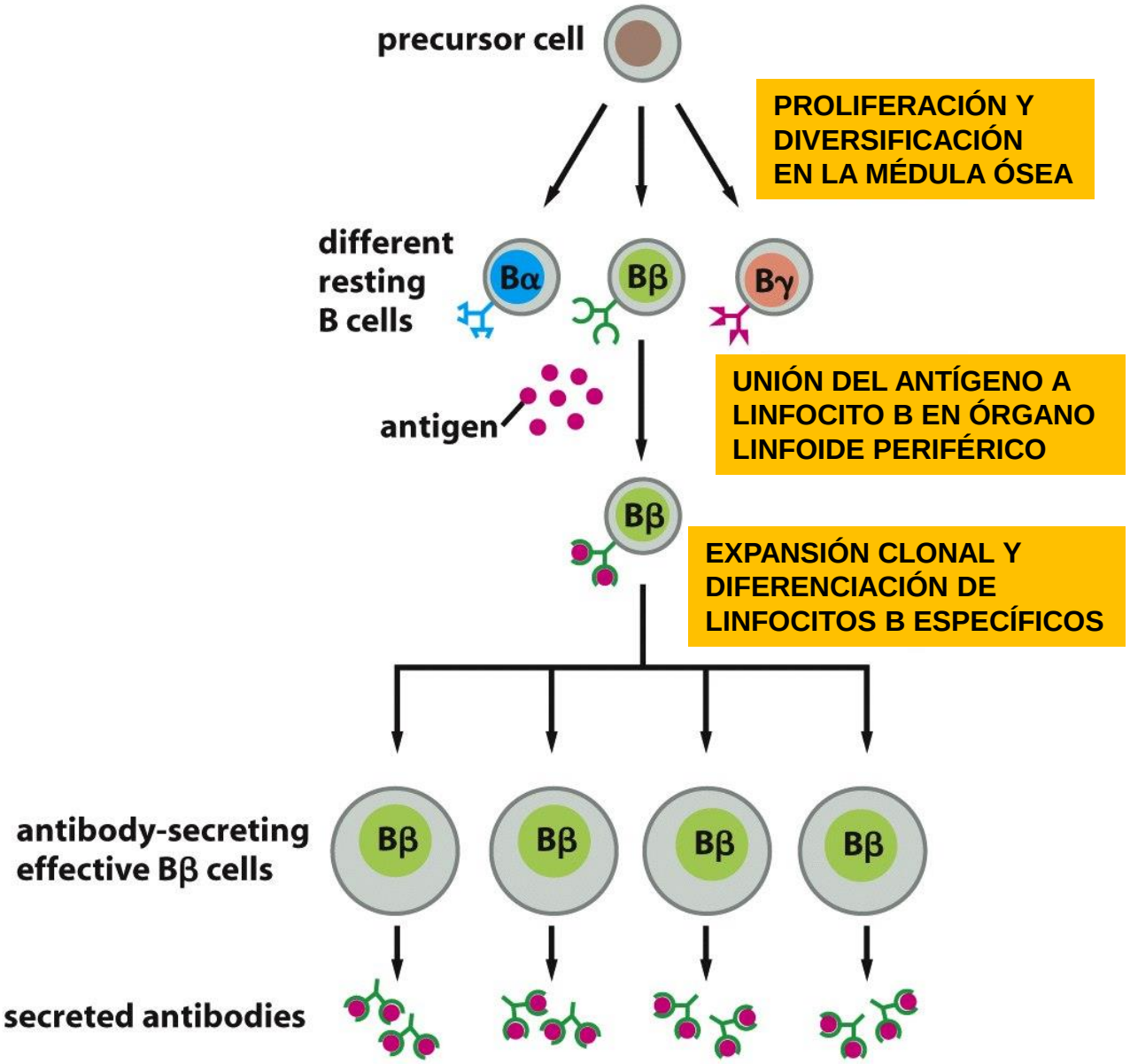


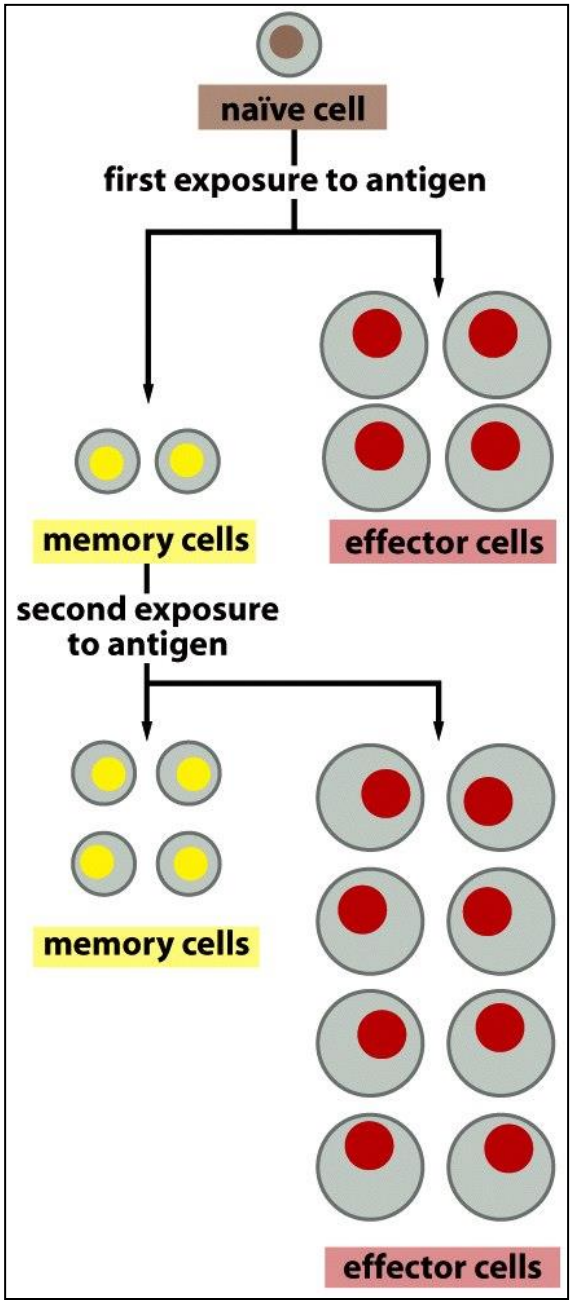


Respuesta de anticuerpos

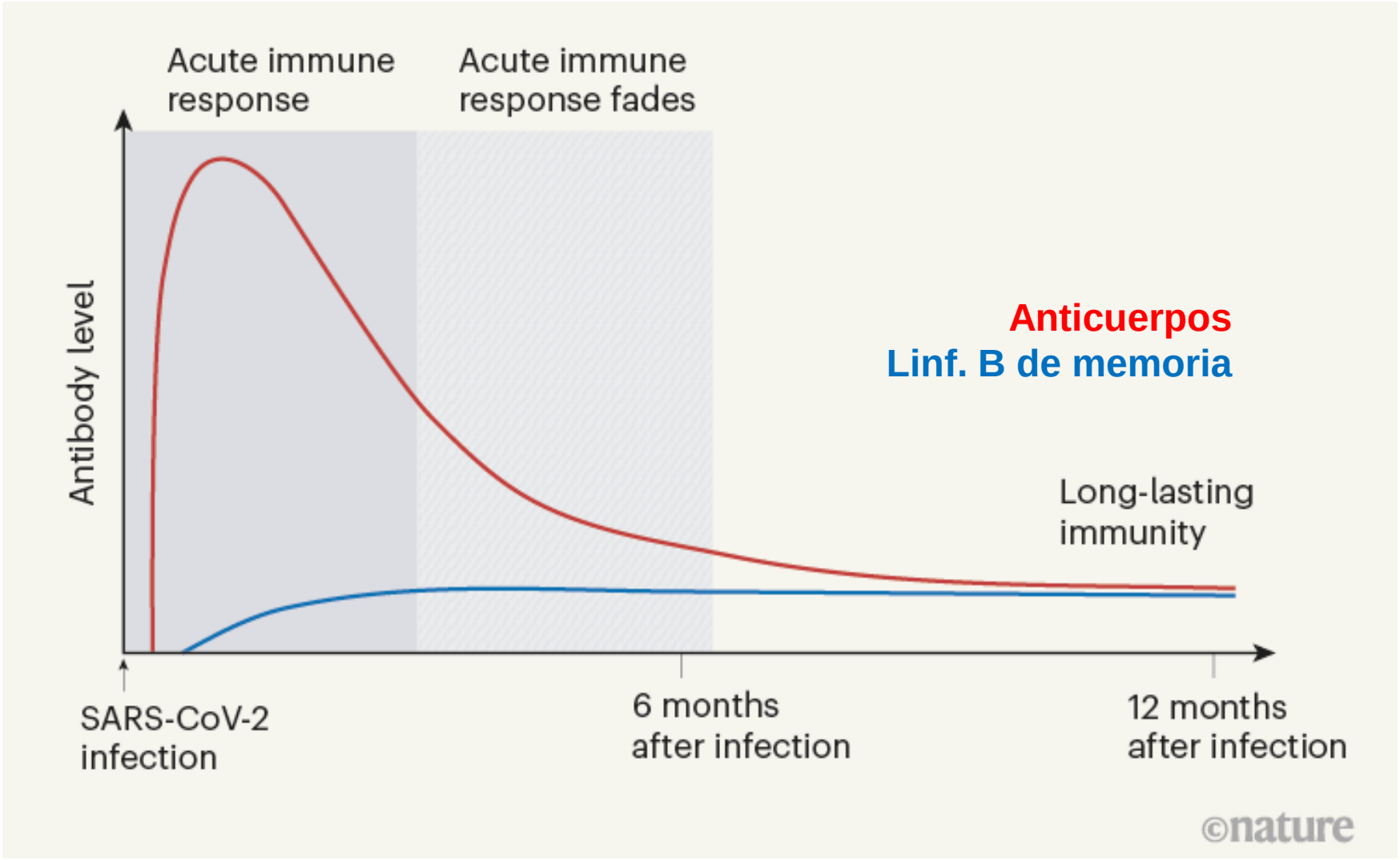


Teoría de la selección clonal





¿Inmunidad a largo plazo para SARS-CoV-2?



Hadbruch y Chang, 14 de junio de 2021, Nature

doi: https://doi.org/10.1038/d41586-021-01557-z

Anticuerpos monoclonales

Nature Vol. 256 August 7 1975

Continuous cultures of fused cells secreting antibody of predefined specificity

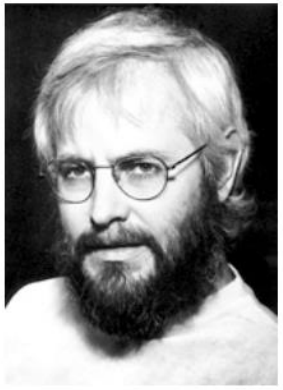
G. KÖHLER
C. MILSTEIN

MRC Laboratory of Molecular Biology, Hills Road, Cambridge CB2 2QH, UK

The Nobel Prize in Physiology or Medicine 1984

The Nobel Prize in Physiology or Medicine 1984 was awarded jointly to Niels K. Jerne, Georges J.F. Köhler and César Milstein *"for theories concerning the specificity in development and control of the immune system and the discovery of the principle for production of monoclonal antibodies"*.

Niels K. Jerne
Prize share: 1/3



Georges J.F. Köhler
Prize share: 1/3

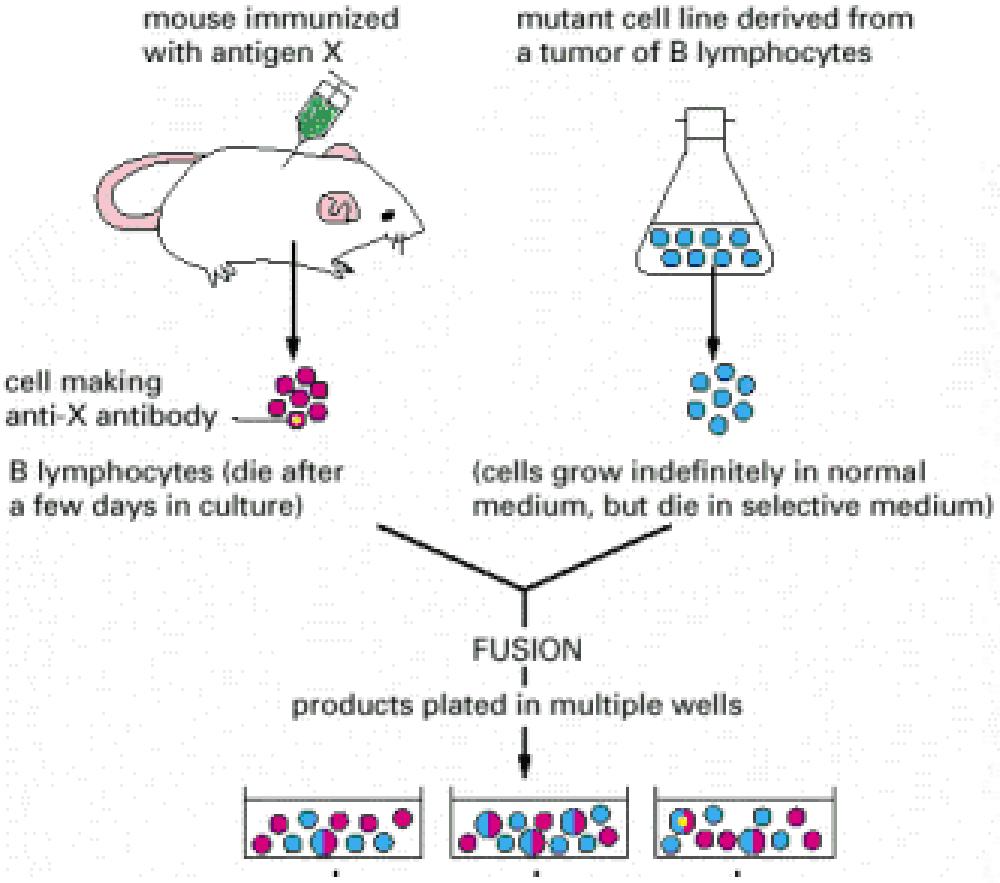
César Milstein
Prize share: 1/3

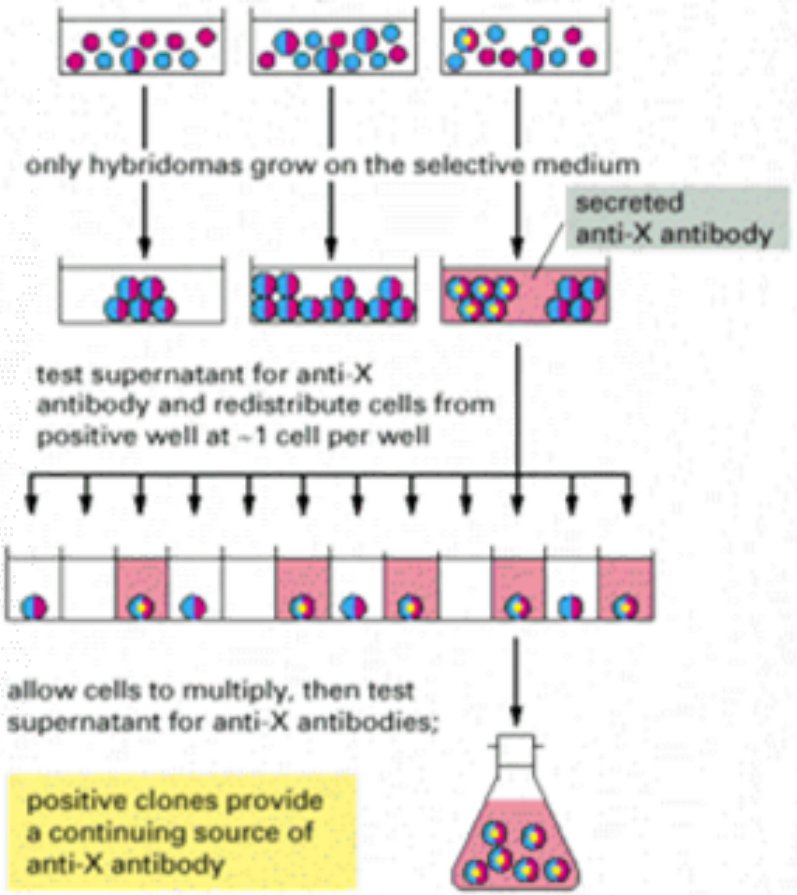
Anticuerpos monoclonales:

1- ¿Qué son y cómo se obtienen?

