AULA #5

Linfócitos T e B – papel e ativação

BMI0256

Informações essenciais:

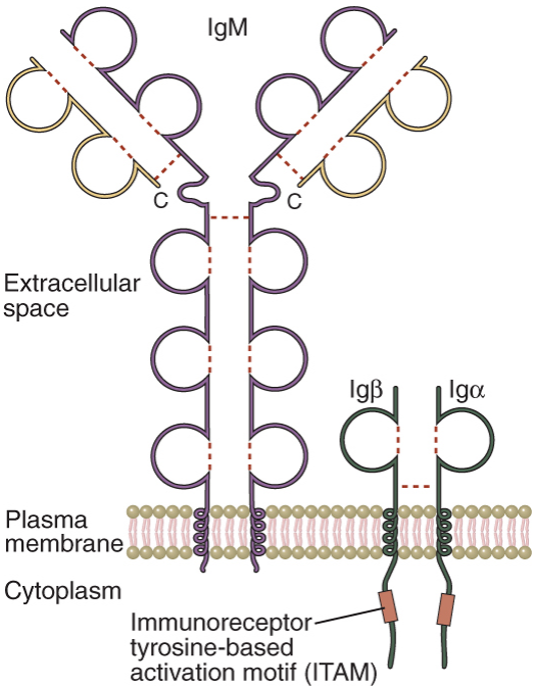
1. Respostas adaptativas funcionam com 2 sinais – um deles é o antígeno, o outro vem de indicadores de "perigo" associados ao antígeno. O sinal do antígeno é sempre disparado por TCR ou BCR;

2. Linfócitos B pelo BCR ligam-se diretamente ao antígeno que pode ser protéico ou não;

3. Linfócitos TCR$\alpha\beta$ reconhecem antígenos protéicos apenas, que são peptídeos apresentados por MHC;

4. Durante o processo de ativação de linfócitos ocorre:
Sinalização
Proliferação clonal
Produção de moléculas efetoras (anticorpos, citocinas e outros)
Controle da resposta e apoptose

Linfócitos B



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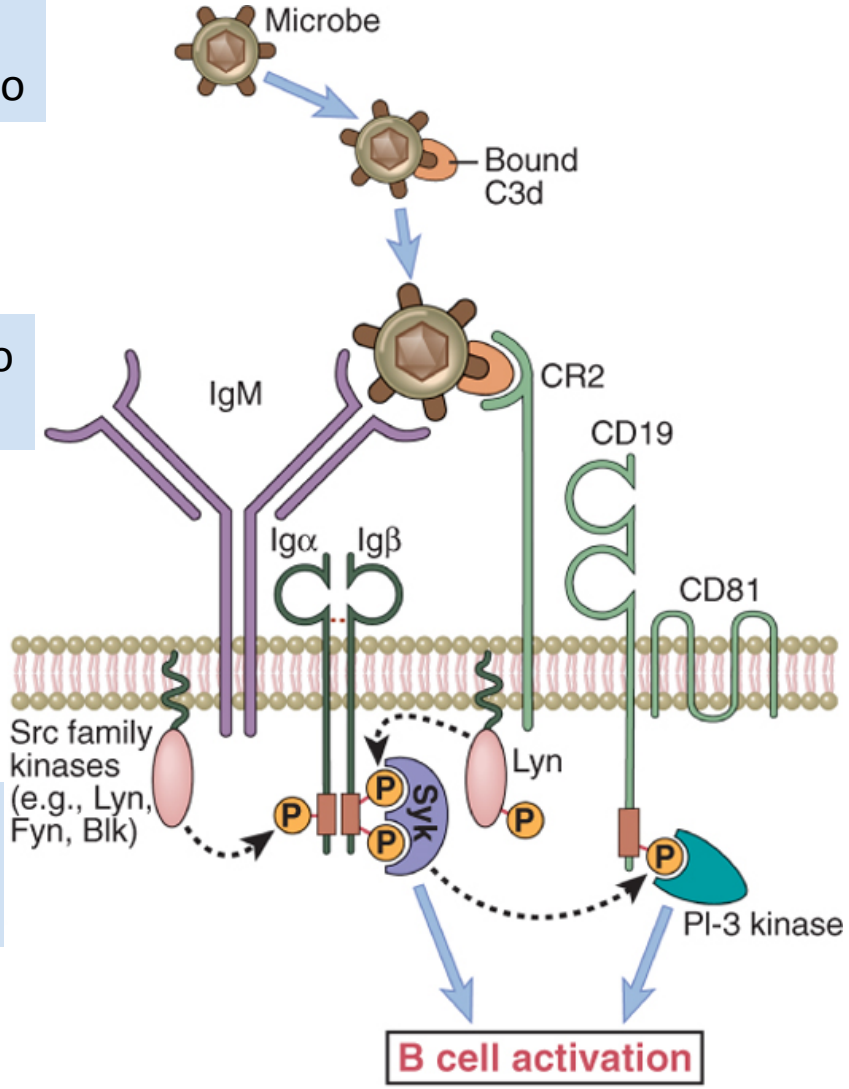
Ativação
S complemento

Reconhecimento
do antígeno

Sinalização
e ativação



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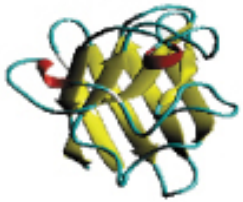
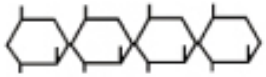
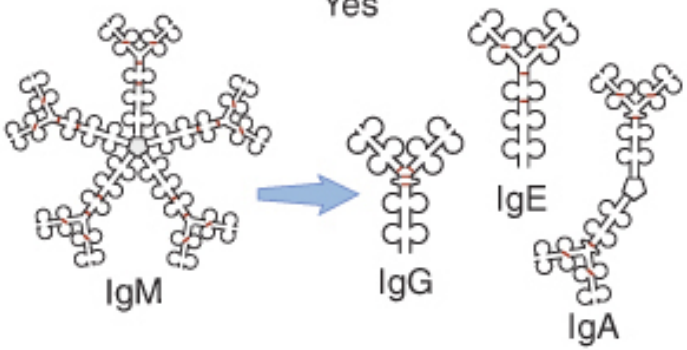
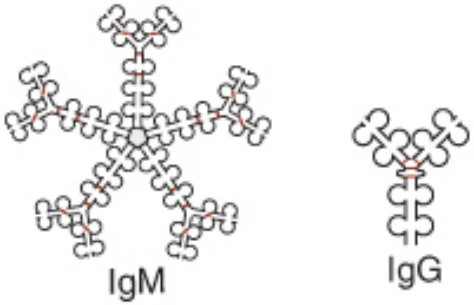
TIPOS DE ANTÍGENOS – IMPORTÂNCIA DA RESPOSTA HUMORAL

	TIMO-DEPENDENDENTES	TIMO-INDEPENDENDENTES
Chemical nature	Proteins 	Polímeros, polisacarídeos, glicolipídes, ácidos nucléicos 
Características da resposta		
Troca de isotipo	Yes 	Little or no: may be some IgG 
Alteração da afinidade	Yes	Little or no
Resposta 2ária (memória)	Yes	Only seen with some antigens

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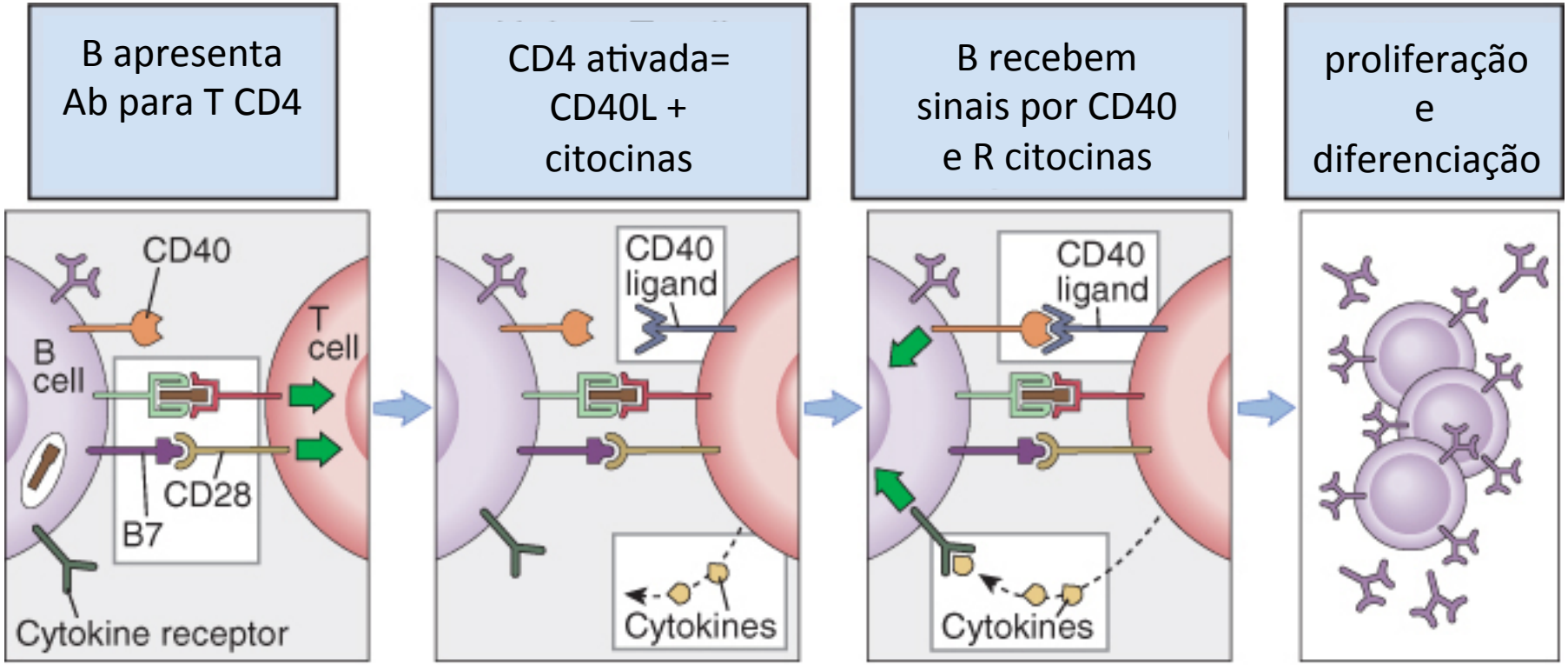
Ativação de linfócitos B em linfonodos



