

The Big Picture

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Learning Objectives

By the end of this lecture you will be able to:

- ① Understand how different components of the immune system interact in health and disease

Where do B lymphocytes come from?

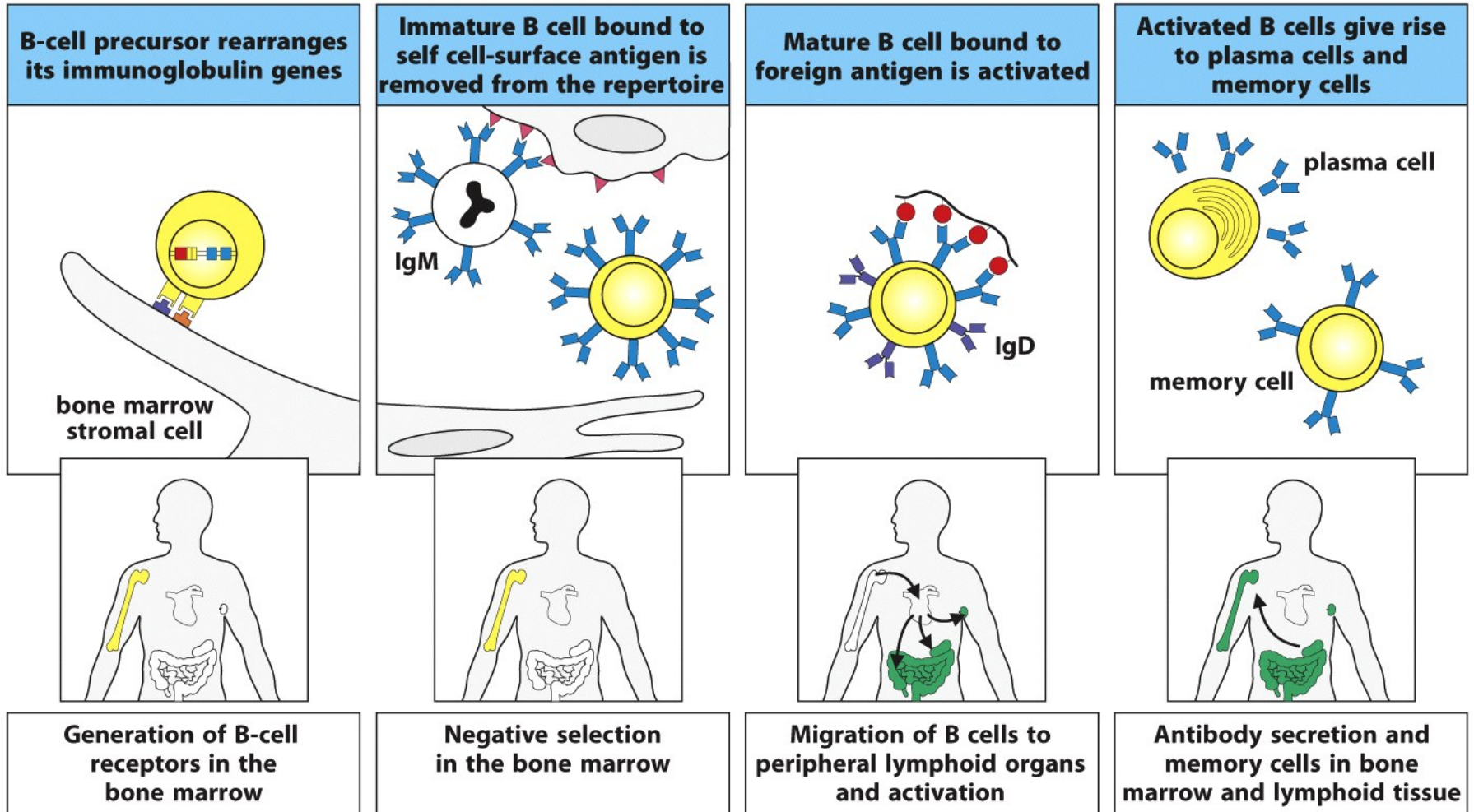


Figure 8.1 Janeway's Immunobiology, 8ed. (© Garland Science 2012)

Where do T lymphocytes come from?