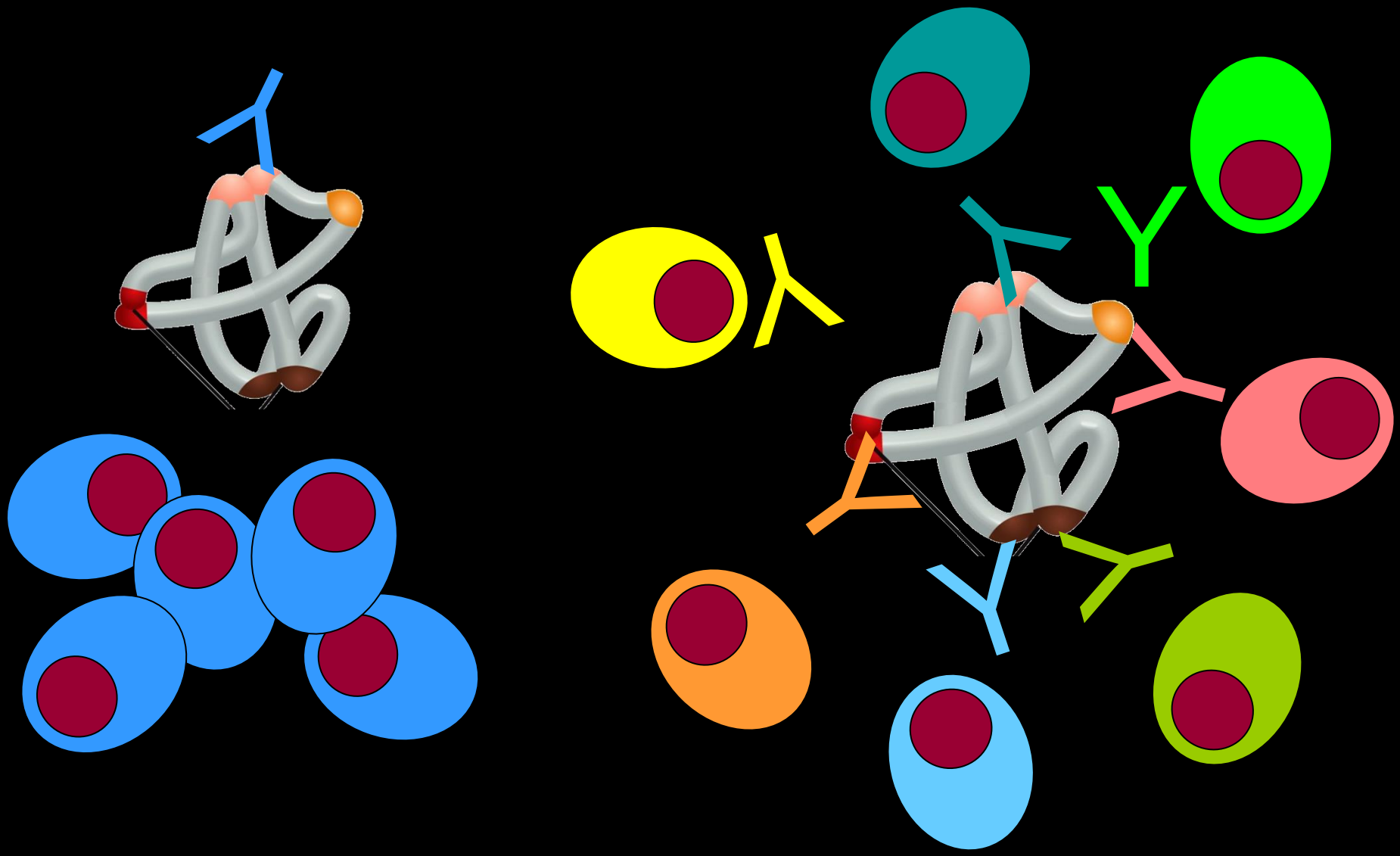
2- ¿Qué aplicaciones tienen hoy en día?

Anticuerpos monoclonales

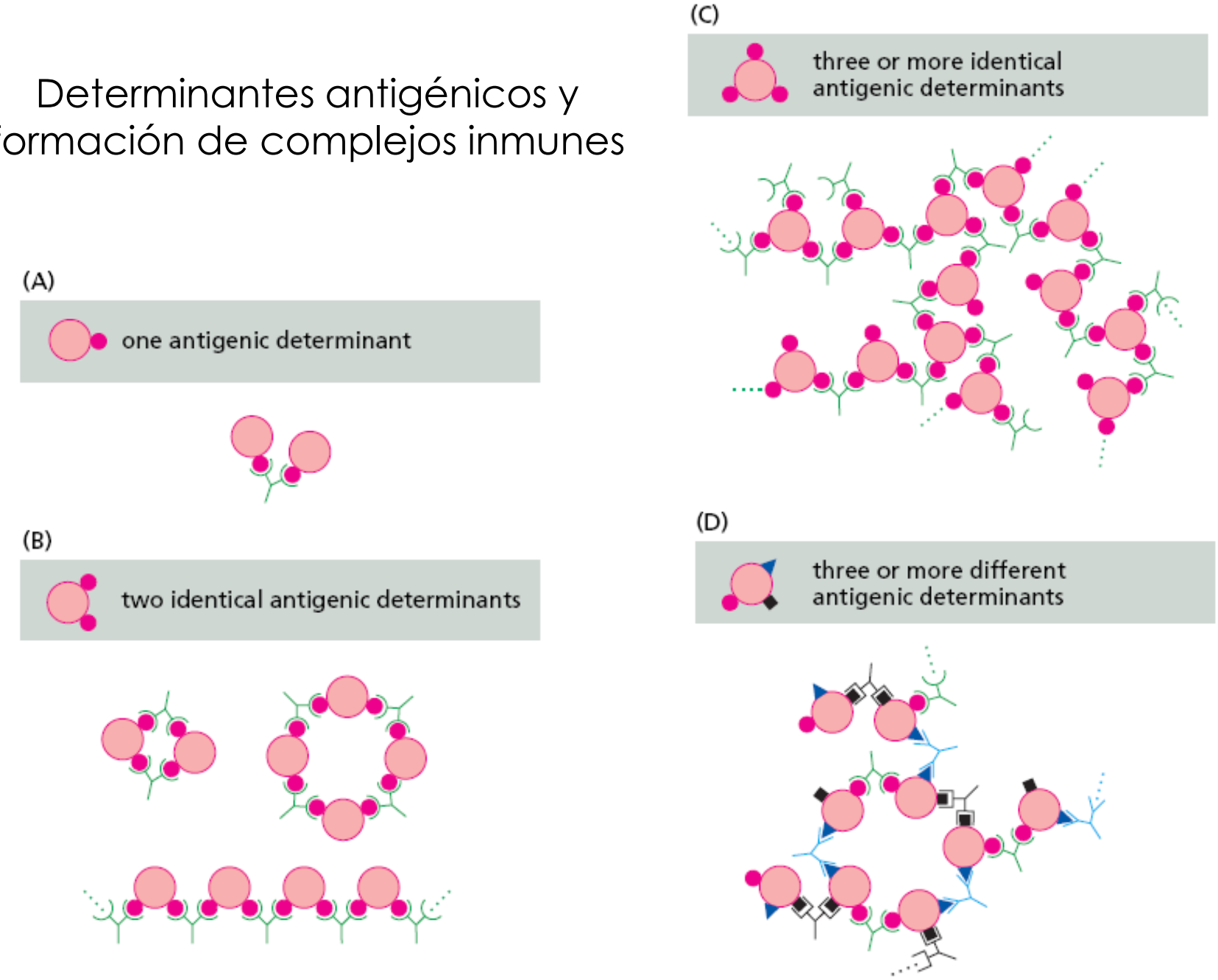




Epítopes, determinantes antigénicos y respuestas policlonales



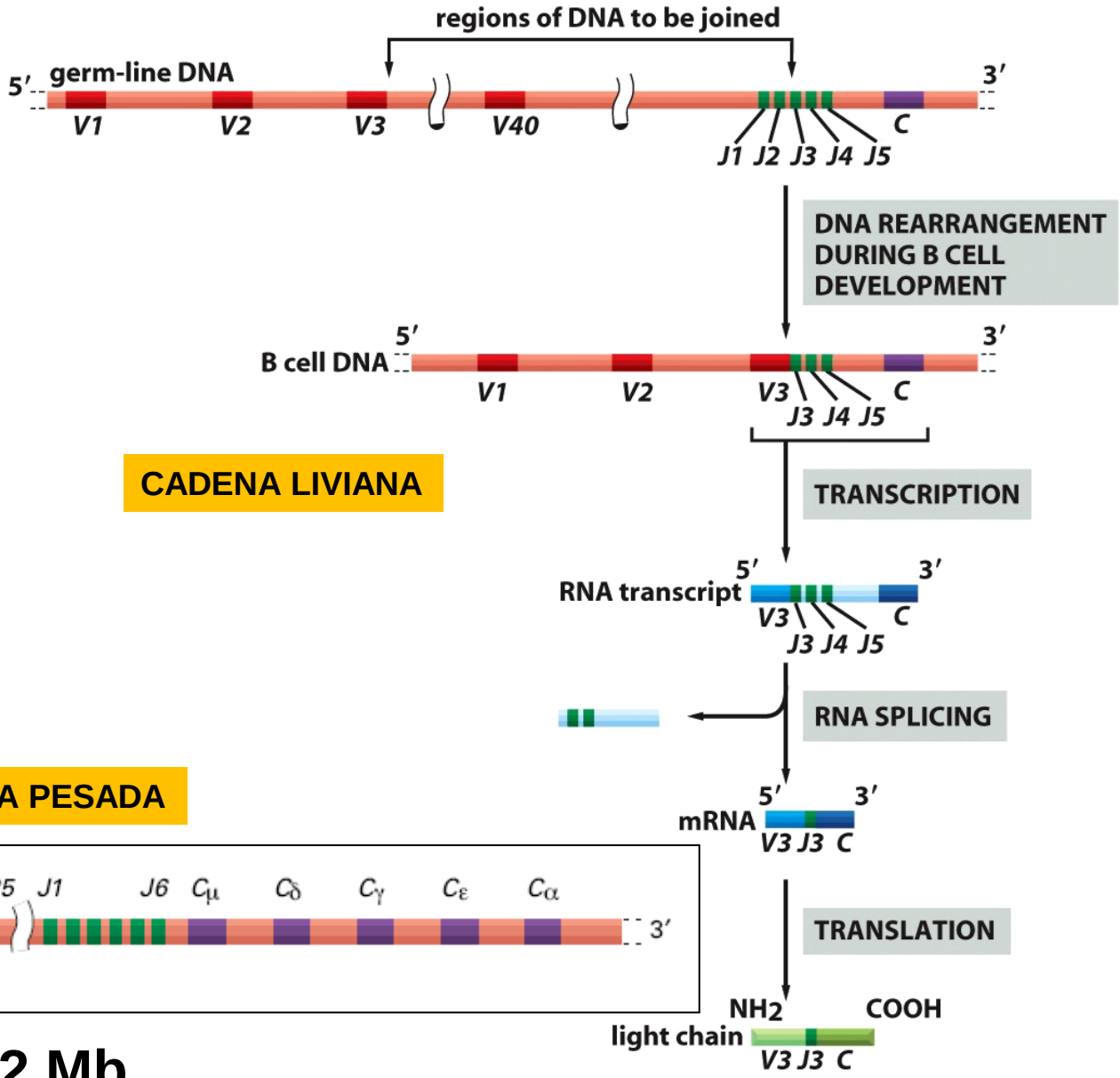
Determinantes antigénicos y formación de complejos inmunes



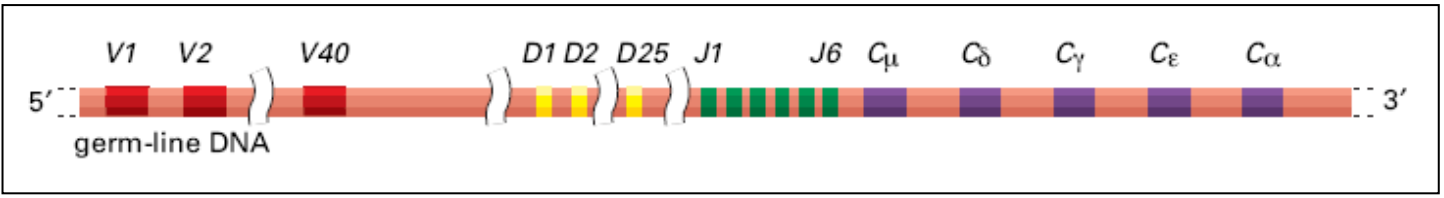
1.000.000.000.000

Generación de la diversidad de anticuerpos

- Unión combinatoria de segmentos génicos
- Diversificación durante la unión de segmentos
- Unión combinatoria de cadenas pesadas y livianas
- Hipermutación somática
- Recombinación en el cambio de clases