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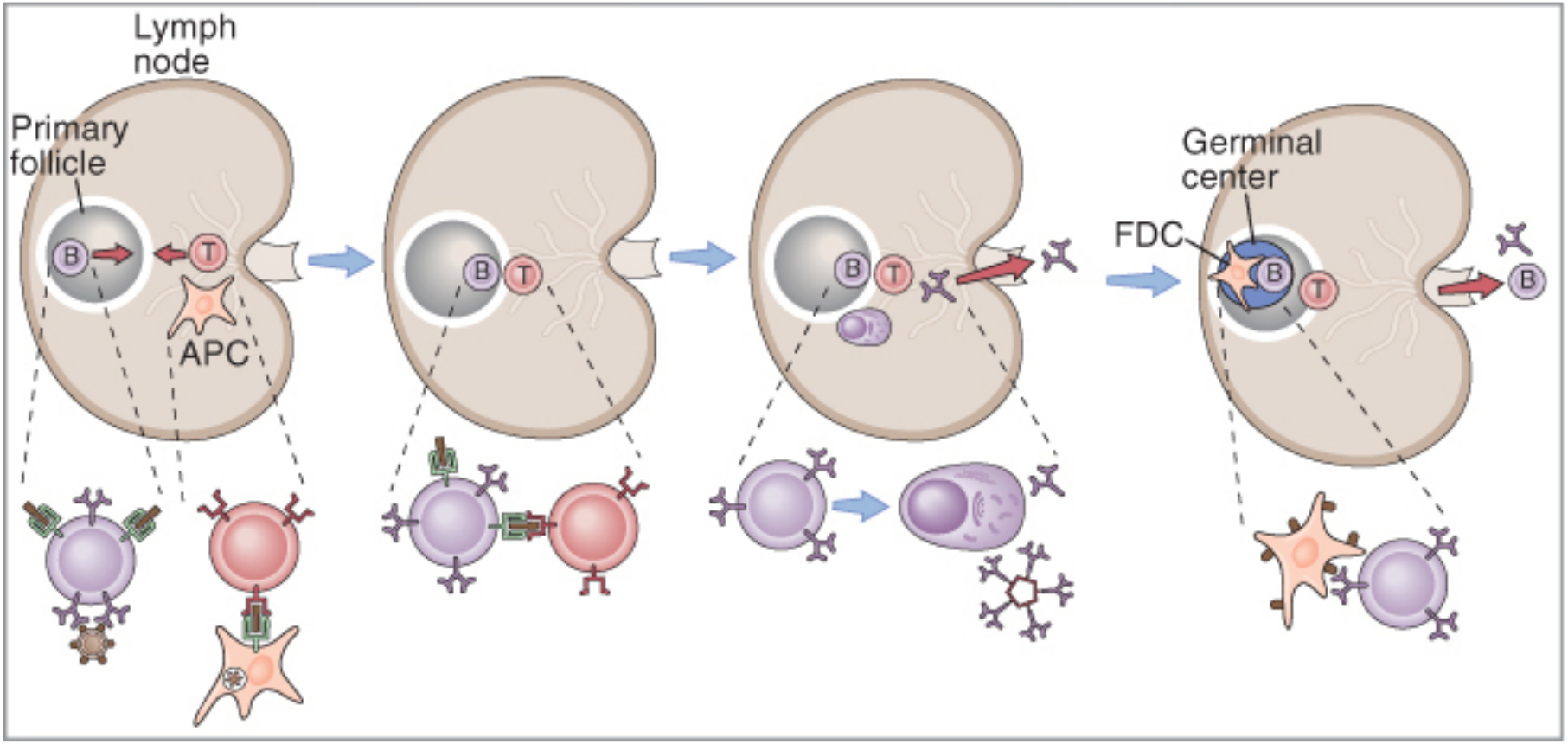
Ativação de linfócitos B em linfonodos – timo-dependente

Ativação e migração de T e B

interação de T e B

Diferenciação B secreção Ig troca de isotipo

Maturação afinidade centro germinativo



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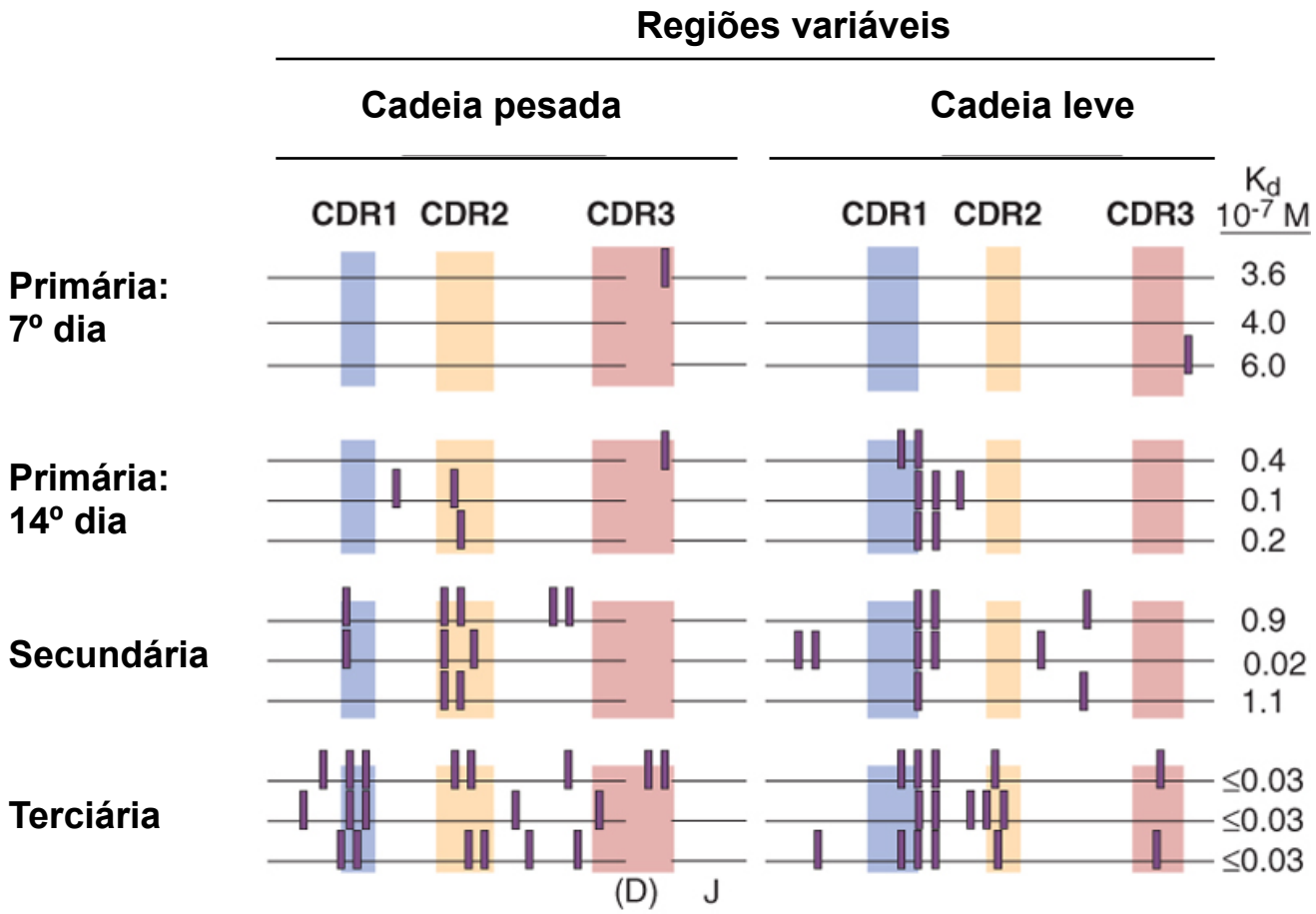
GERAÇÃO DE DIVERSIDADE APÓS ENCONTRO COM O ANTÍGENO

