



덕성여자대학교
DUKSUNG WOMEN'S UNIVERSITY

면역학 9주-2

덕성여자대학교 약학과
조효선 교수



CD8 T vs CD4 T

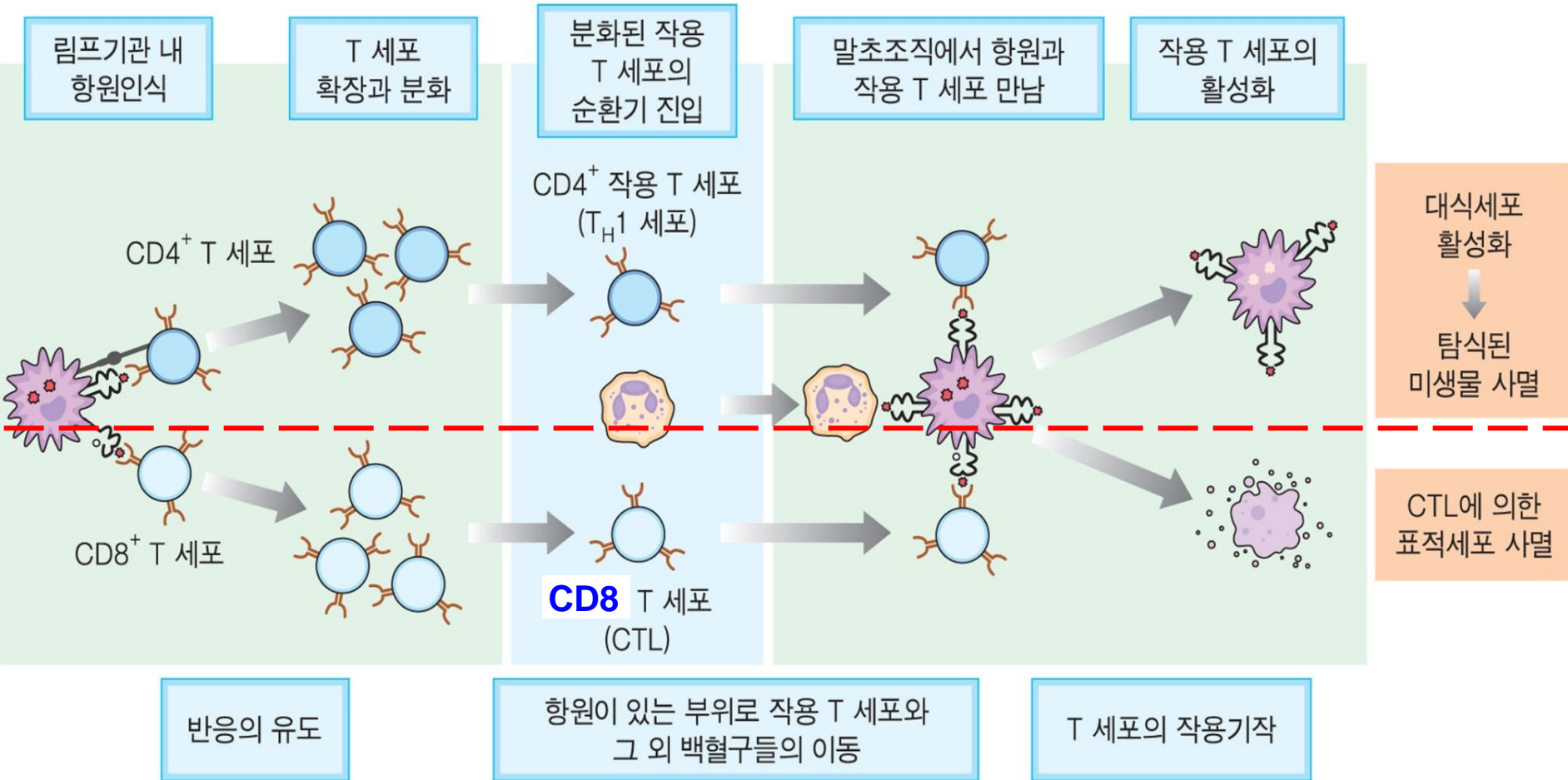


그림 12-3 세포성 면역의 유도과 작용단계 최신면역학 (라이프사이언스, 2011)