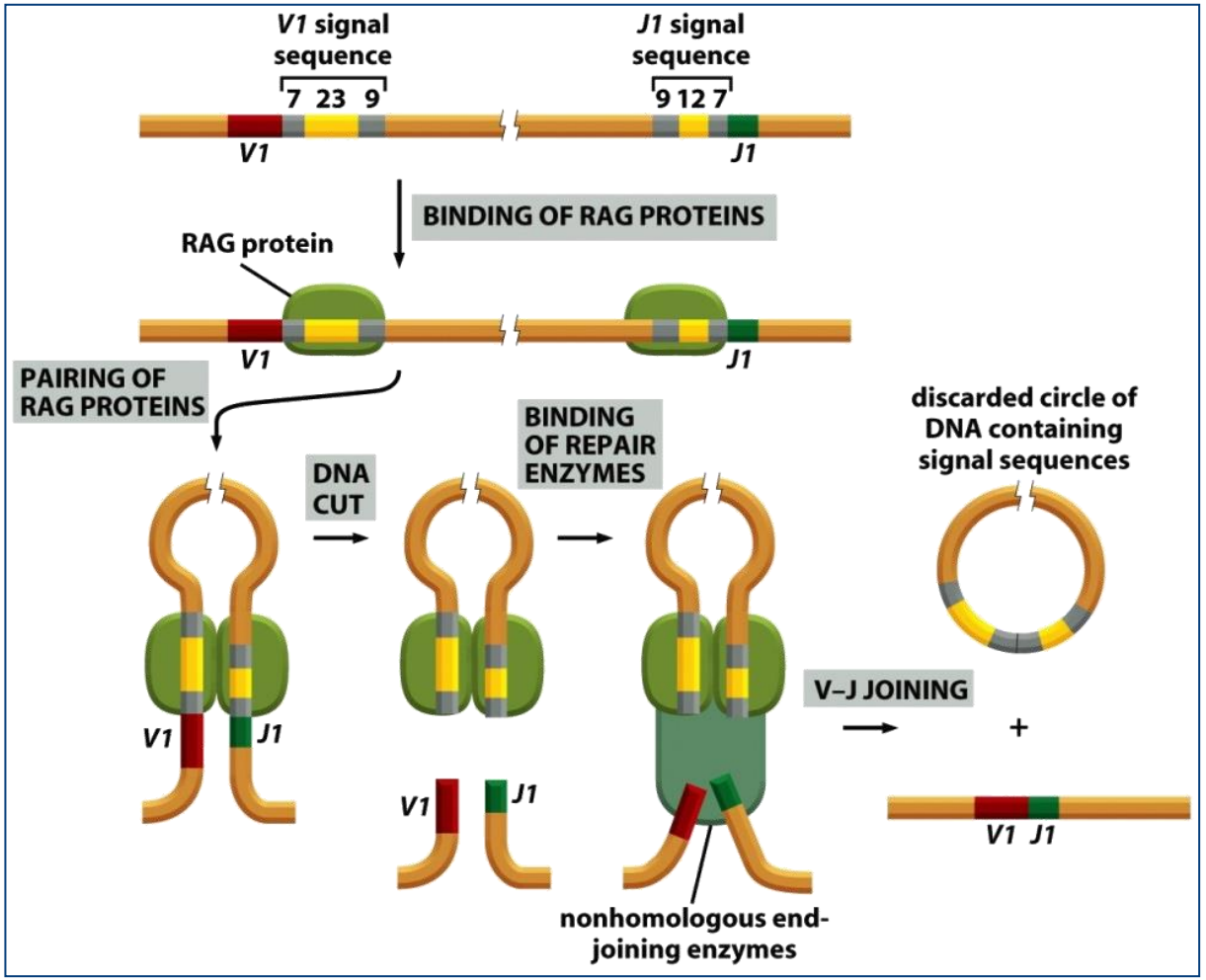


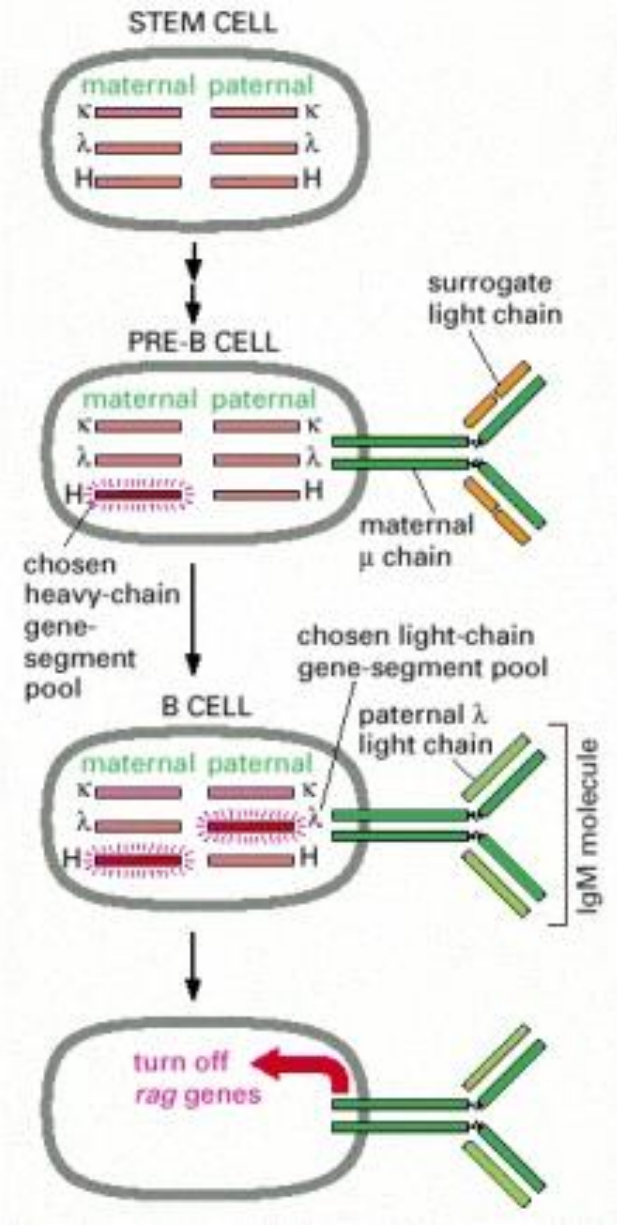
CADENA PESADA



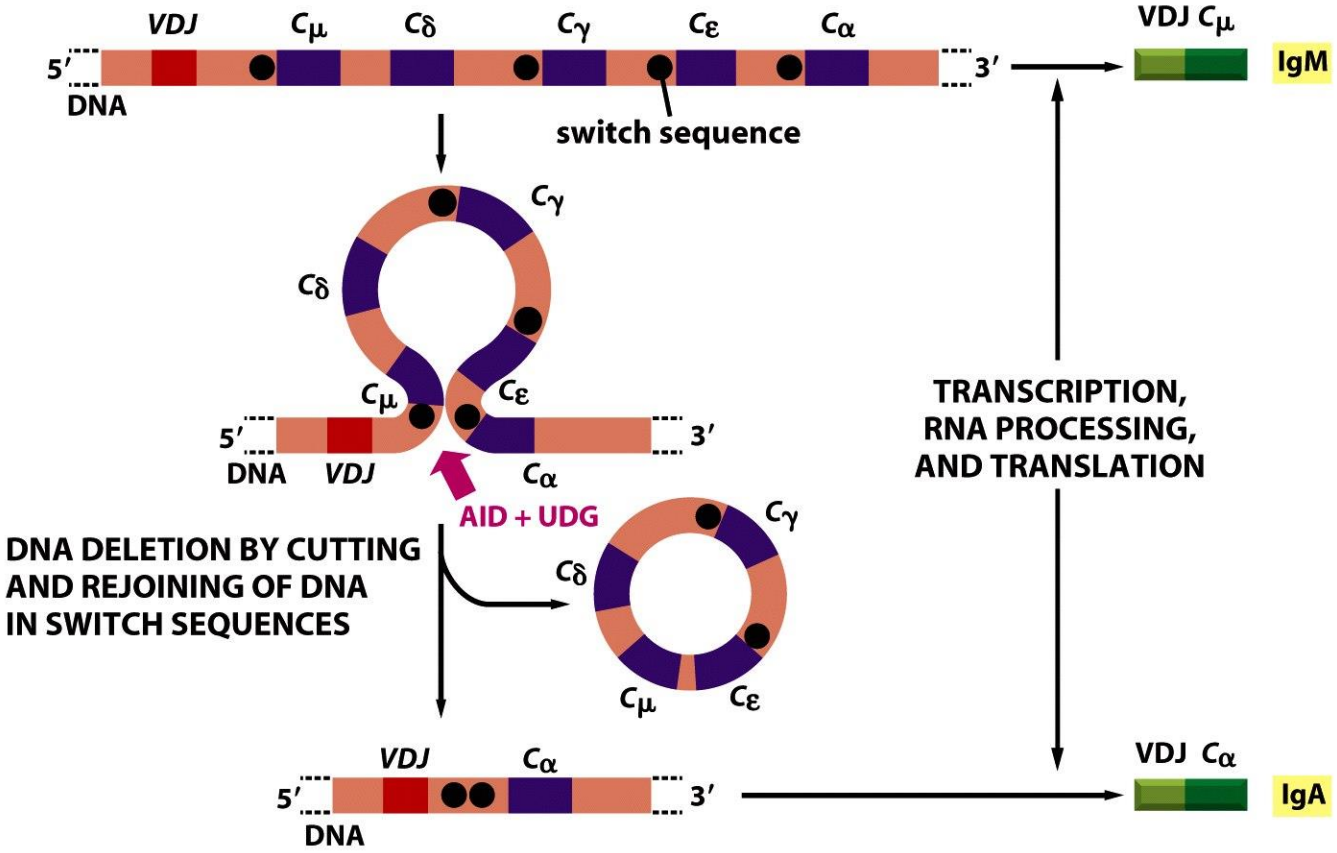
2 Mb

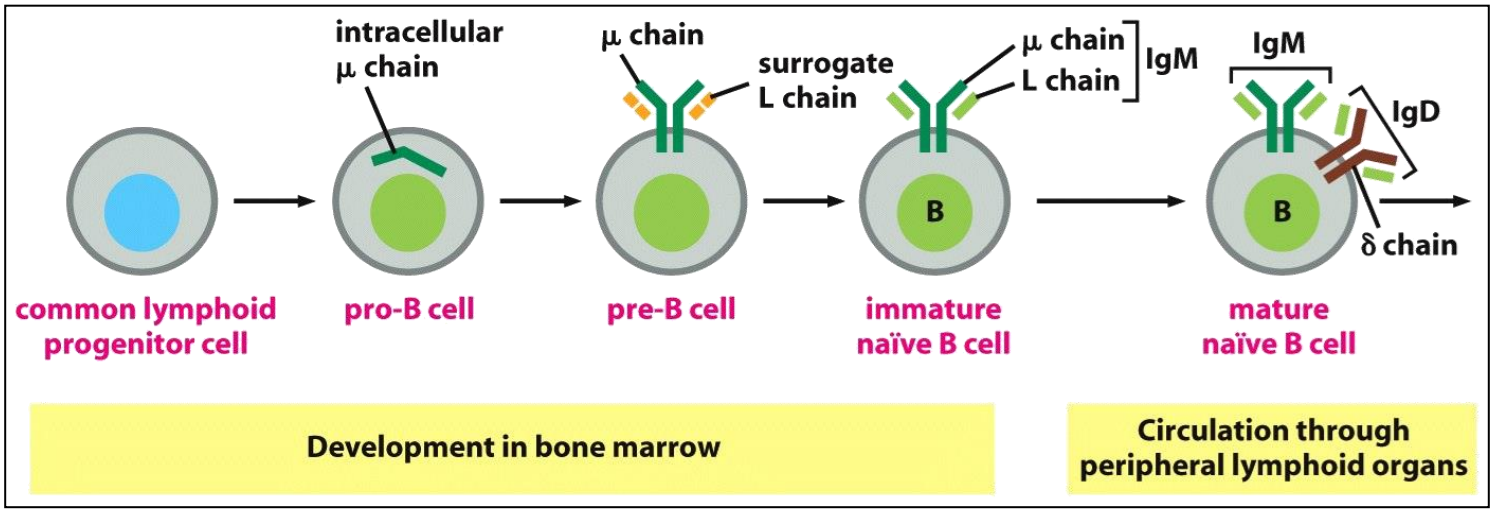
Generación de la diversidad de anticuerpos