Hipermutação somática

substituições aleatórias de 1 nucleotídeo que alteram a especificidade antigênica



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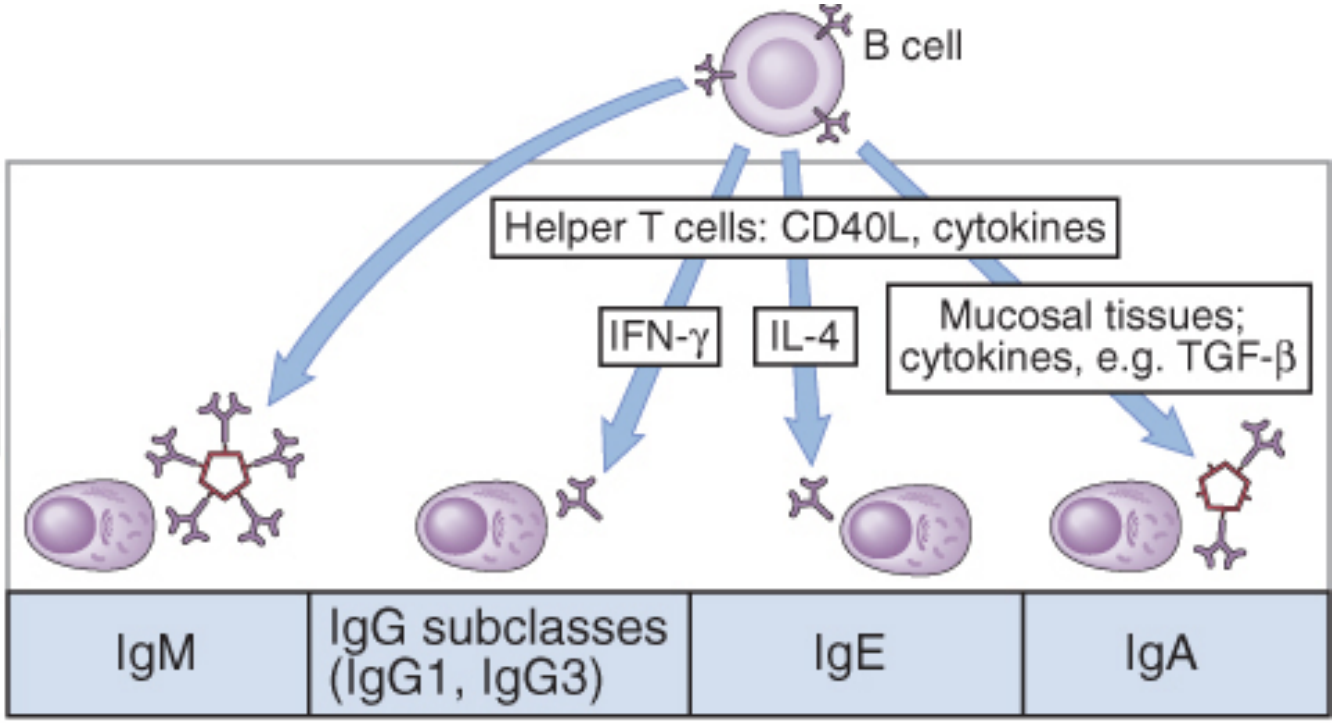
Troca de isotipo

Troca de isotipo



	IgM	IgG subclasses (IgG1, IgG3)	IgE	IgA
Principal effector functions	Ativação Sistema complemento	Ativação Sistema Complemento; Fagocitose via FcR; Imunidade Neonatal; Citotoxicidade; neutralização	Degranulação mastócitos; Imunidade contra helmintos (eosinófilos)	Neutralização; Imunidade de mucosas

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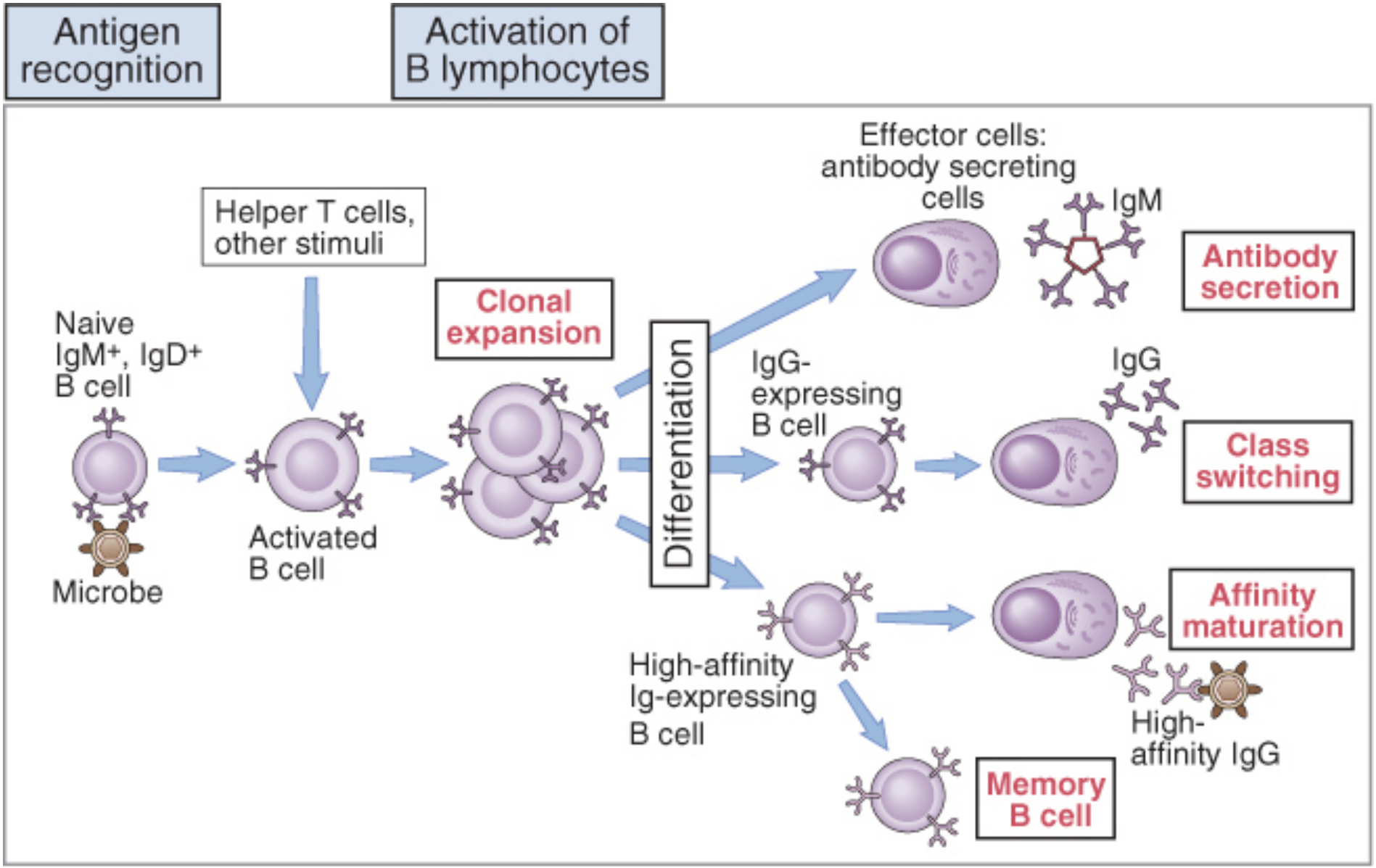
ETAPAS DA ATIVAÇÃO