Cell-mediated immunity: T세포의 작용기작

Naïve T cells(미감작 T세포) vs Effector T cells(작용 T세포) vs Target cells (표적세포)



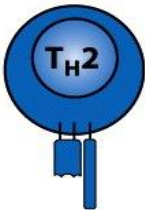


	CD8 cytotoxic T cells	CD4 T _H 1 cells	CD4 T _H 2 cells	CD4 T _H 17 cells	CD4 regulatory T cells (various types)
Types of effector T cell					
Main functions in adaptive immune response	Kill virus-infected cells	Activate infected macrophages Provide help to B cells for antibody production	Provide help to B cells for antibody production, especially switching to IgE	Enhance neutrophil response	Suppress T-cell responses
Pathogens targeted	Viruses (e.g. influenza, rabies, vaccinia) Some intracellular bacteria	Microbes that persist in macrophage vesicles (e.g. mycobacteria, <i>Listeria</i> , <i>Leishmania donovani</i> , <i>Pneumocystis carinii</i>) Extracellular bacteria	Helminth parasites	Extracellular bacteria (e.g. <i>Salmonella enterica</i>)	

Figure 8-1 Immunobiology, 7ed. (© Garland Science 2008)

CD8T, T_H1, T_H2 and Tregs are specialized to different classes of pathogens

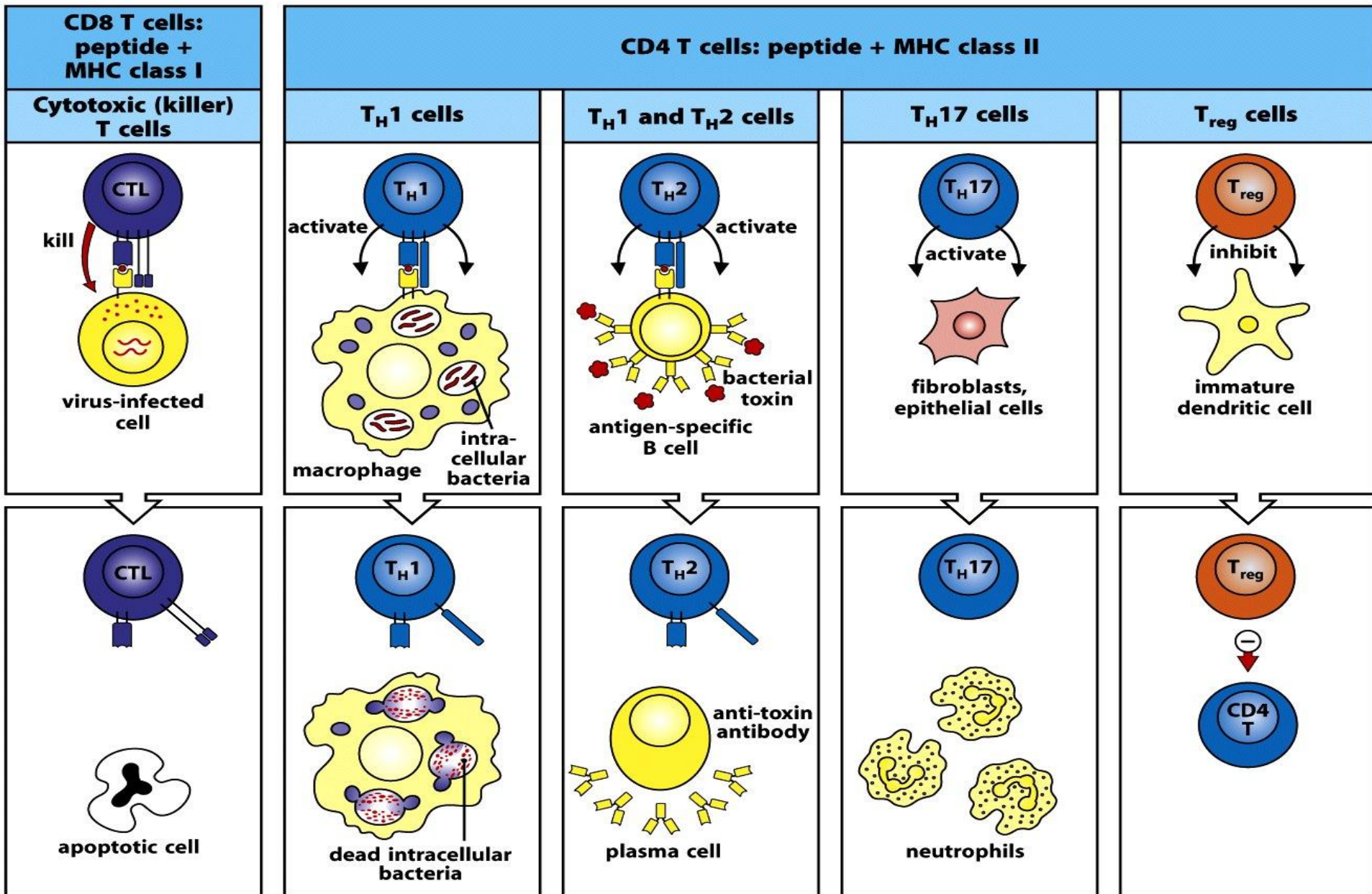
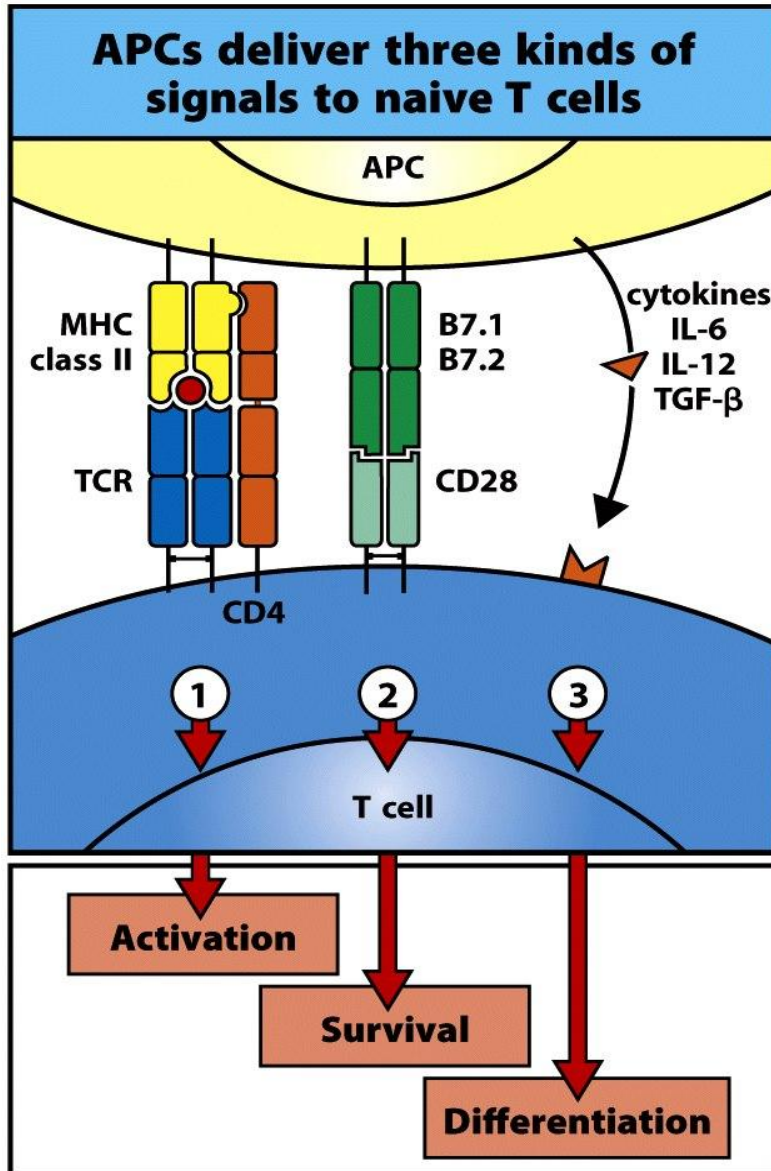


Figure 8-27 Immunobiology, 7ed. (© Garland Science 2008)



Signal 1 : TCR + MHC-peptide

Signal 2 : CD28 + B7.1,7.2

Signal 3 : cytokines

T_H1 (IL-12)