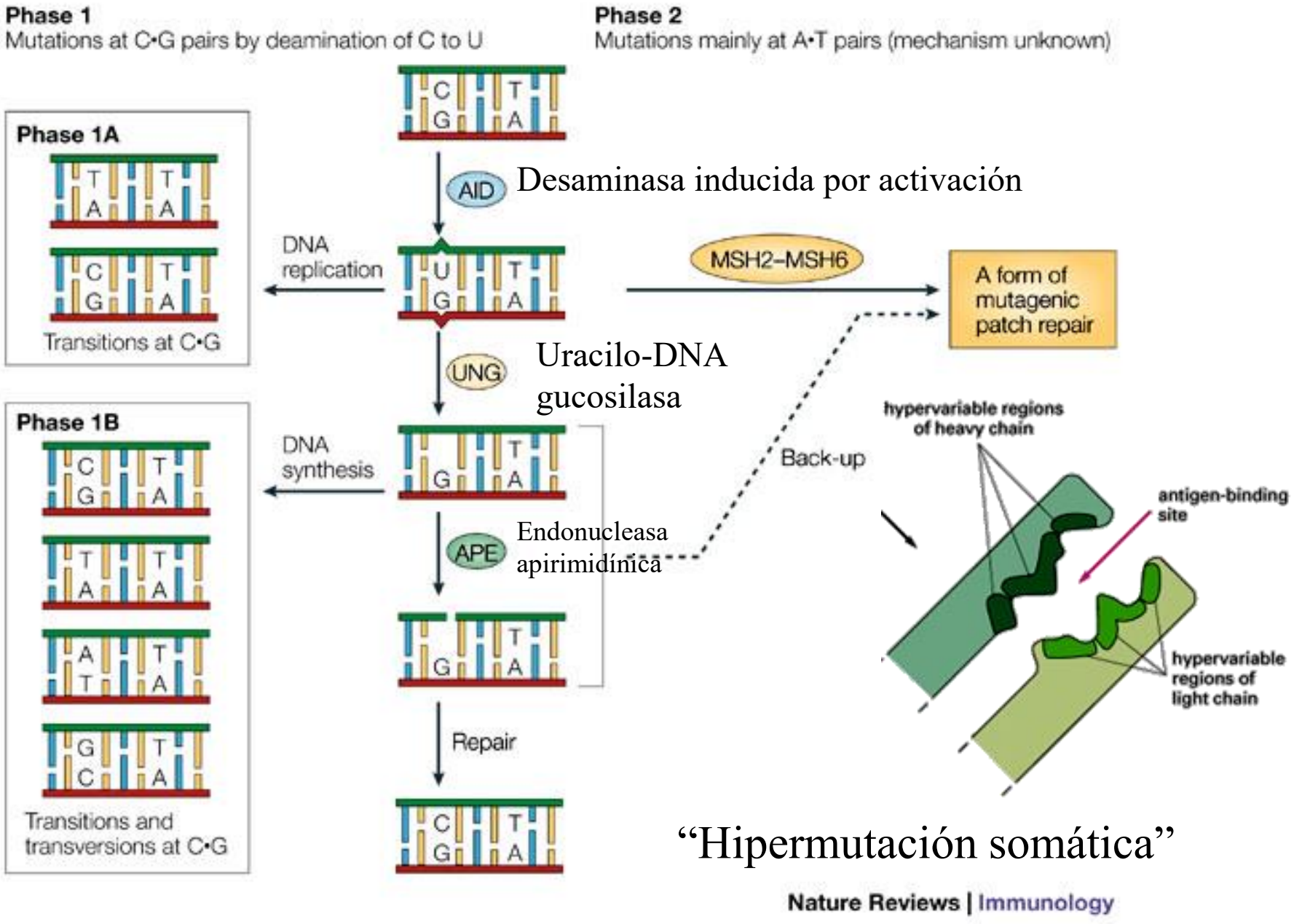


Generación de la diversidad de anticuerpos

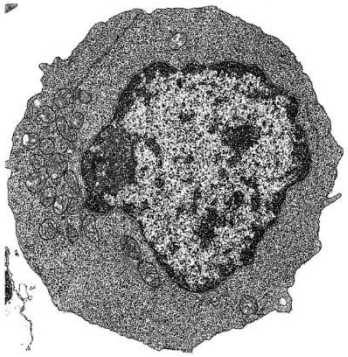


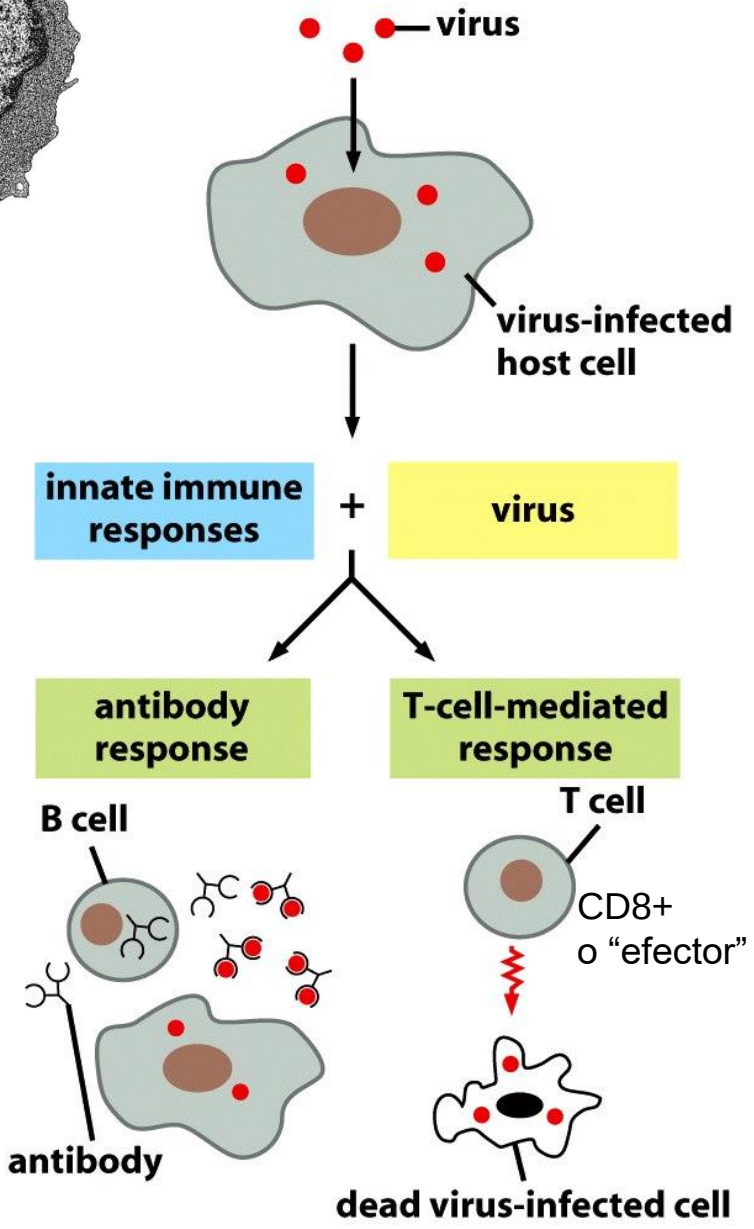


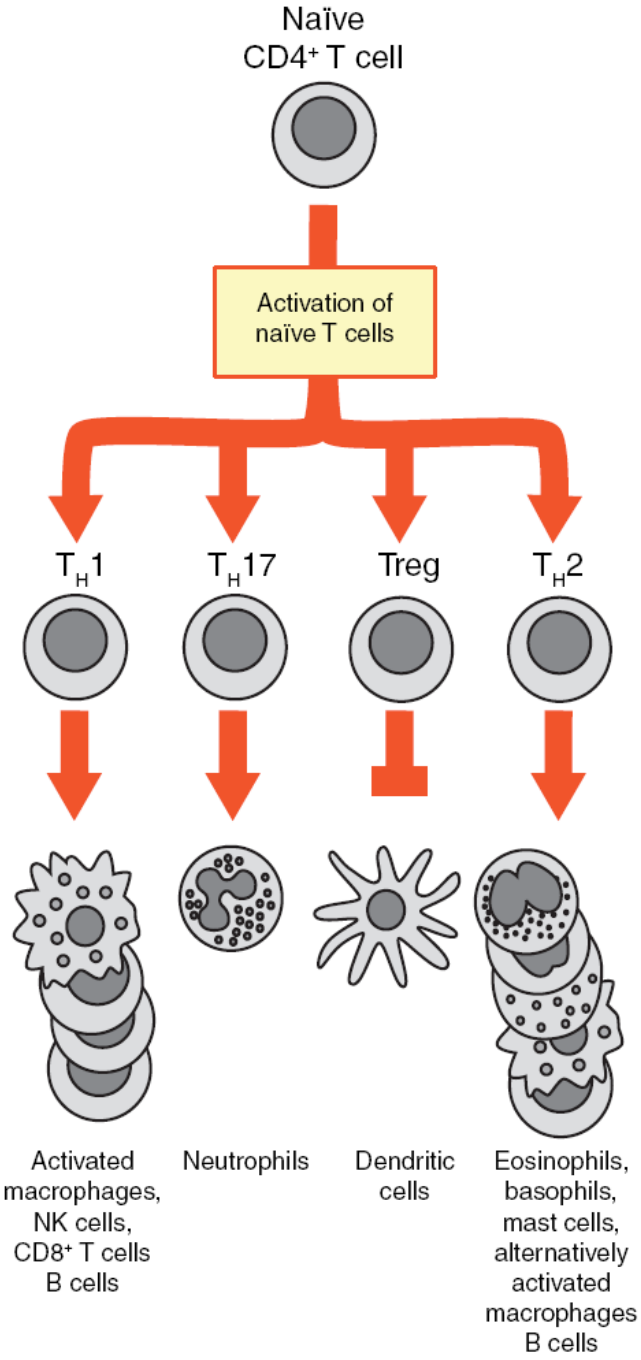
Generación de la diversidad de anticuerpos