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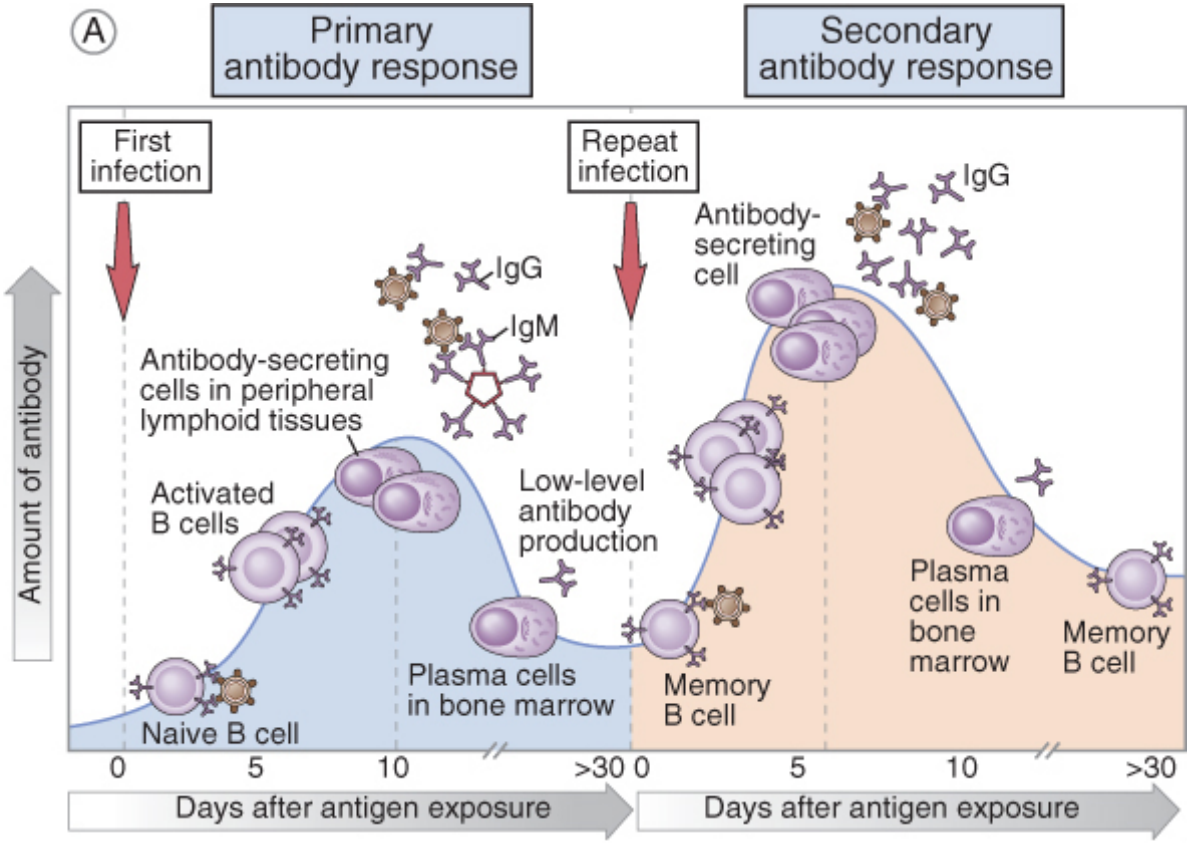
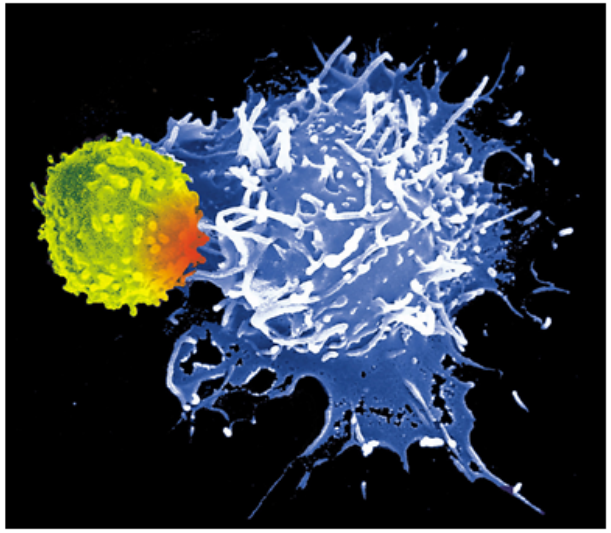
Resposta Primária x Resposta Secundária

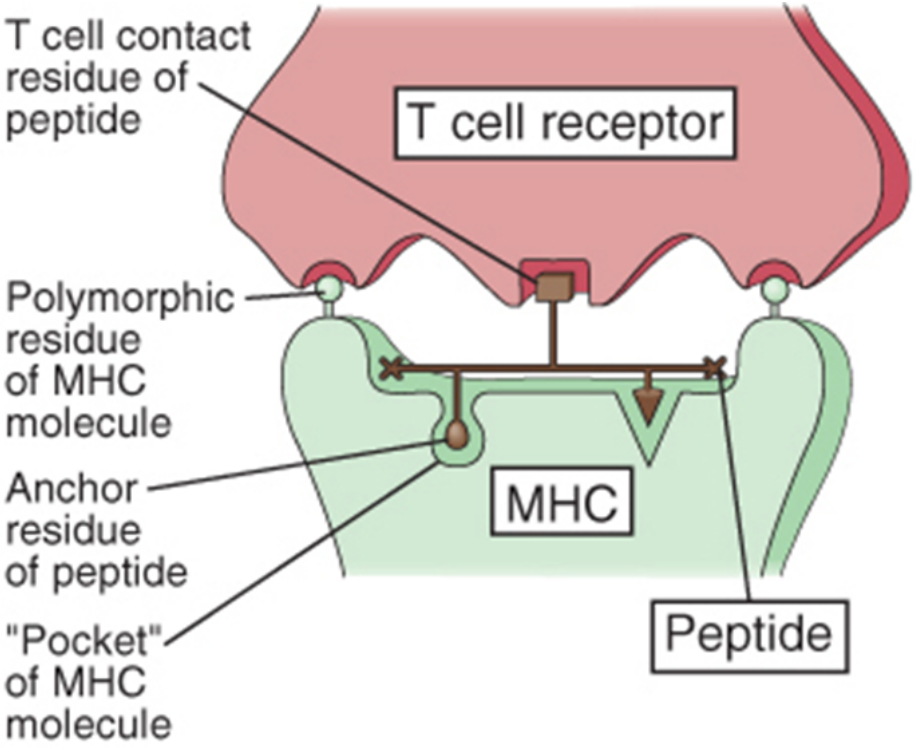


B

	Primary response	Secondary response
Lag after immunization	Usually 5-10 days	Usually 1-3 days
Peak response	Smaller	Larger
Antibody isotype	Usually IgM>IgG	Relative increase in IgG and, under certain situations, in IgA or IgE (heavy chain class switching)
Antibody affinity	Lower average affinity, more variable	Higher average affinity (affinity maturation)