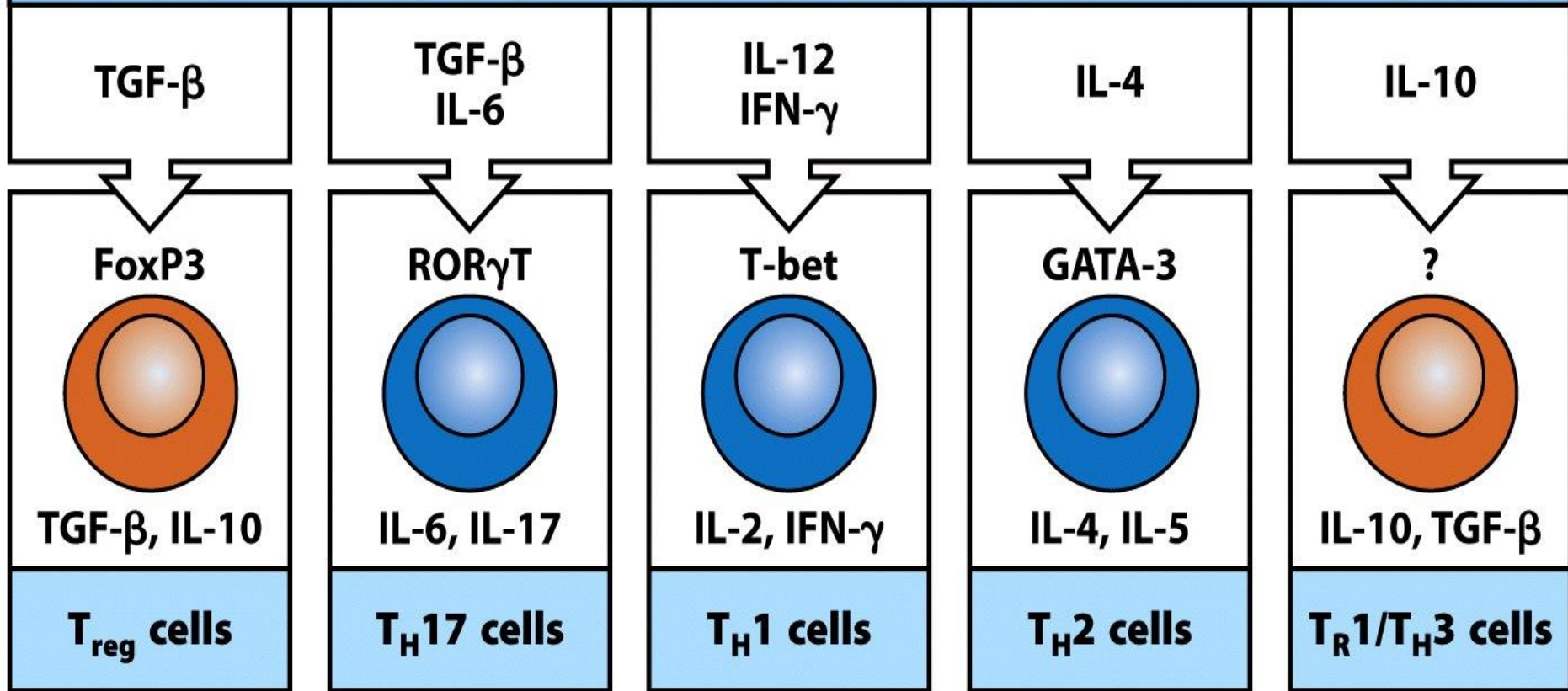
T_H2 (IL-4)

T_H17 (IL-6+TGF- β)

Tregs(IL-10 ,TGF- β)

Figure 8-19 Immunobiology, 7ed. (© Garland Science 2008)