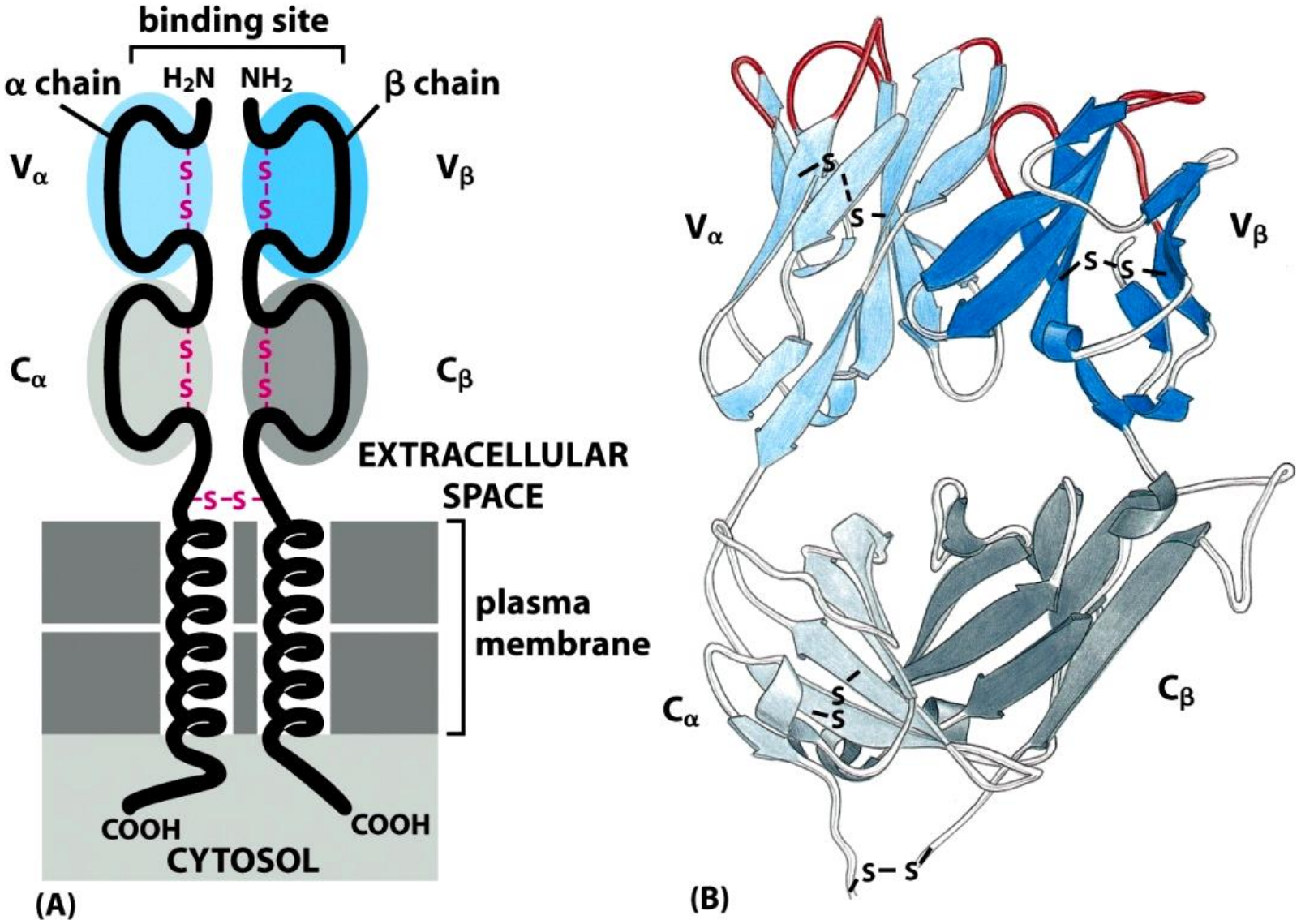
Linfocitos T



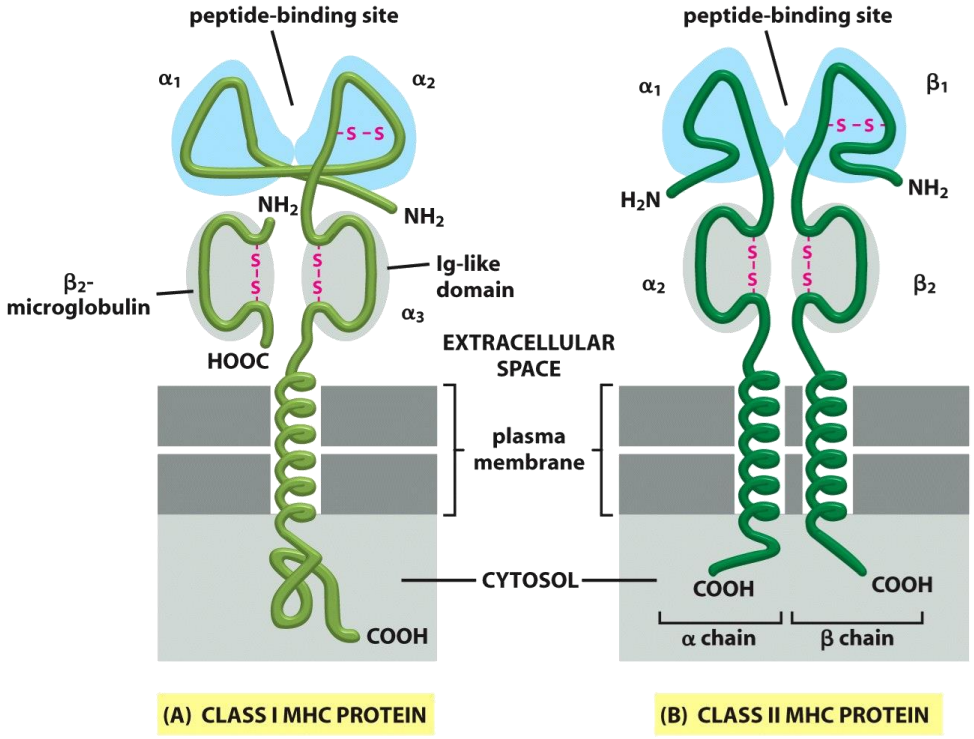


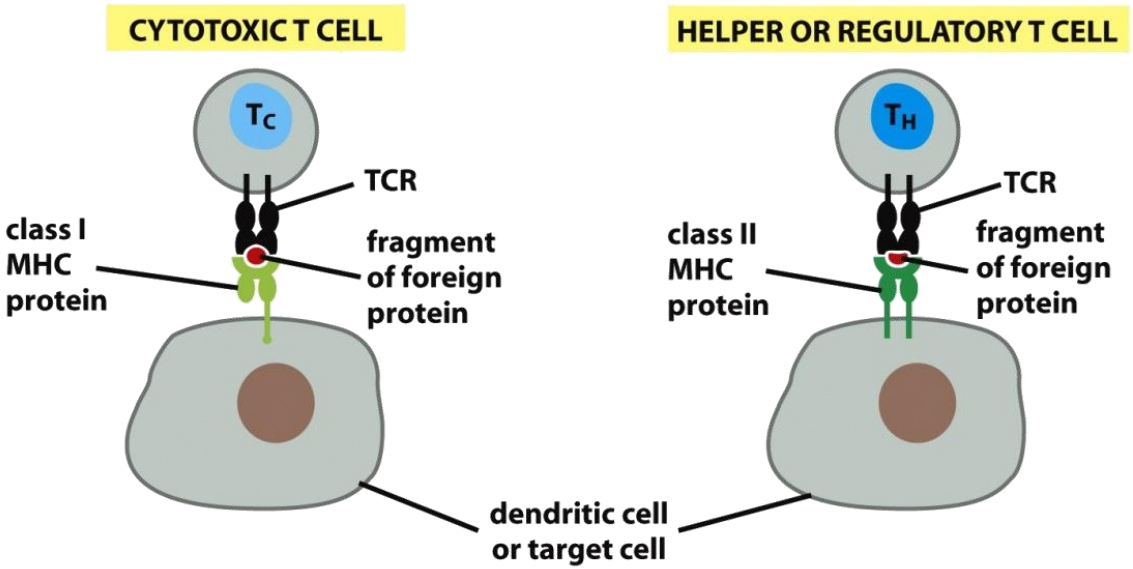


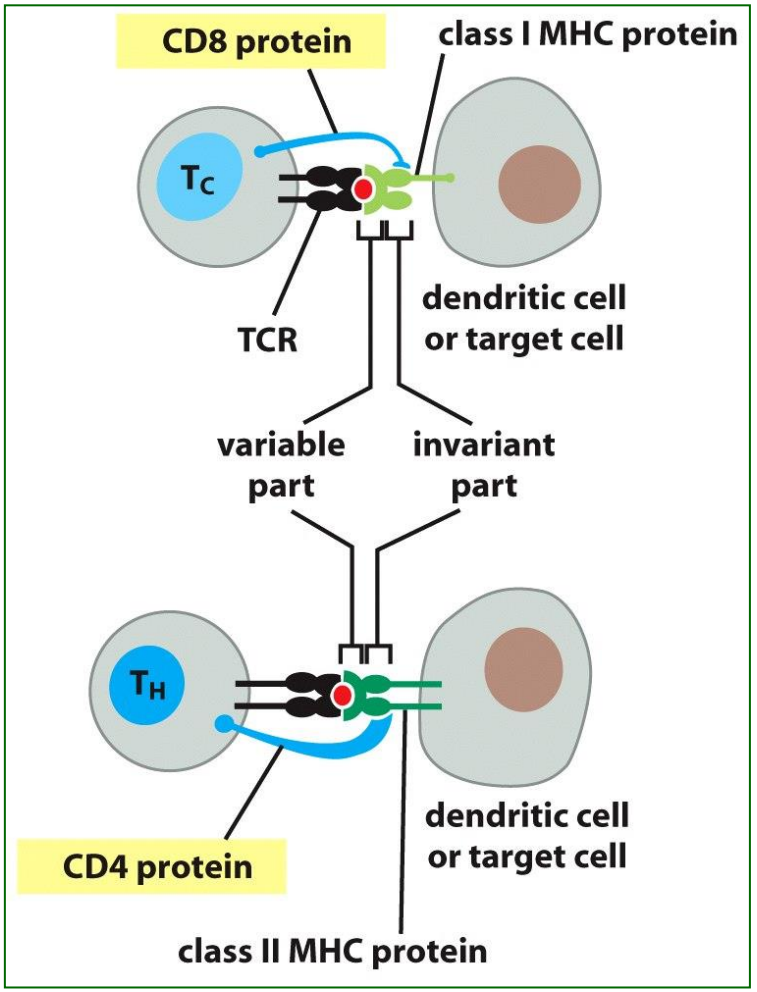
El receptor T



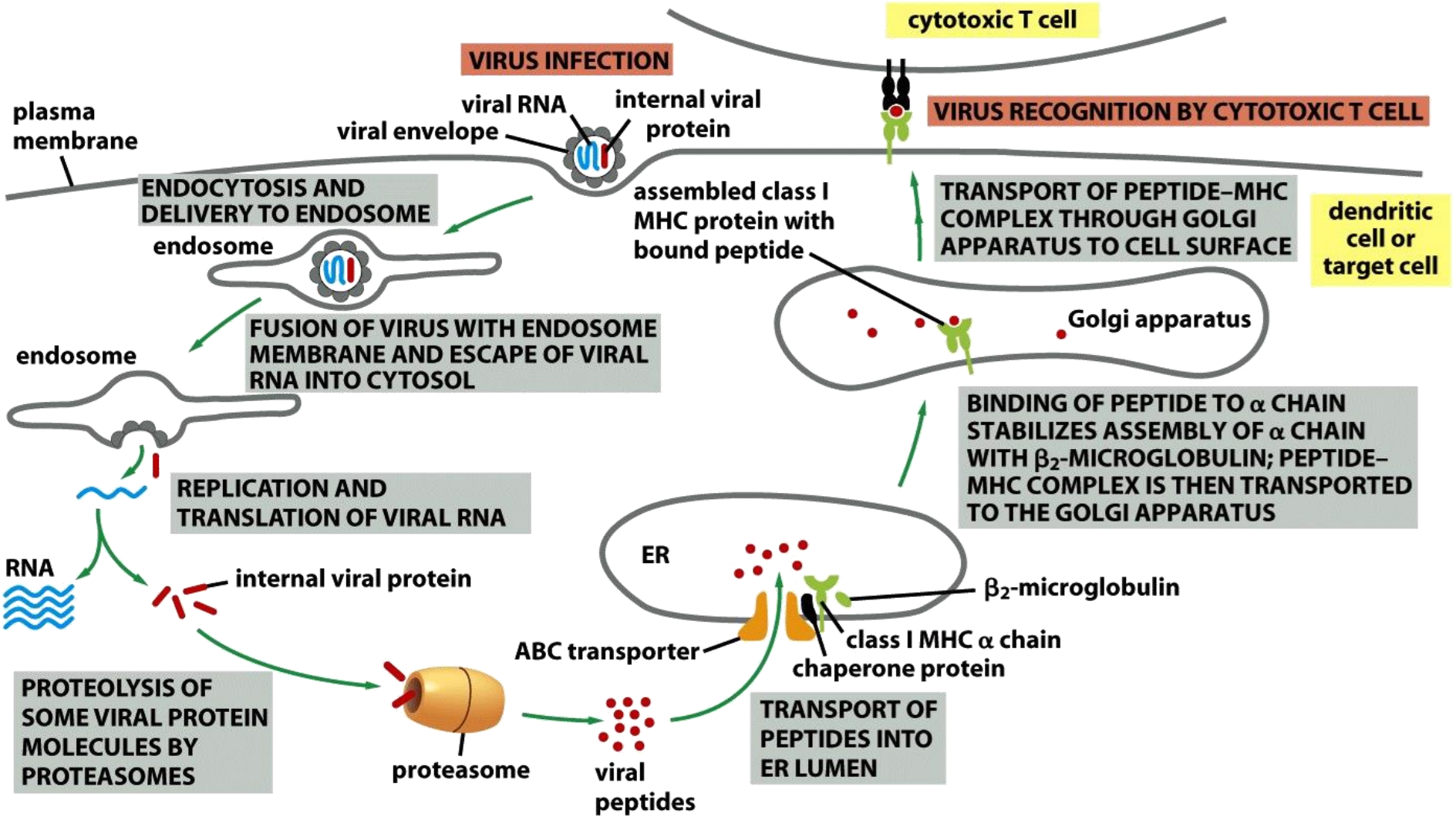
Activación de linfocitos T: Proteínas MHC





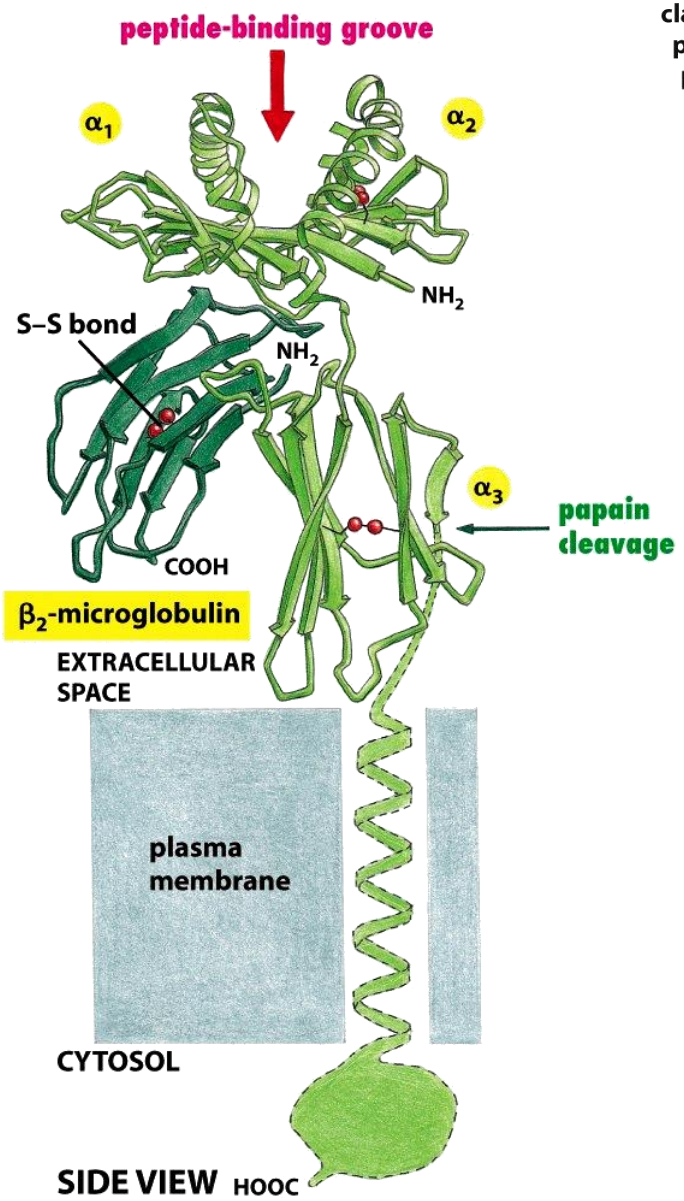


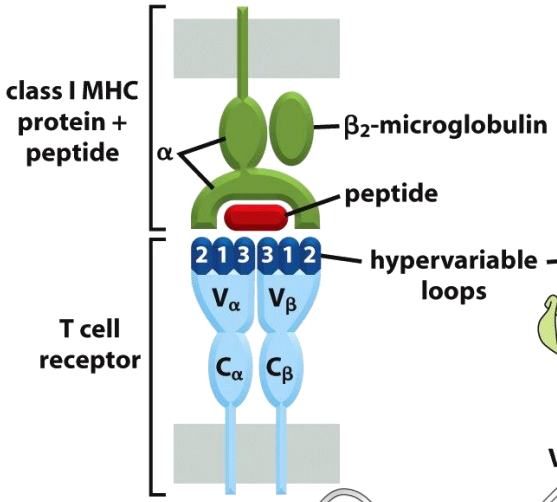
Procesamiento y presentación de antígenos a linfocitos T