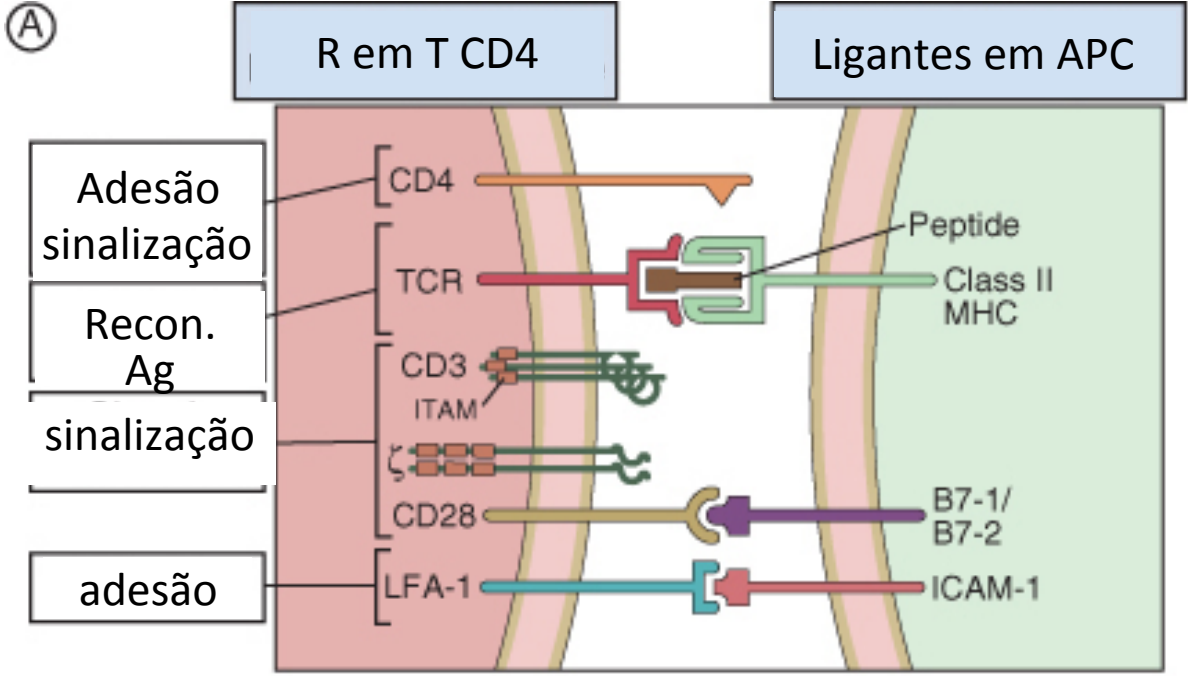
Linfócitos T





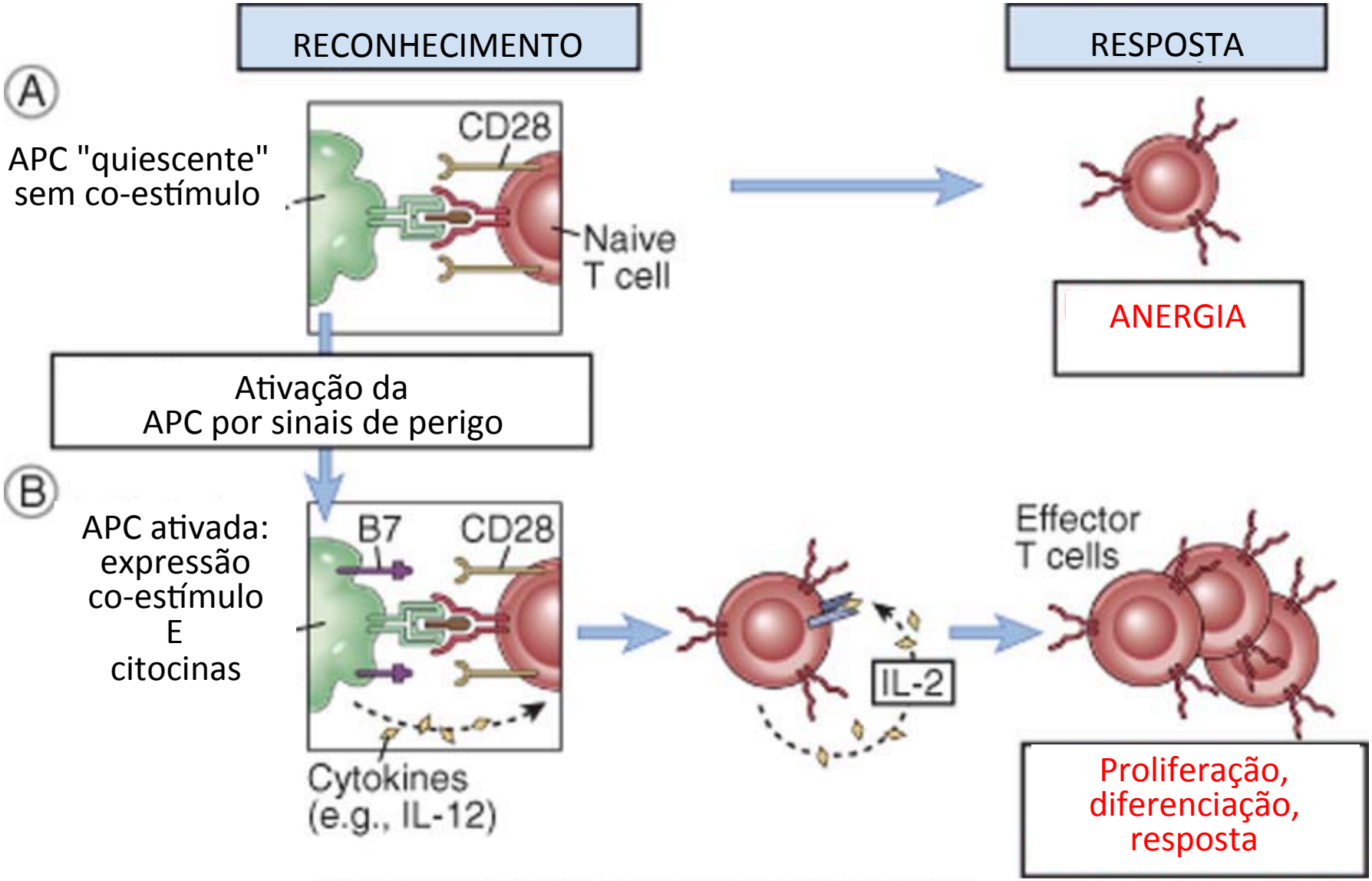
SINAPSE IMUNOLÓGICA

*T e APC

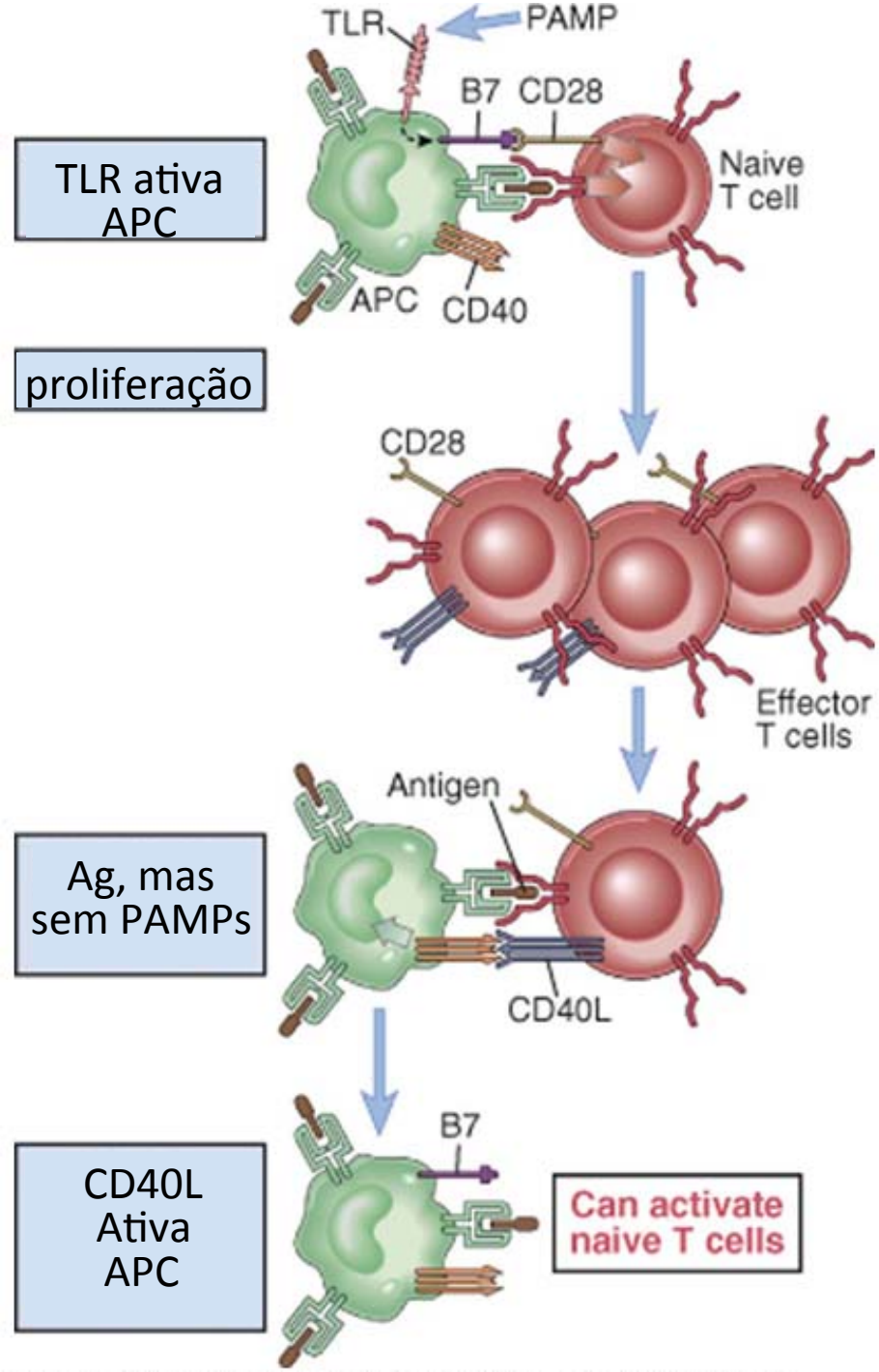


Ⓑ T cell accessory molecule	Function	Ligand	
		Name	Expressed on
CD3	Signal transduction by TCR complex	None	
ζ	Signal transduction by TCR complex	None	
CD4	Adhesion and signal transduction	Class II MHC	Antigen-presenting cells
CD8	Adhesion and signal transduction	Class I MHC	Antigen-presenting cells, CTL target cells
CD28	Signal transduction (costimulation)	B7-1/B7-2	Antigen-presenting cells
CTLA-4	Signal transduction (negative regulation)	B7-1/B7-2	Antigen-presenting cells
LFA-1	Adhesion	ICAM-1	Antigen-presenting cells, endothelium
VLA-4	Adhesion	VCAM-1	Endothelium