Signal 3 delivered by antigen-presenting cell



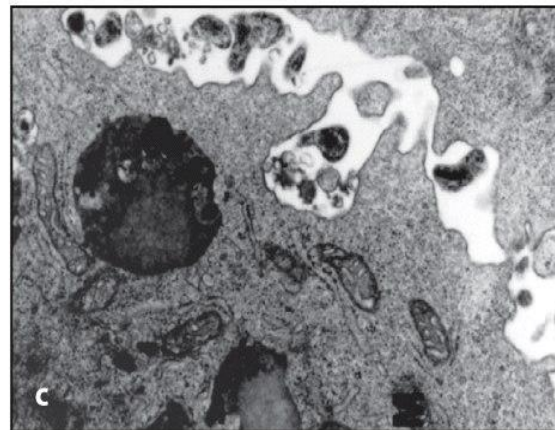
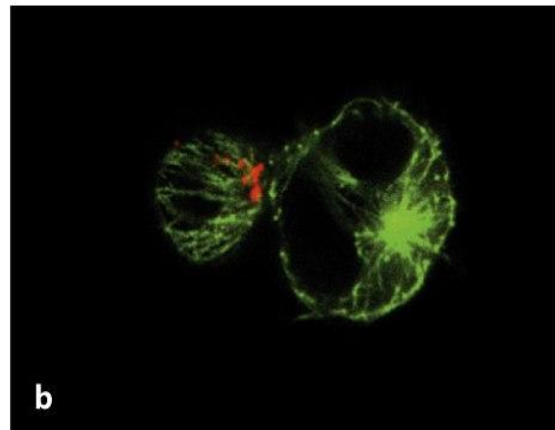
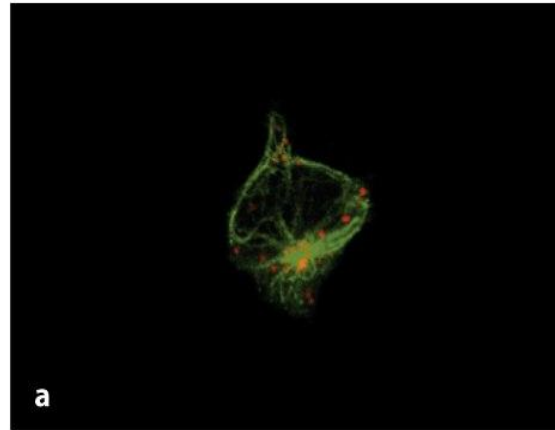
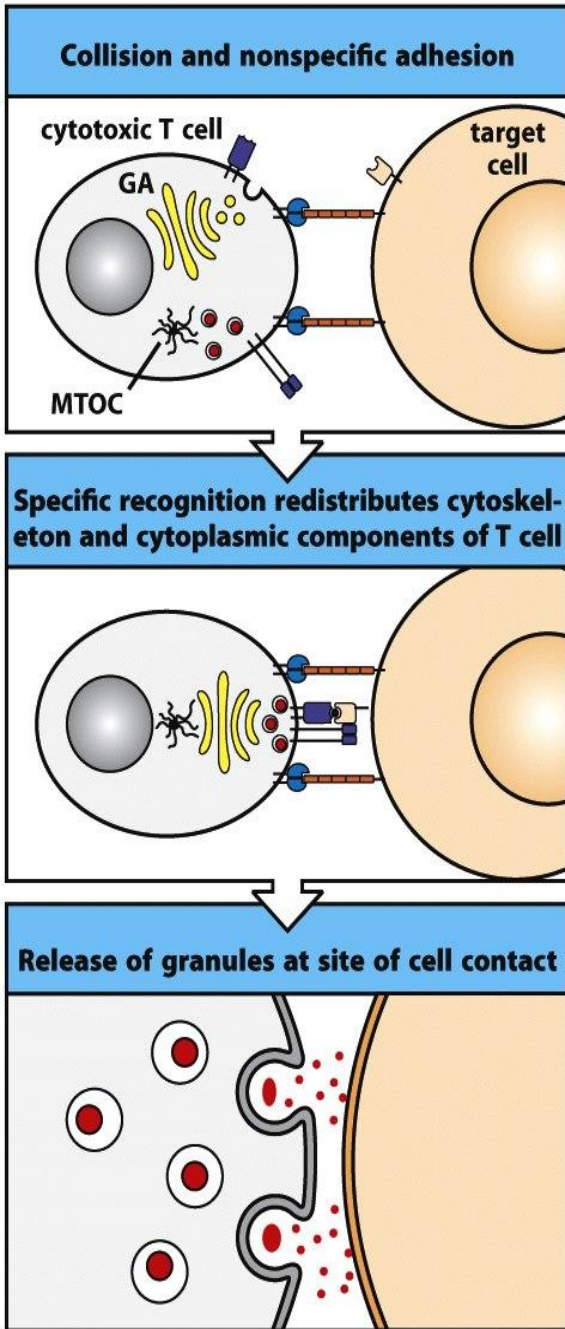
STAT1, STAT4