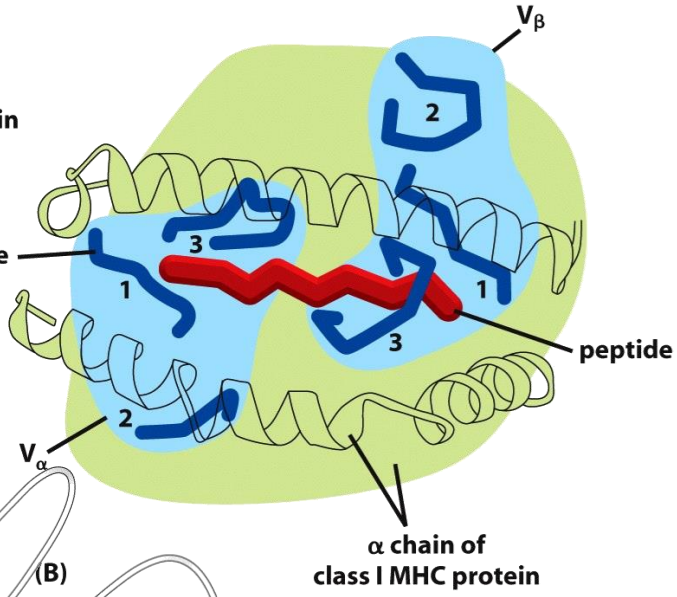


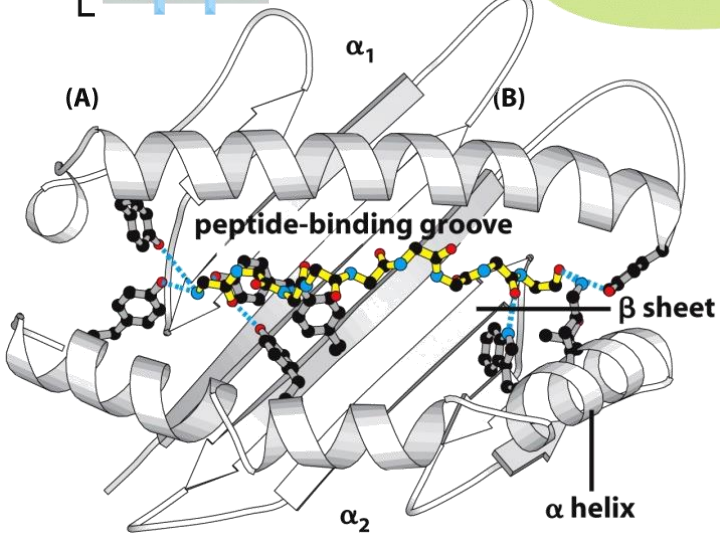
Estructura de los MHC

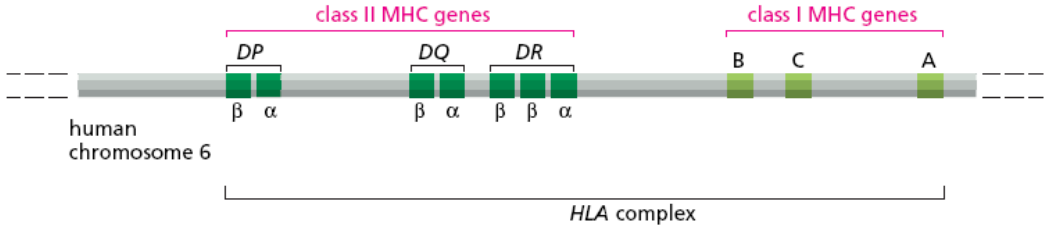
MHC I

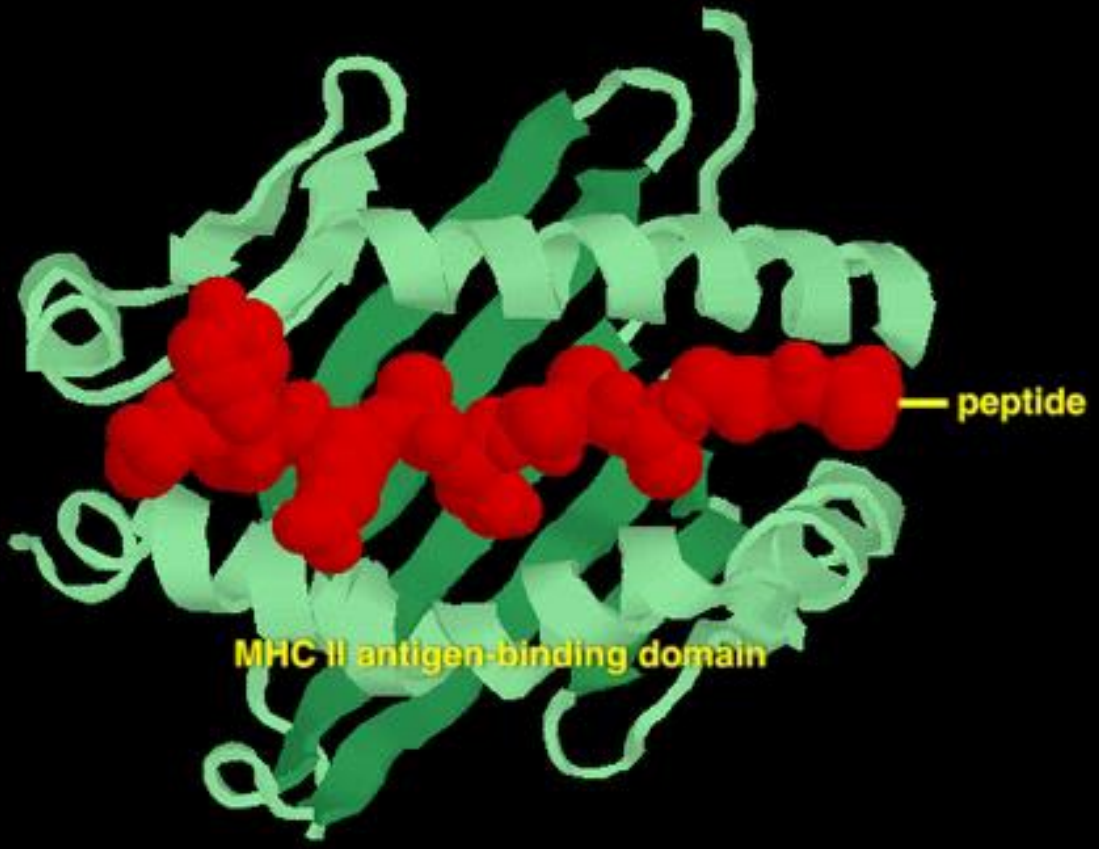






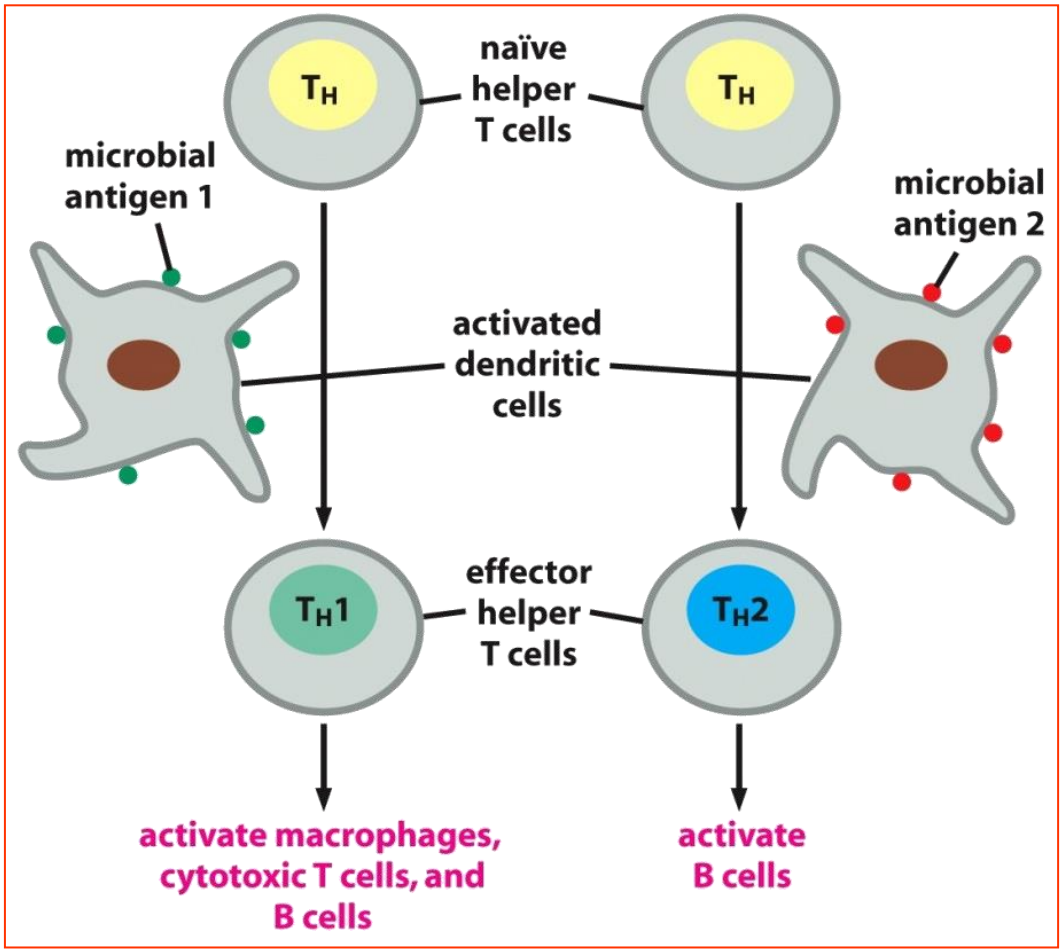


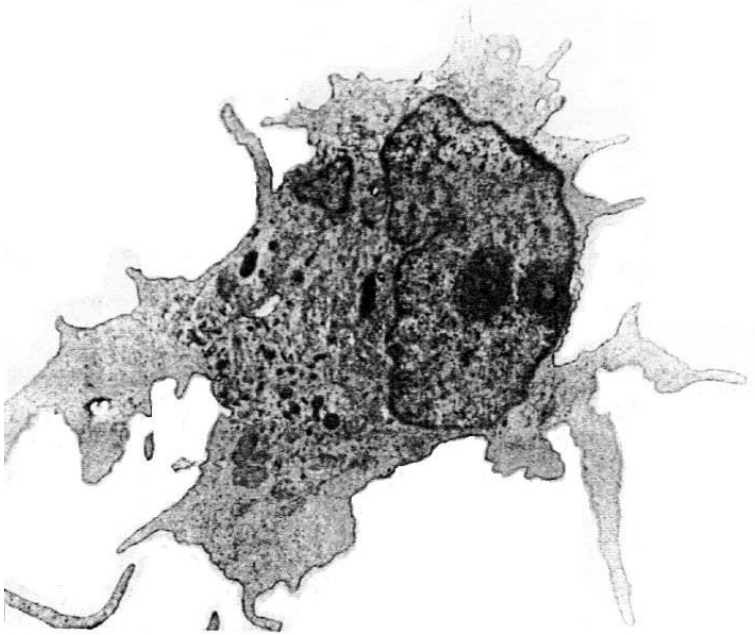


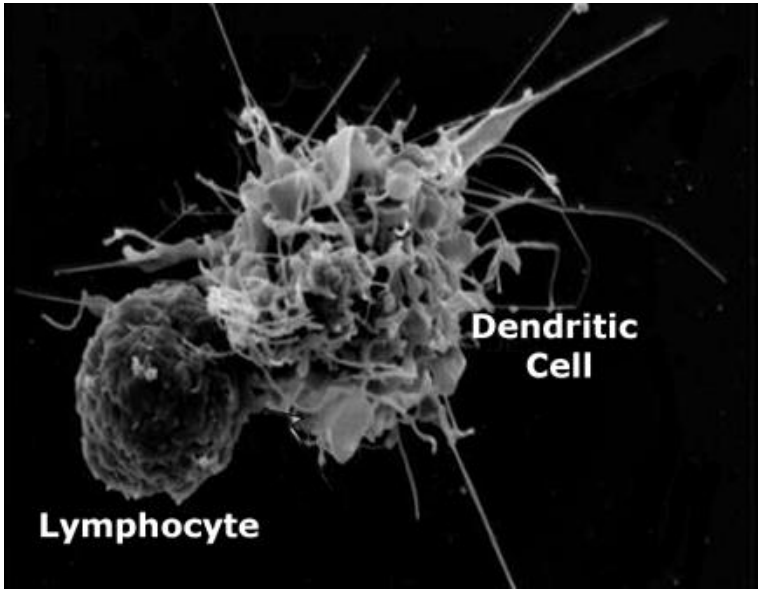


https://youtu.be/9MOmT3WgtkY

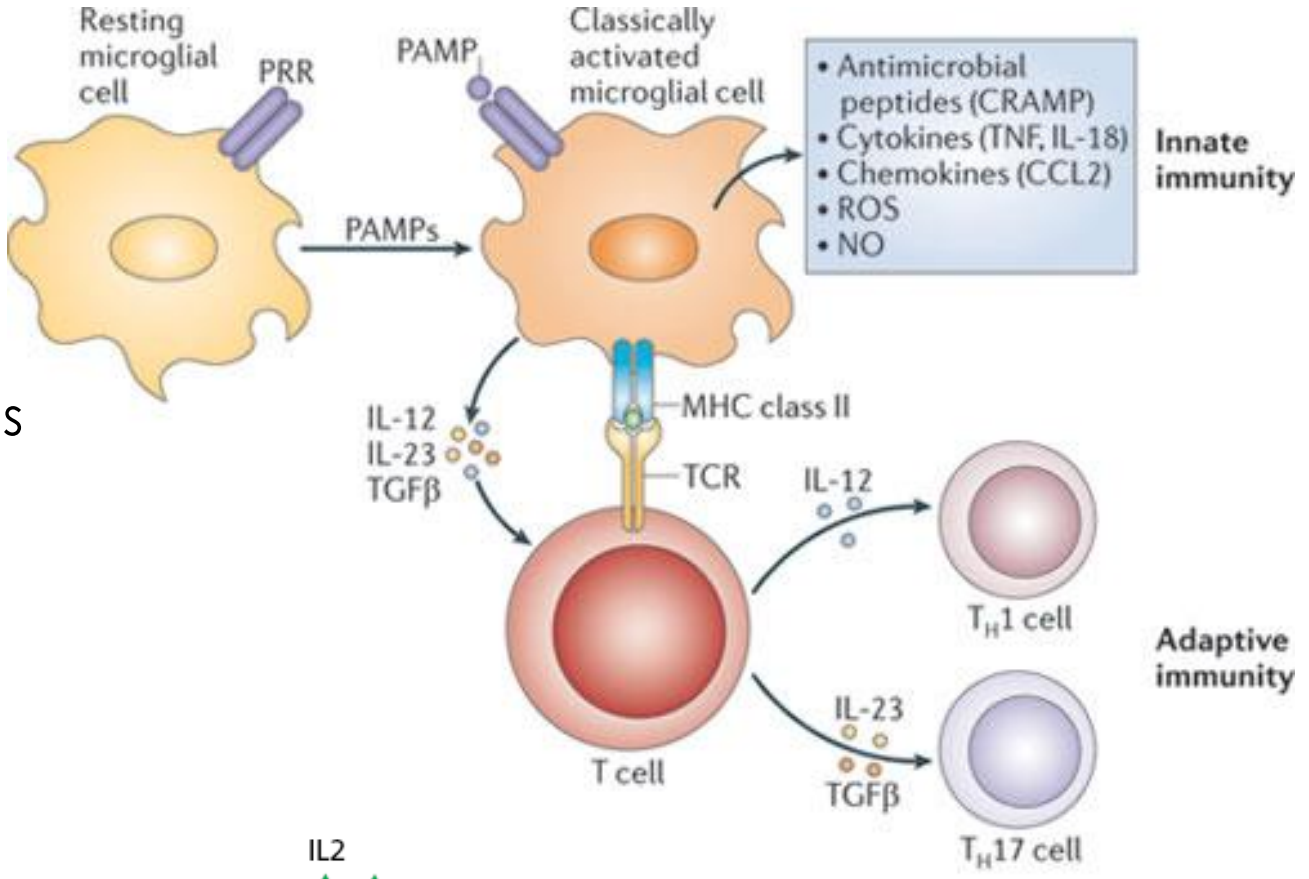
Activación de linfocitos T por células del sistema inmune innato