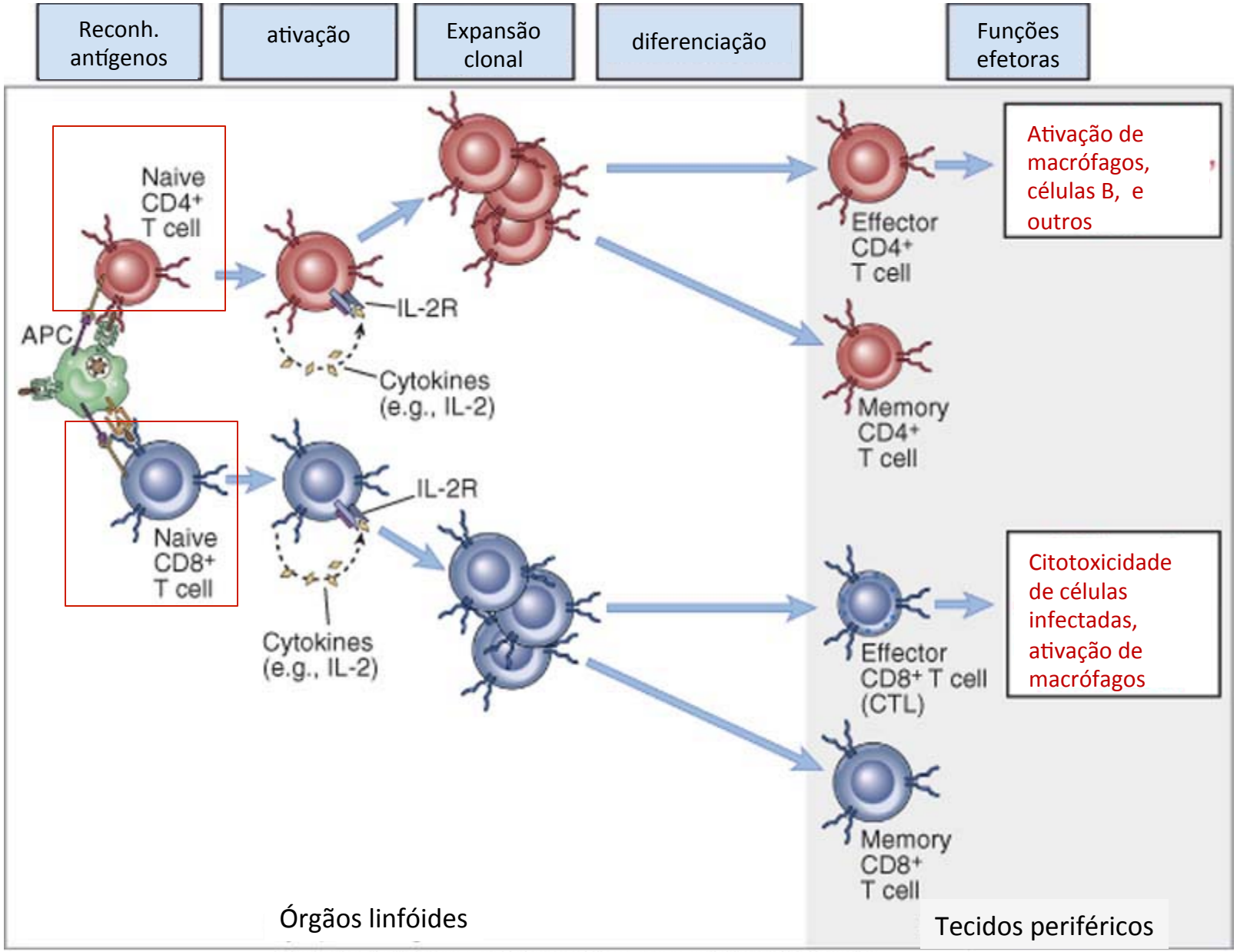
A RESPOSTA É DETERMINADA DURANTE A APRESENTAÇÃO DE ANTÍGENO – 2 SINAIS



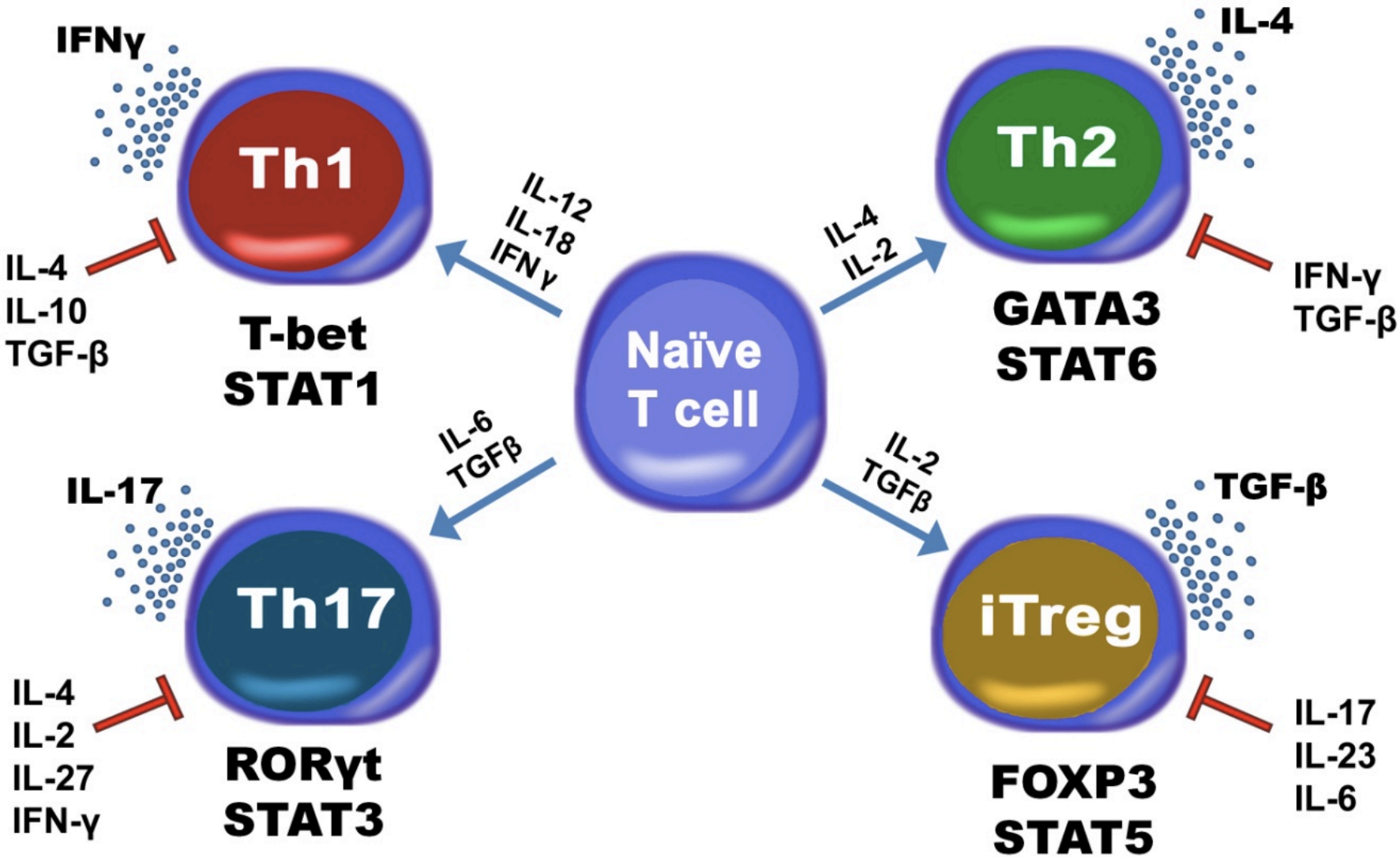
SINALIZAÇÃO ENTRE APC E LINFÓCITO



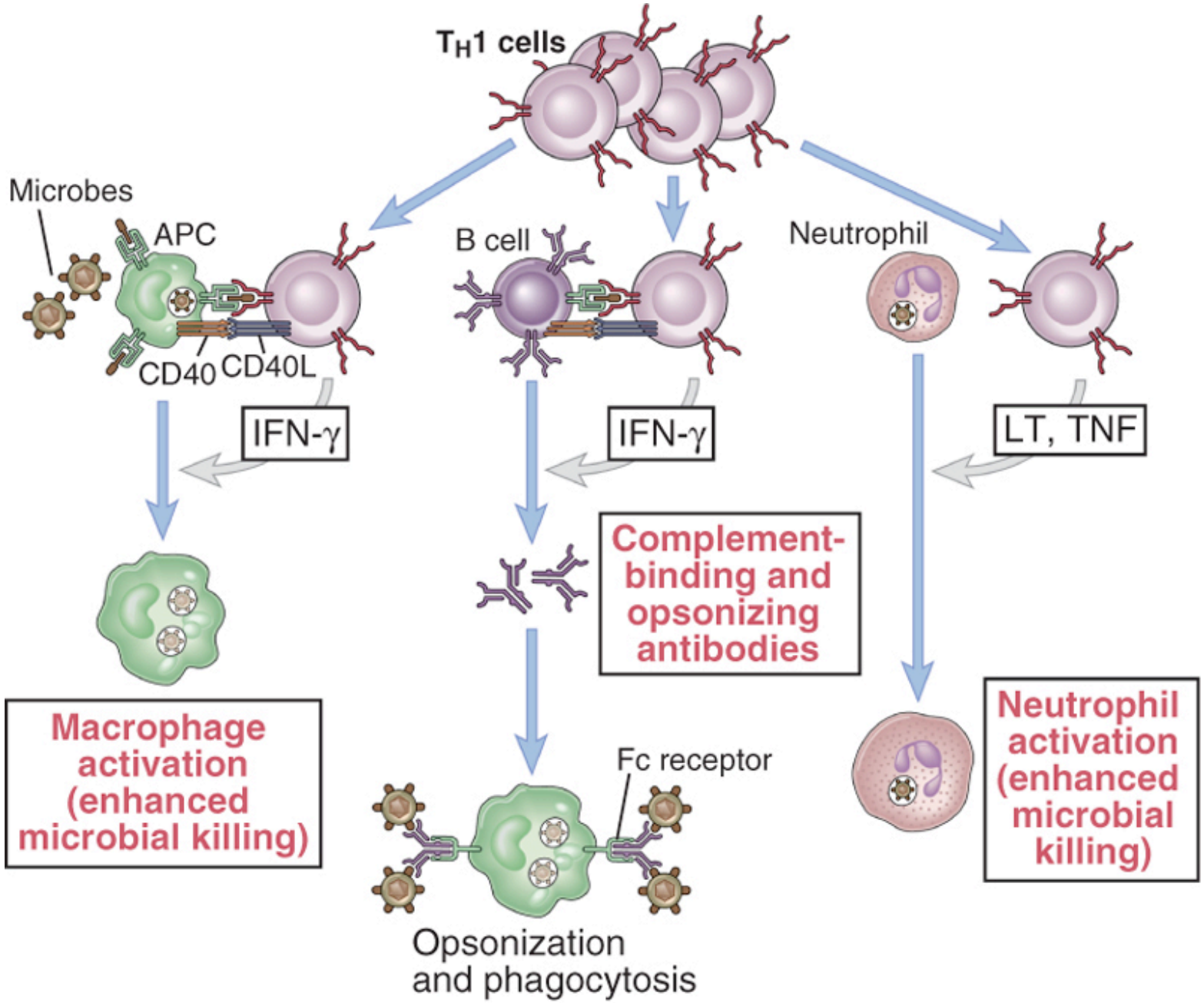
LINHAGENS DE CÉLULAS T E FENÓTIPO



CITOCINAS TAMBÉM CONTROLAM RESPOSTAS IMUNES