STAT6

Figure 8-29 Immunobiology, 7ed. (© Garland Science 2008)

CD8 T cells: peptide + MHC class I		CD4 T cells: peptide + MHC class II							
Cytotoxic (killer) T cells		T _H 1 cells		T _H 2 cells		T _H 17 cells		T _{reg} cells	
Cytotoxic effector molecules	Others	Macrophage-activating effector molecules	Others	B-cell-activating effector molecules	Others	Neutrophil recruitment	Others	Suppressive cytokines	Others
Perforin Granzymes Granulysin Fas ligand	IFN- γ LT- α TNF- α	IFN- γ GM-CSF TNF- α CD40 ligand Fas ligand	IL-3 LT- α CXCL2 (GRO β)	IL-4 IL-5 IL-13 CD40 ligand	IL-3 GM-CSF IL-10 TGF- β CCL11 (eotaxin) CCL17 (TARC)	IL-17A IL-17F IL-6	TNF CXCL1 (GRO α)	IL-10 TGF- β	GM-CSF

Figure 8-33 Immunobiology, 7ed. (© Garland Science 2008)



CD8 T 세포의 CTL 매개 세포독성
: 항원특이적, 접촉의존성

LFA-1 : ICAM
(nonspecific adhesion molecules)



Ag-MHCI : TCR
(specific recognition)



GA, MTOC (focused)



Cytotoxic granules (red)
: perforin, granzyme
granulysin

CD8 T cells induce apoptosis in target cells (표적세포)

Perforin : deliver contents of granules into cytoplasm of target cells

Granzymes : serine proteases, activate apoptosis in the target cells

Granulysin : antimicrobial actions, induce apoptosis

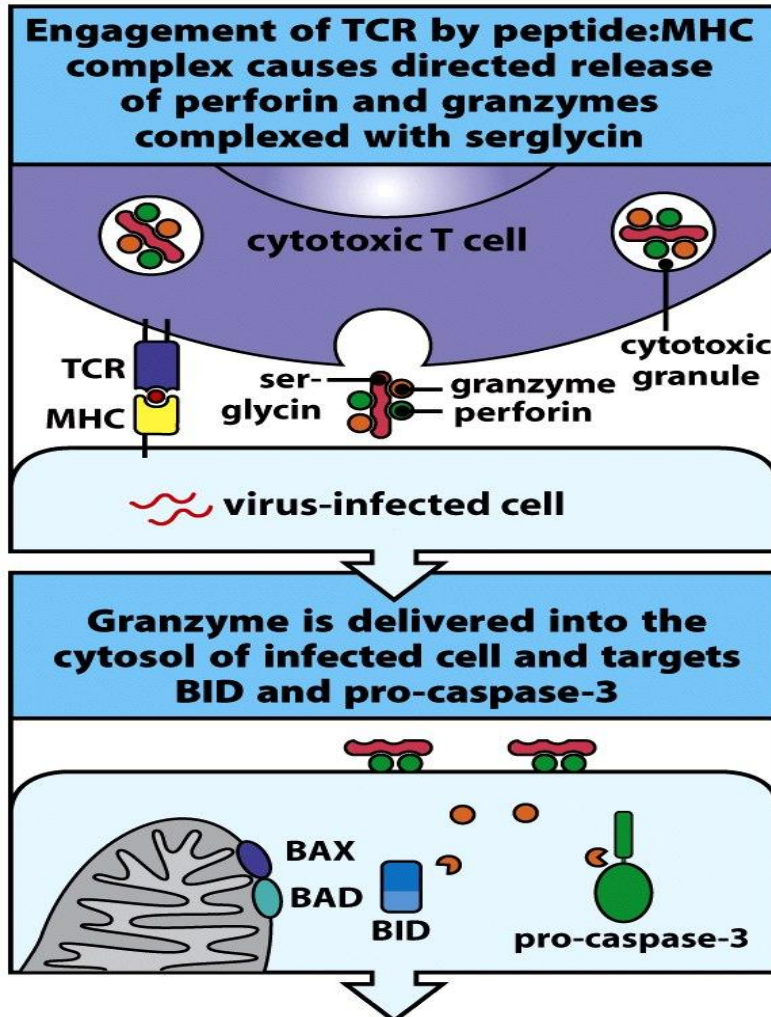


Figure 8-38 part 1 of 3 Immunobiology, 7ed. (© Garland Science 2008)