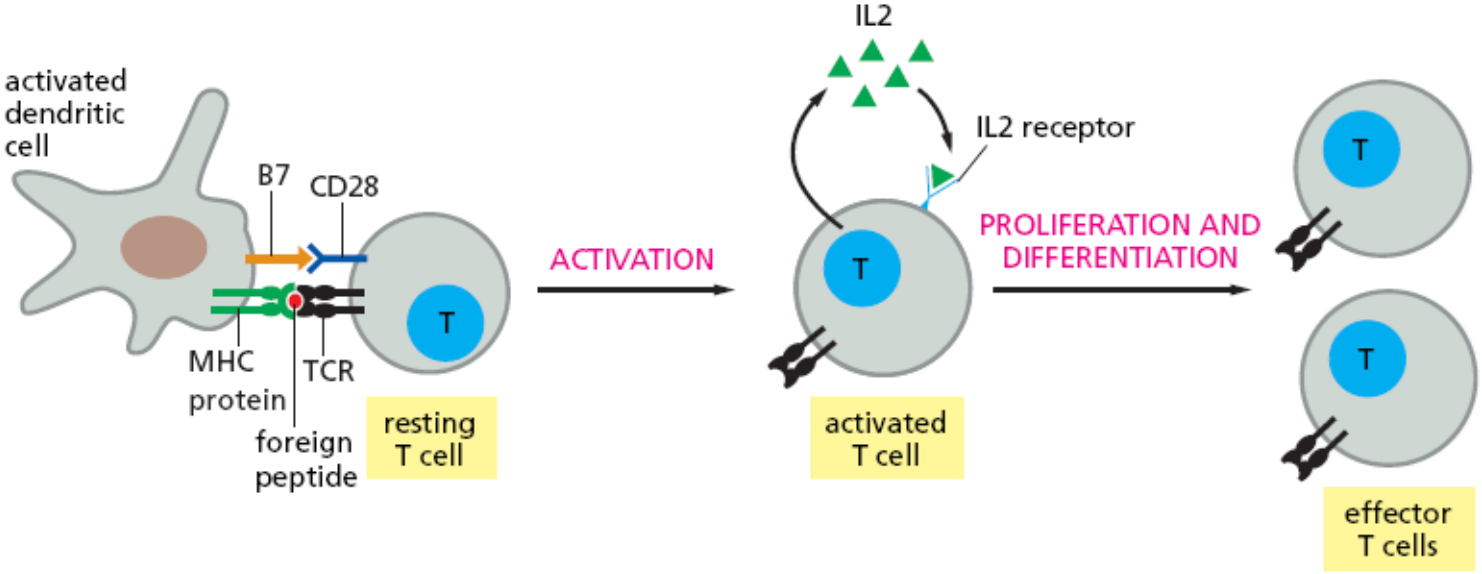




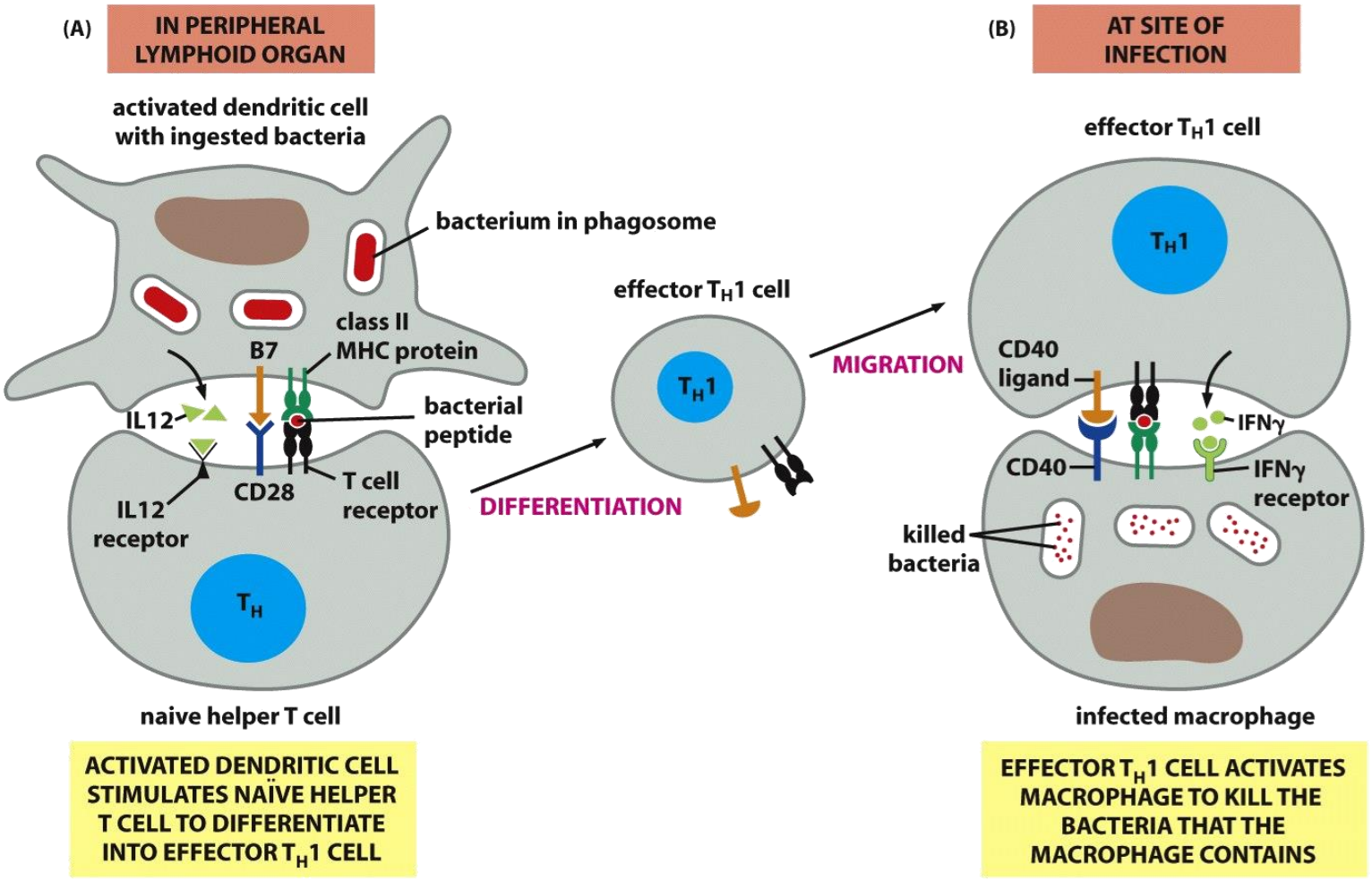


Activación de linfocitos T por células del sistema inmune innato

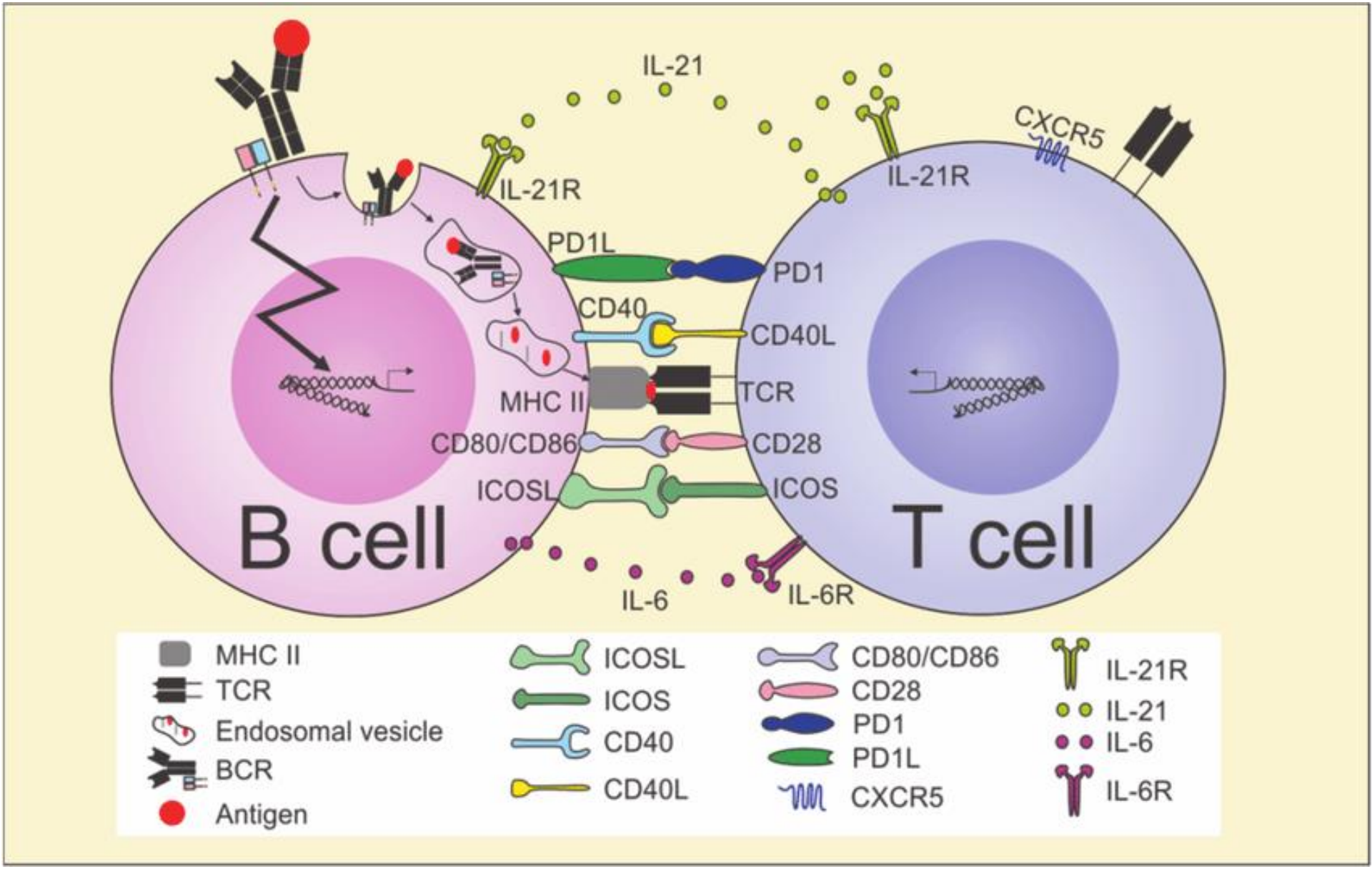




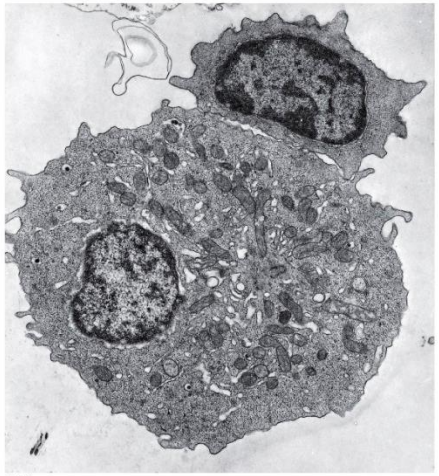
Linfocitos T colaboradores ("helper"): Activación de fagocitos



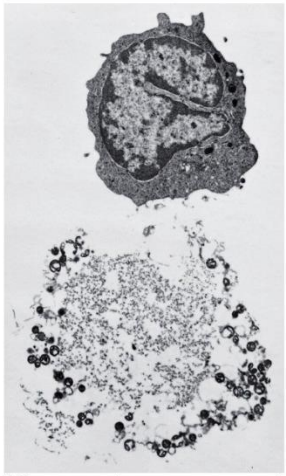
Linfocitos T colaboradores ("helper"): Activación de linfocitos B



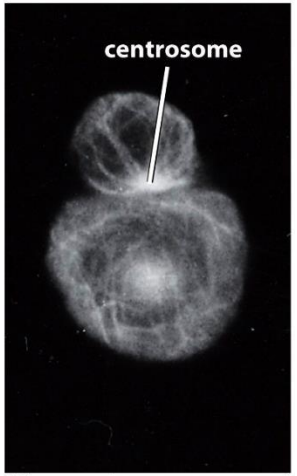
Linfocitos T citotóxicos



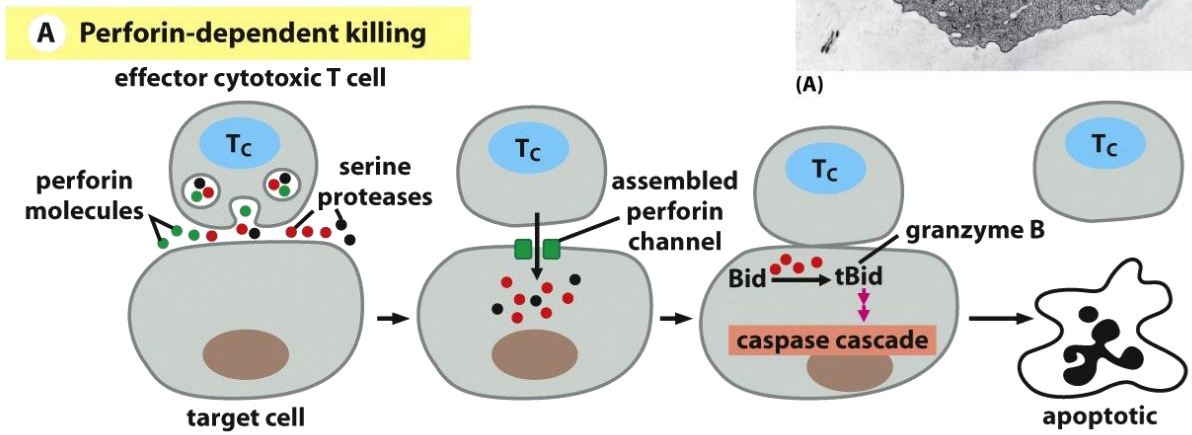
(A)