RESPOSTA CONTRA PATÓGENOS EXTRA-CELULARES – CD4 Th1



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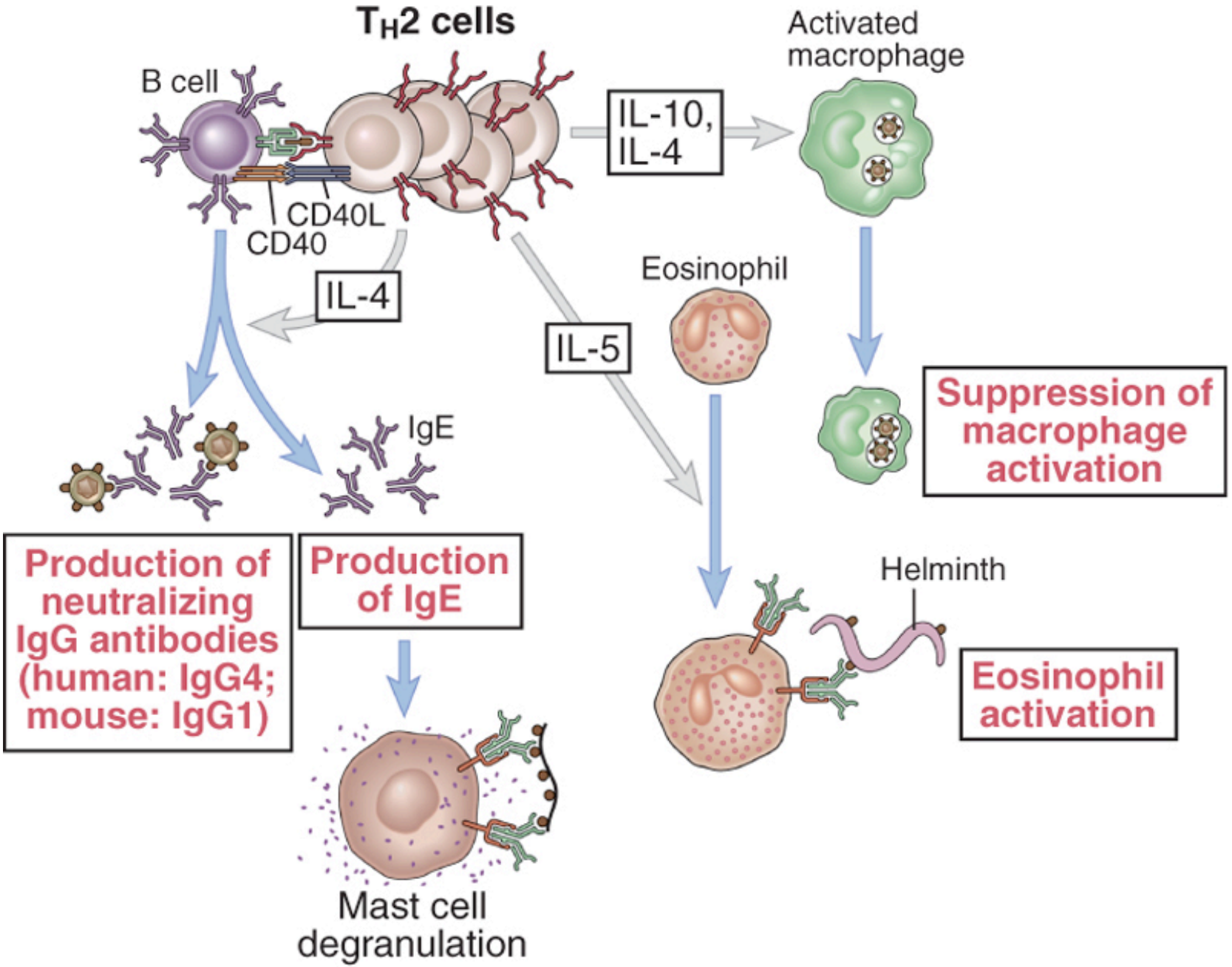
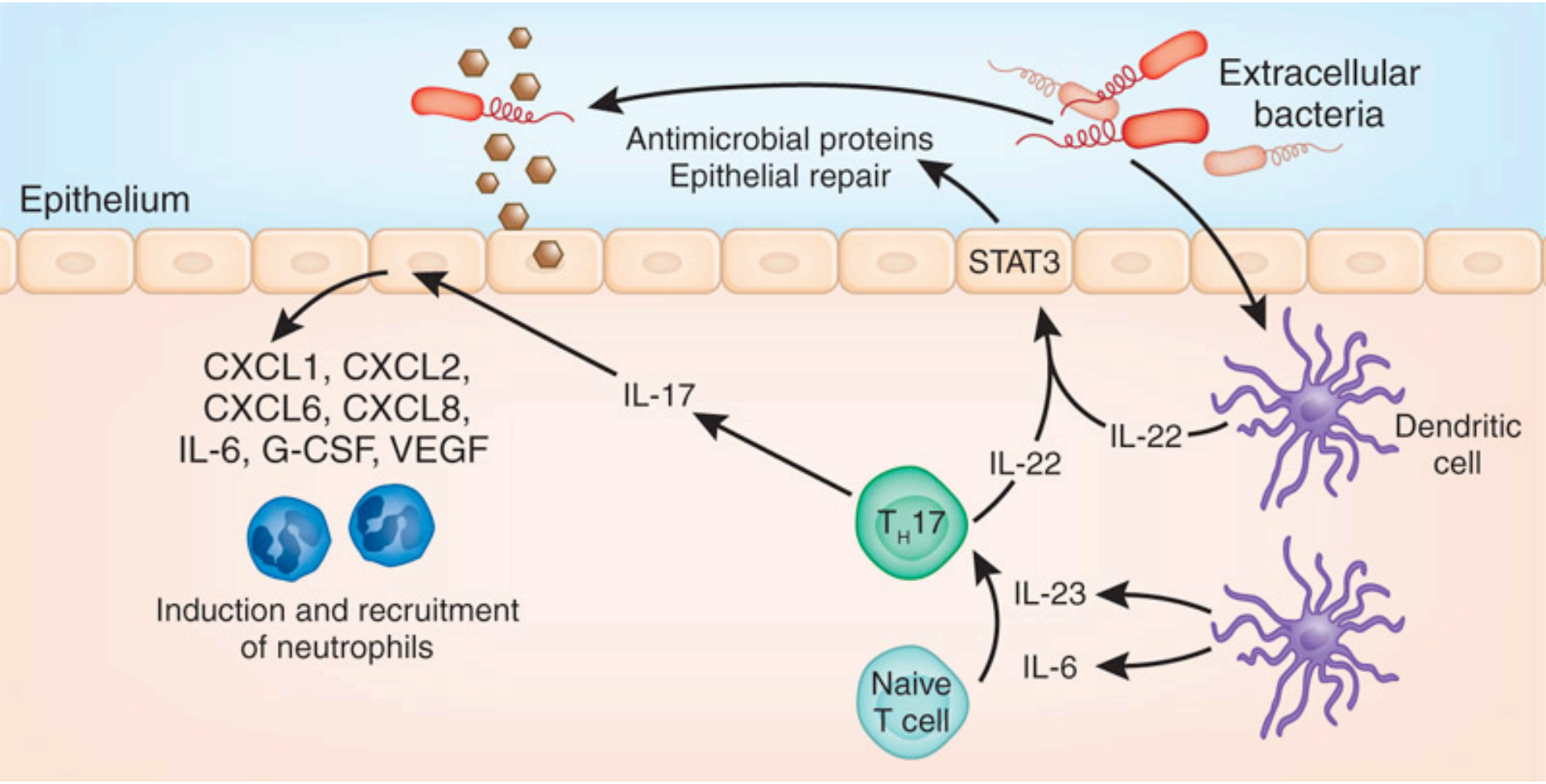
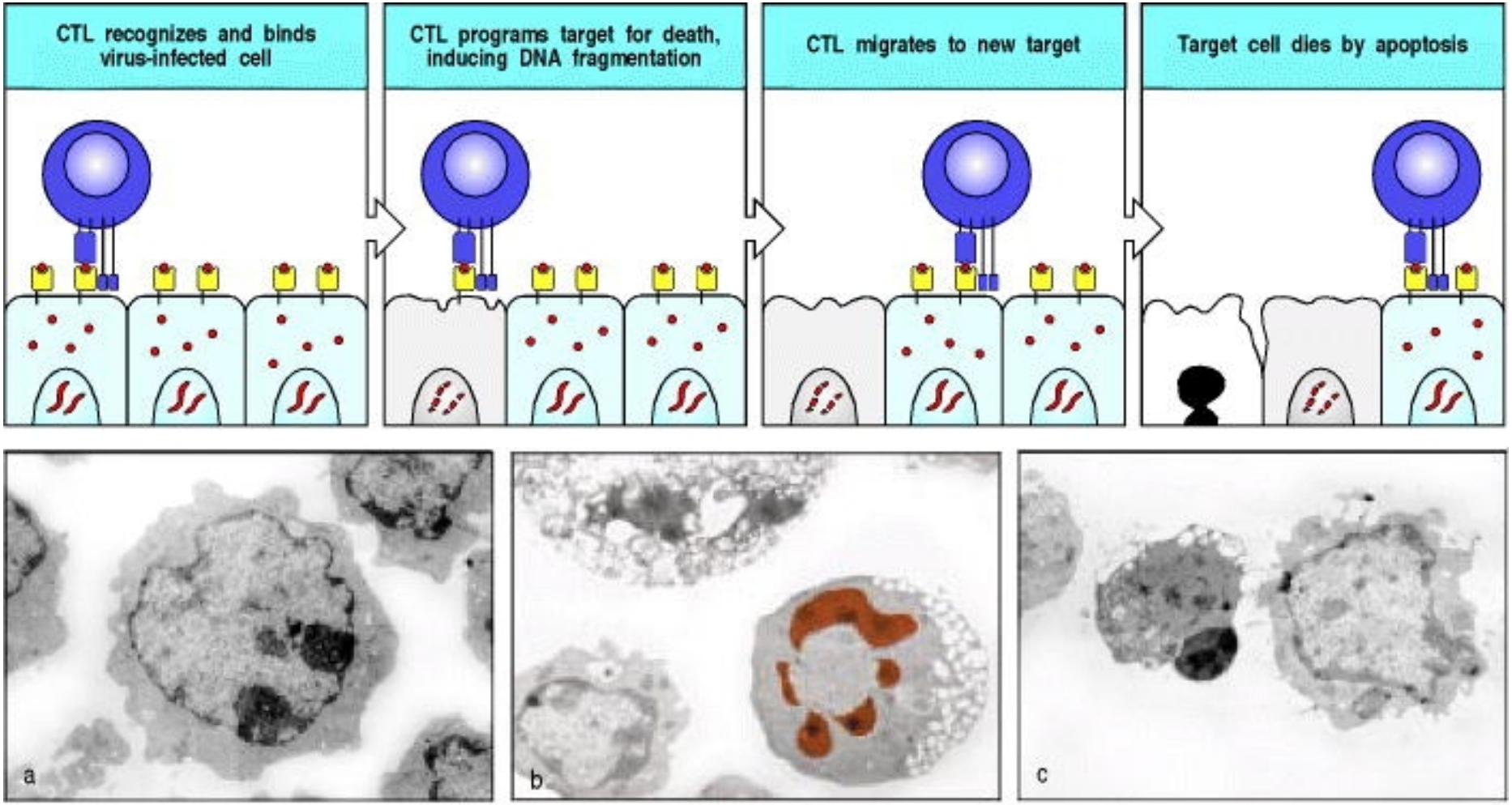
RESPOSTA CONTRA PATÓGENOS EXTRA-CELULARES – CD4 Th2