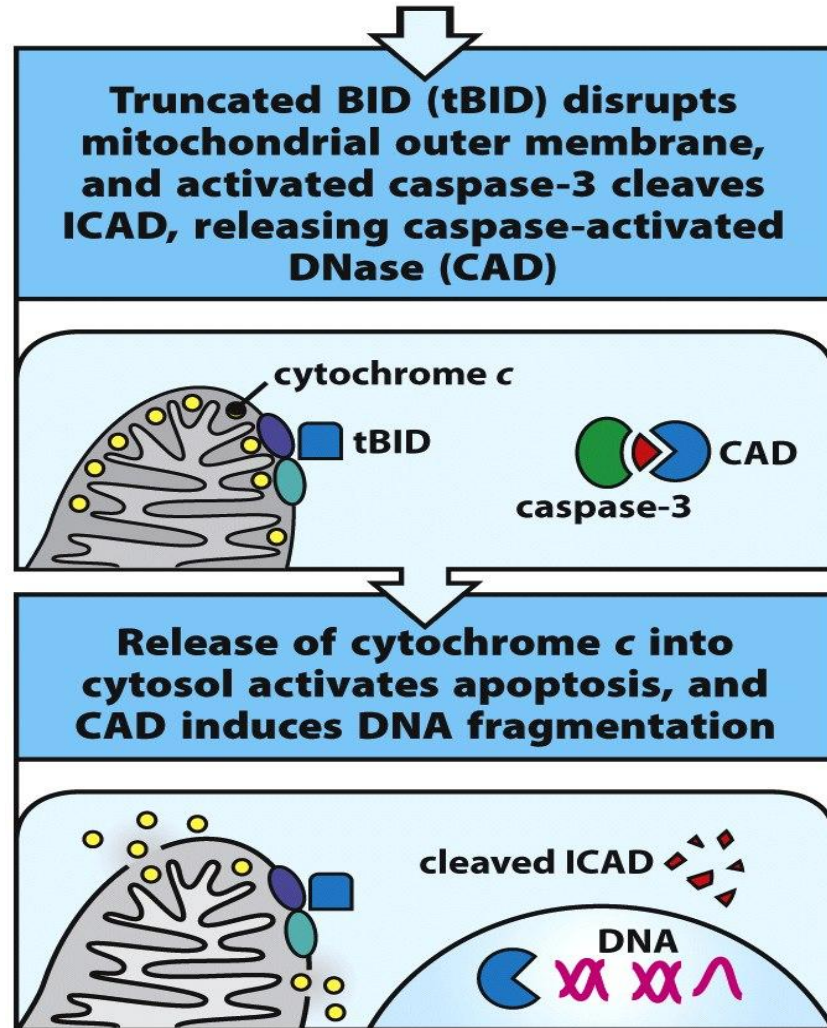
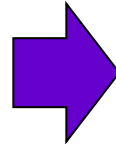
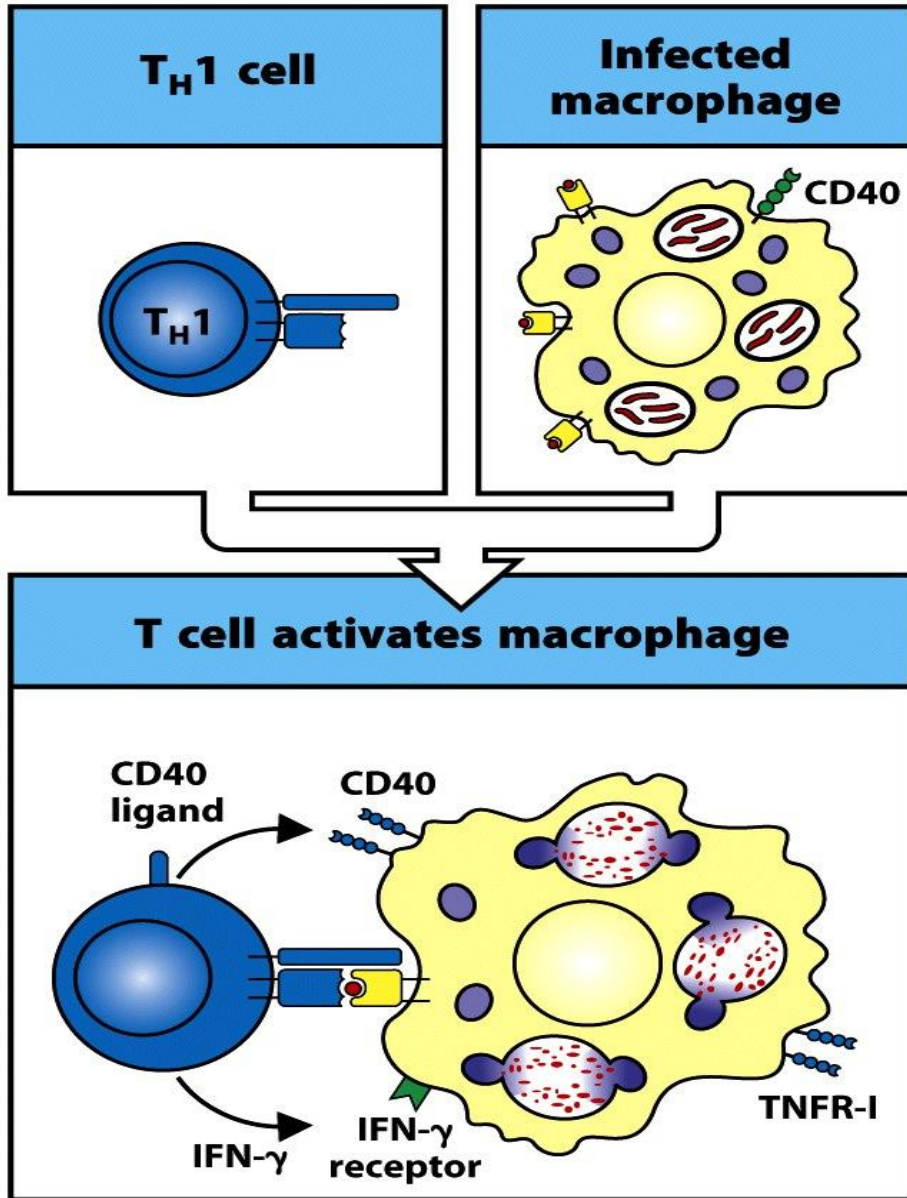