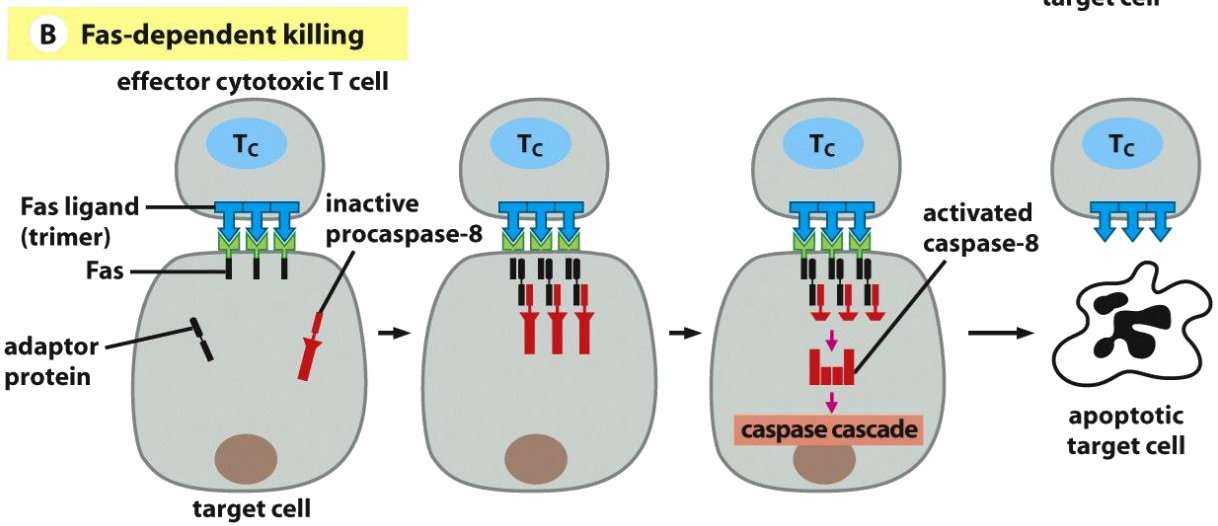


(B) 5 μm



(C) 10 μm

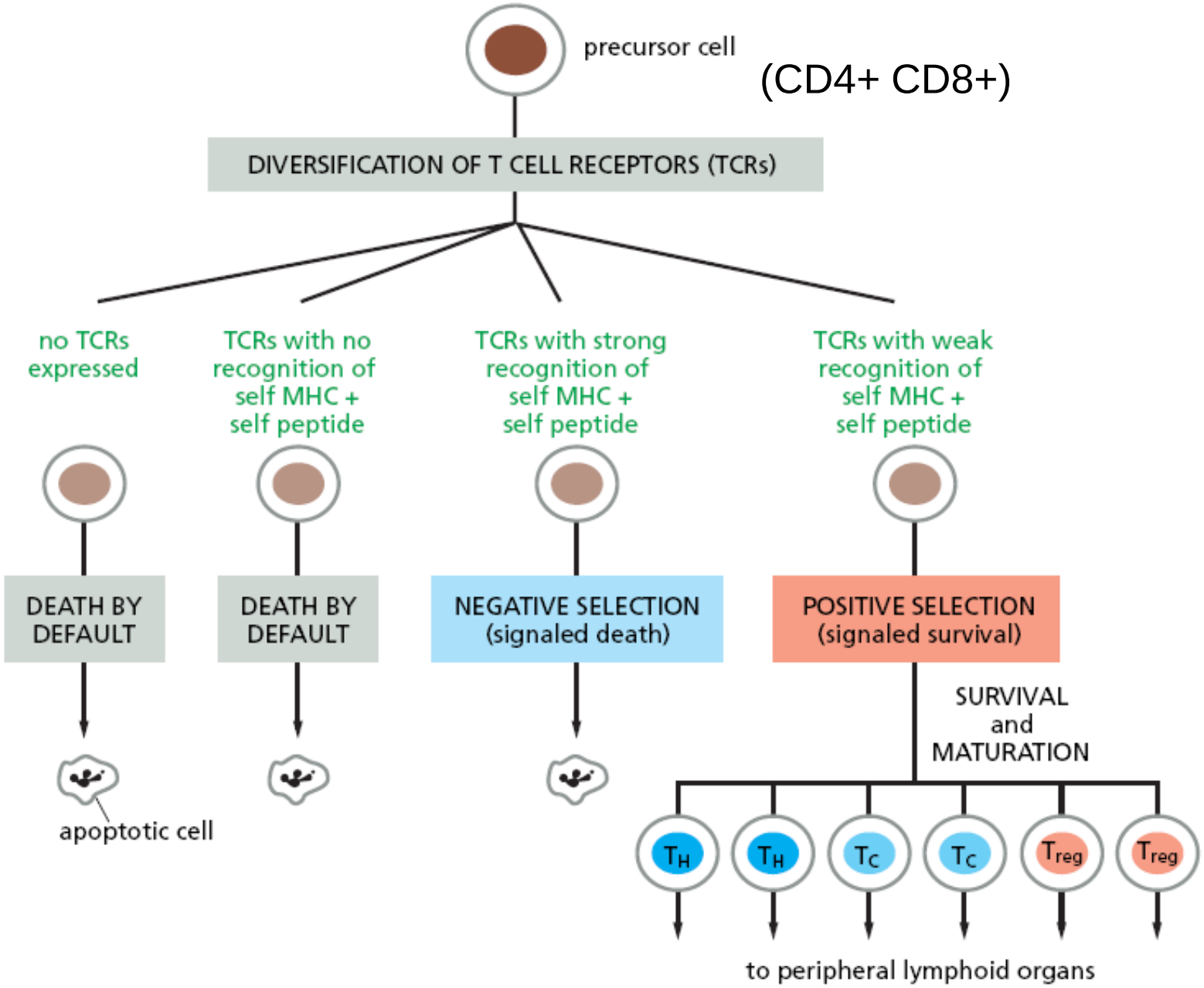




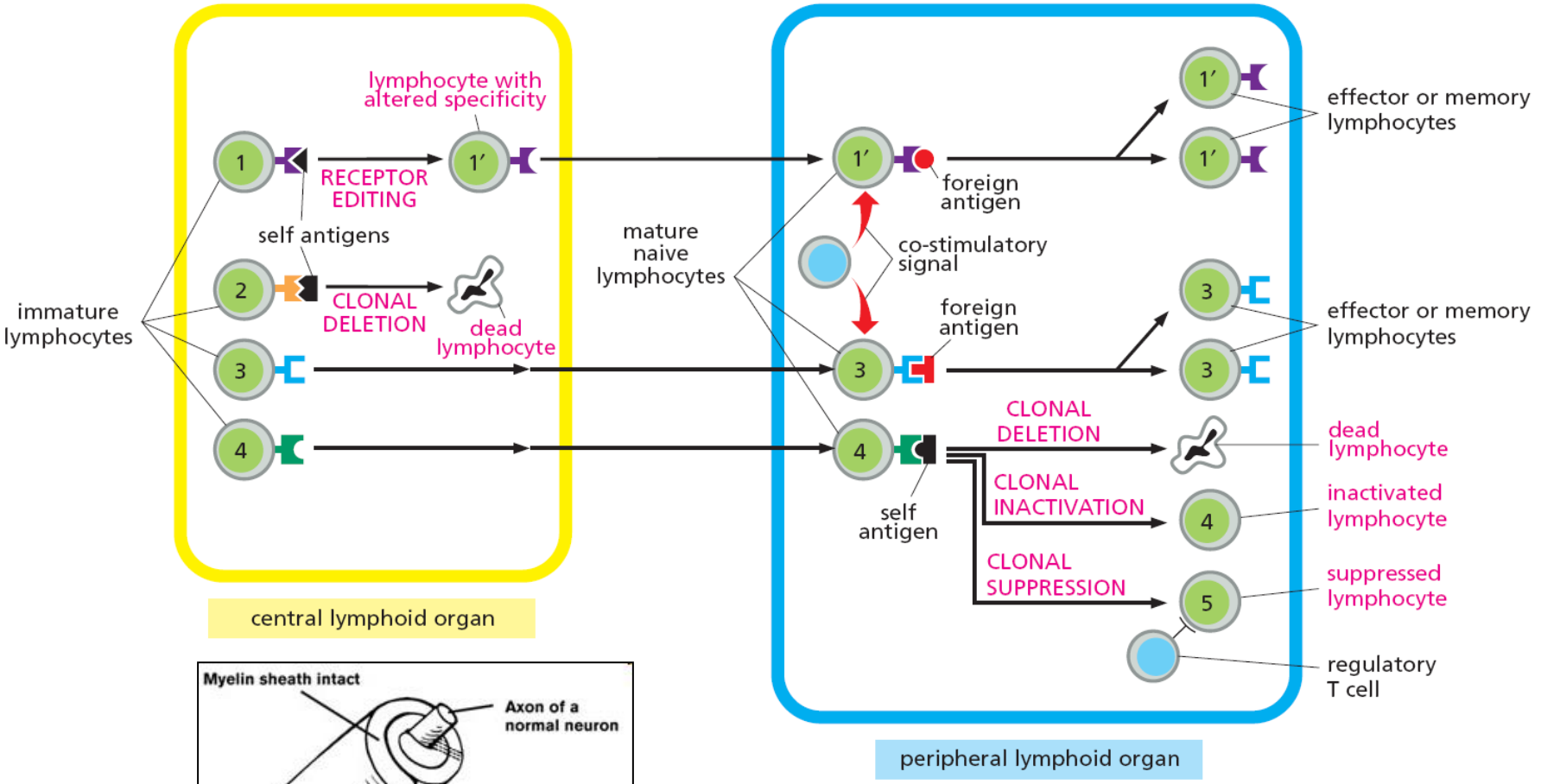
Jaume Barba, 1930

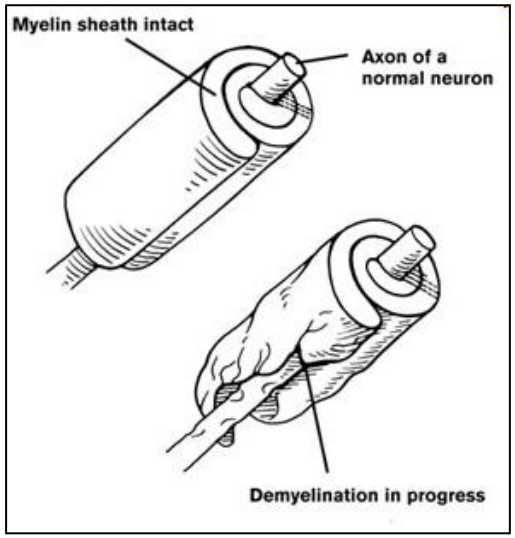
Cementerio Poblenou, Barcelona

Diferenciación de linfocitos T: selección positiva y negativa en el timo



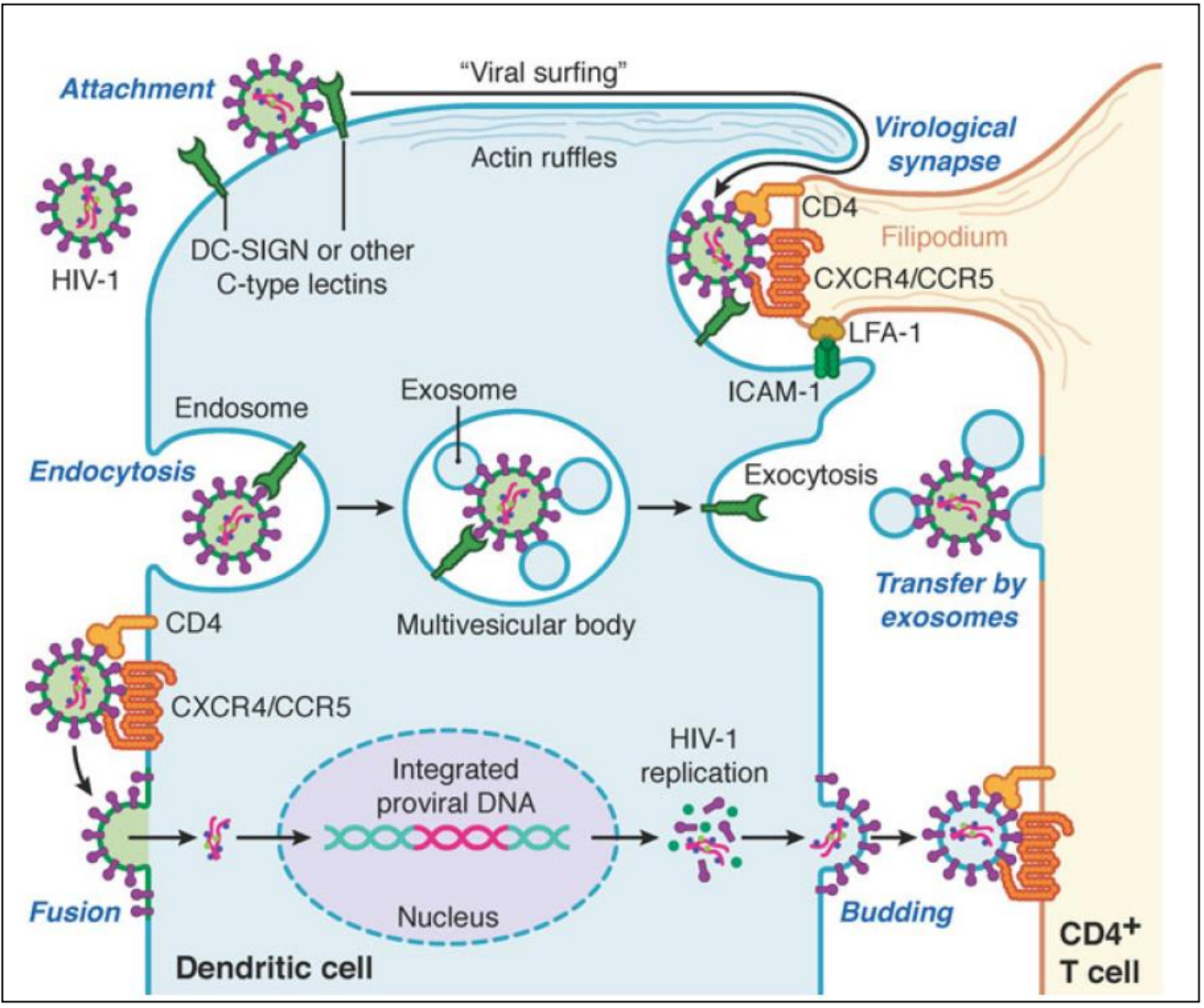
Tolerancia a antígenos propios

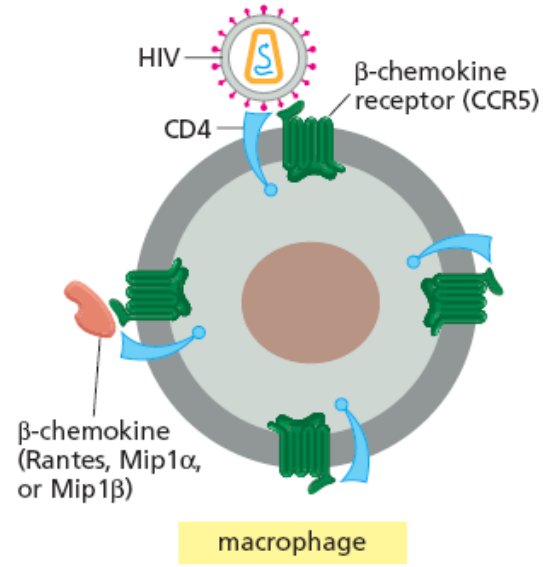


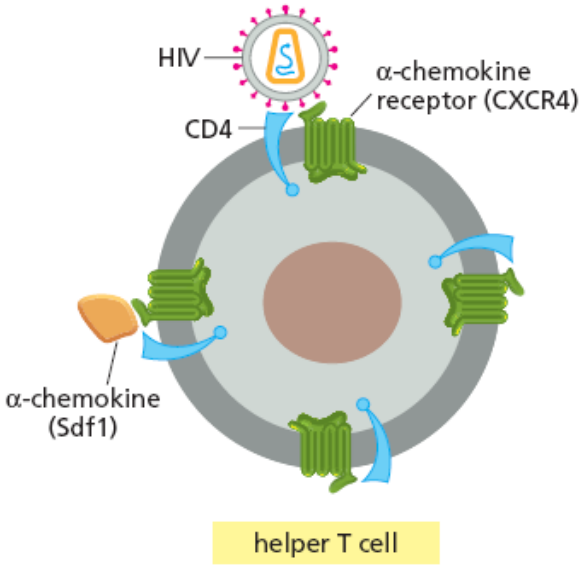


Esclerosis múltiple

Infección de linfocitos T CD4+ por HIV





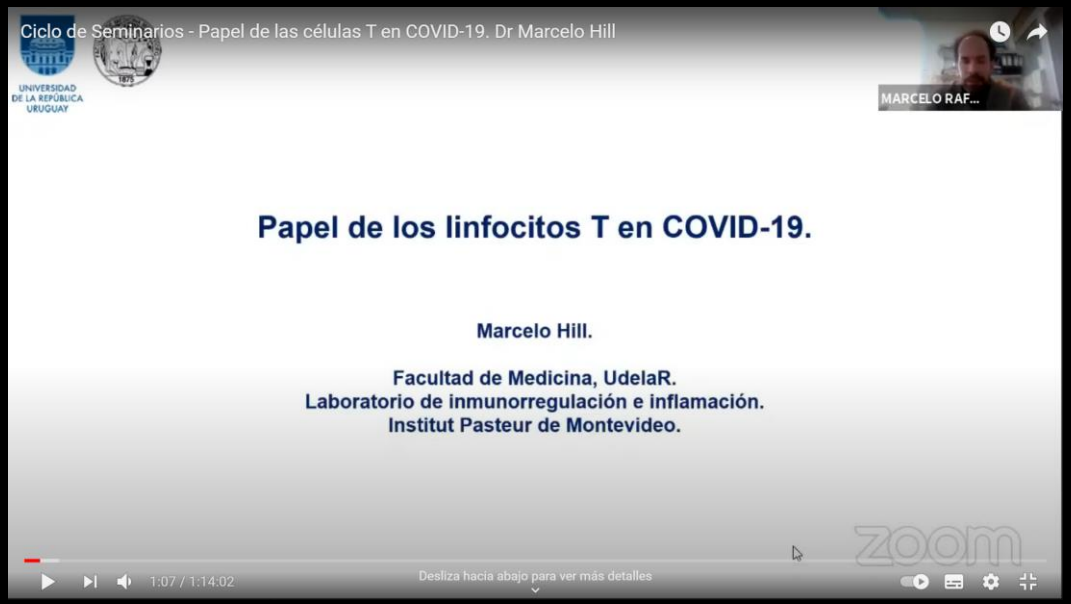


Preguntas pendientes a responder:

1- ¿En qué consisten los tres tipos principales de vacunas para SARS-CoV-2 usadas actualmente?

2- ¿Hay alguna base teórica para que las desarrolladas más recientemente sean más eficientes?

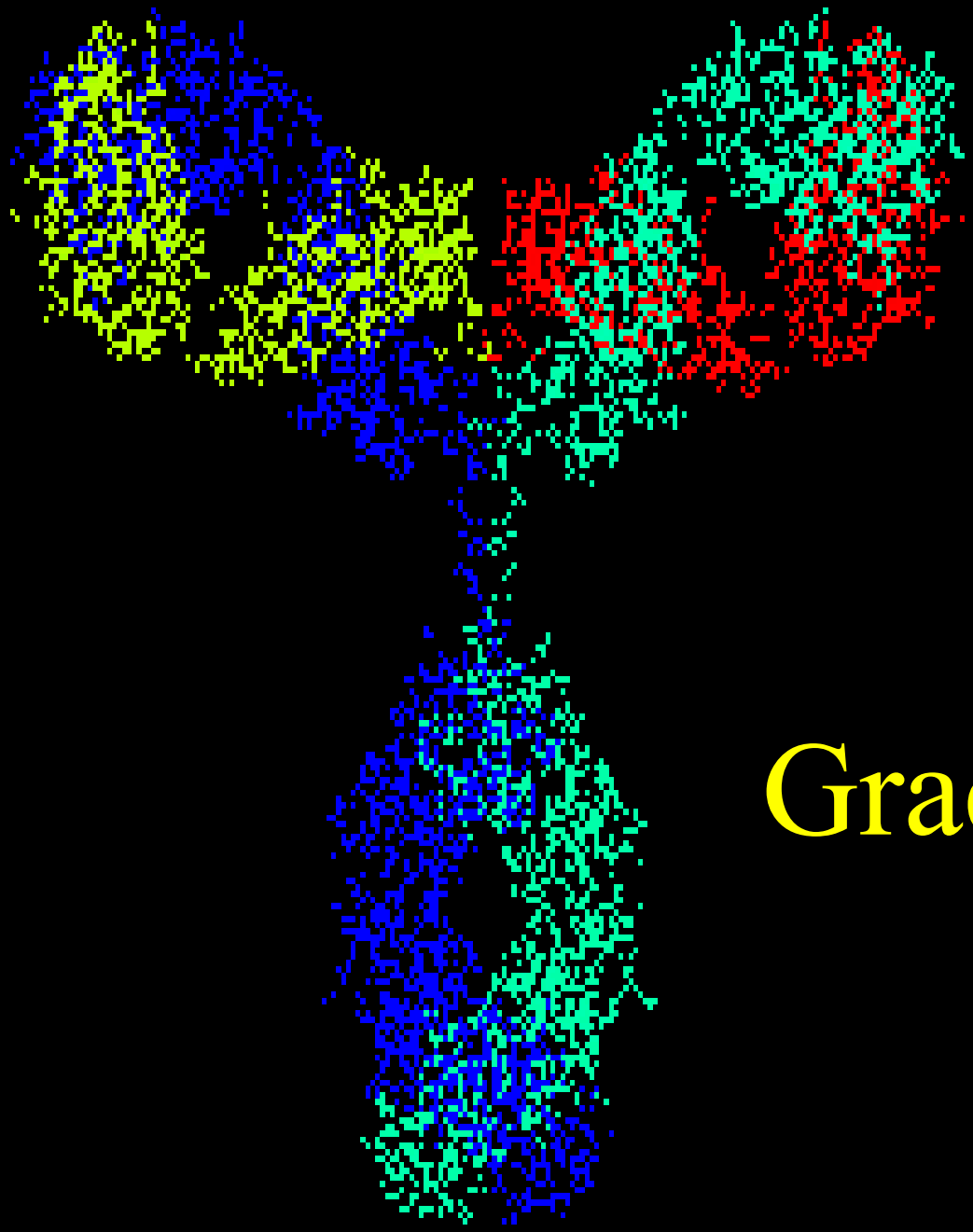
Charla recomendada:



https://youtu.be/q4RPDm6GR68

The Cow-Pock — or — the Wonderful Effects of the New Inoculation! — Vide... the Publications of y^e Anti-Vaccine Society.

Pub.d June 16.th 1802. by H. Humphrey St. James's Street.



Gracias