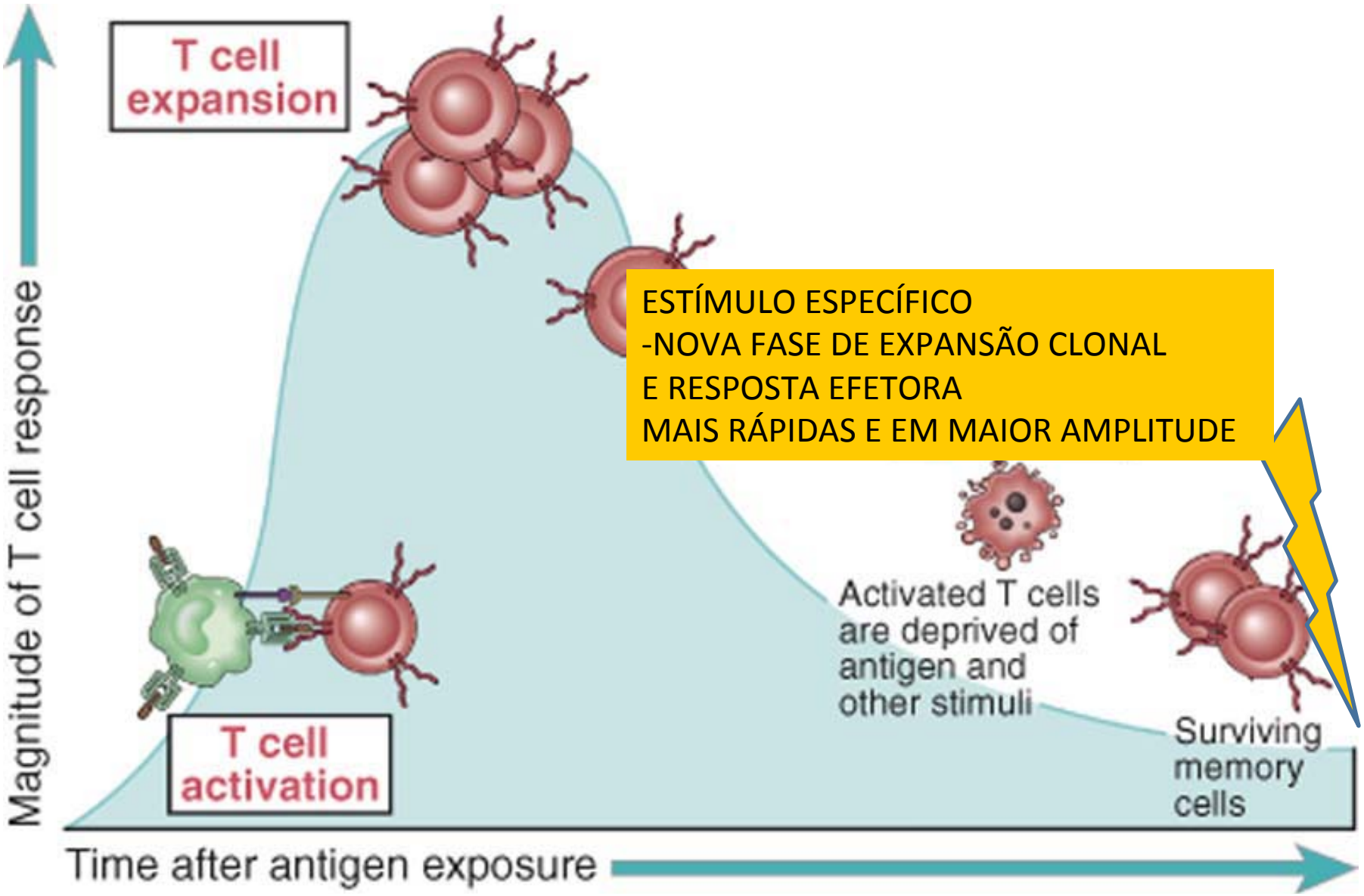
RESPOSTA CONTRA PATÓGENOS EXTRA-CELULARES – CD4 Th17



A RESPOSTA CITOTÓXICA



HOMEOSTASE



ESTÍMULO ESPECÍFICO
-NOVA FASE DE EXPANSÃO CLONAL
E RESPOSTA EFETORA
MAIS RÁPIDAS E EM MAIOR AMPLITUDE