Figure 8-38 part 3 of 3 Immunobiology, 7ed. (© Garland Science 2008)

M. tuberculosis → T_H1 cells & 활성화된 대식세포

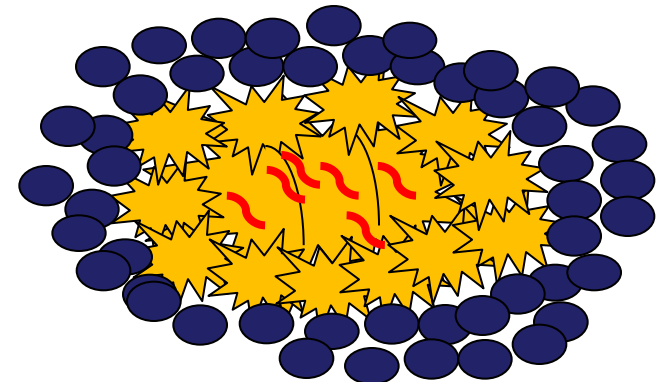
→ DTH(delayed type hypersensitivity)



Partial removal
of live *M. tuberculosis*



Granuloma



Humoral immunity

: 분비성 항체에 의해 매개
미생물 및 미생물 독소에 대항하여 방어
(extracellular pathogens)

B cell-mediated antibody



1. 중화 Neutralization(bacterial toxins)
2. 탐식작용증진 Opsonization
3. 보체 활성화 Complement activation