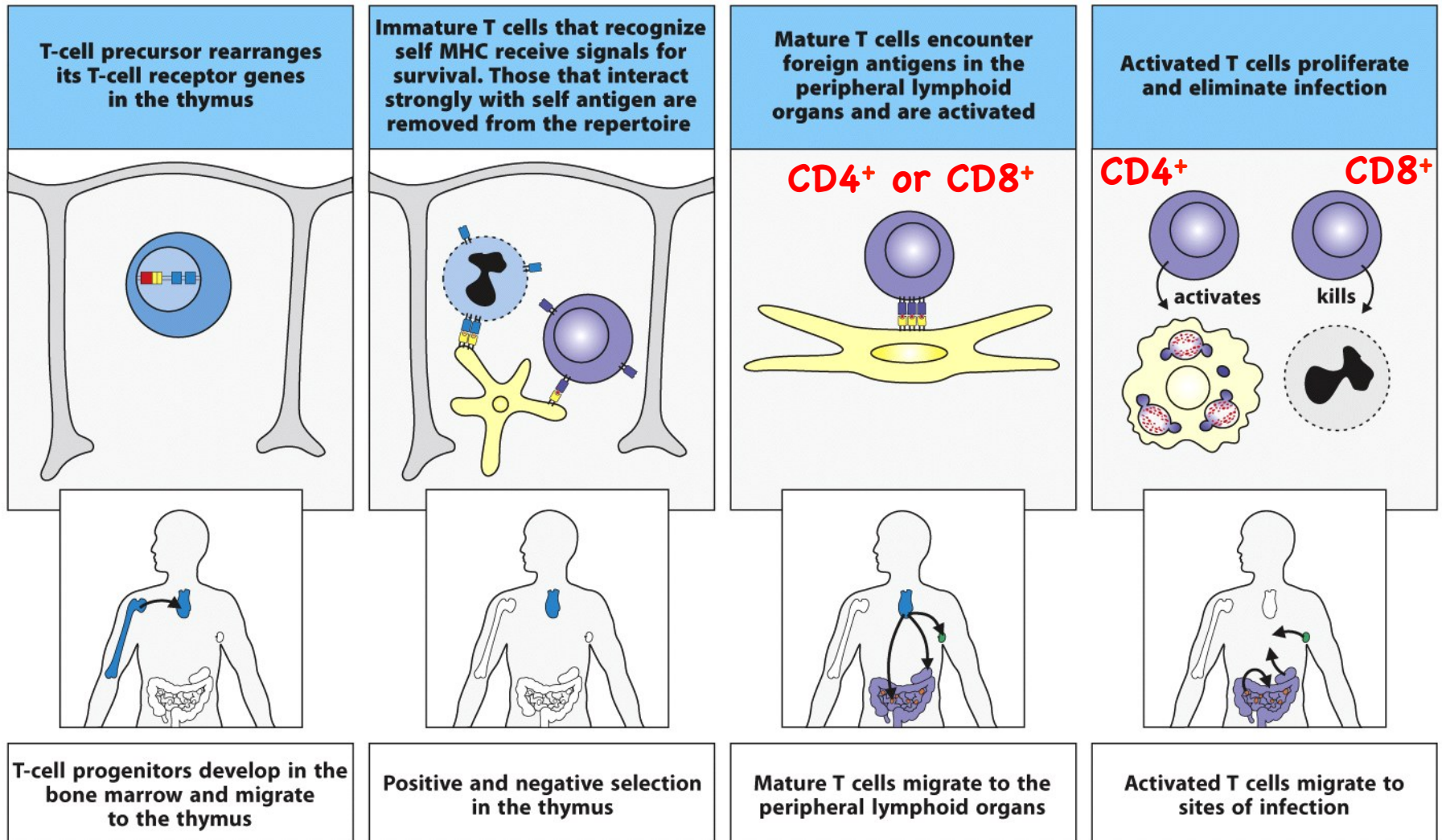
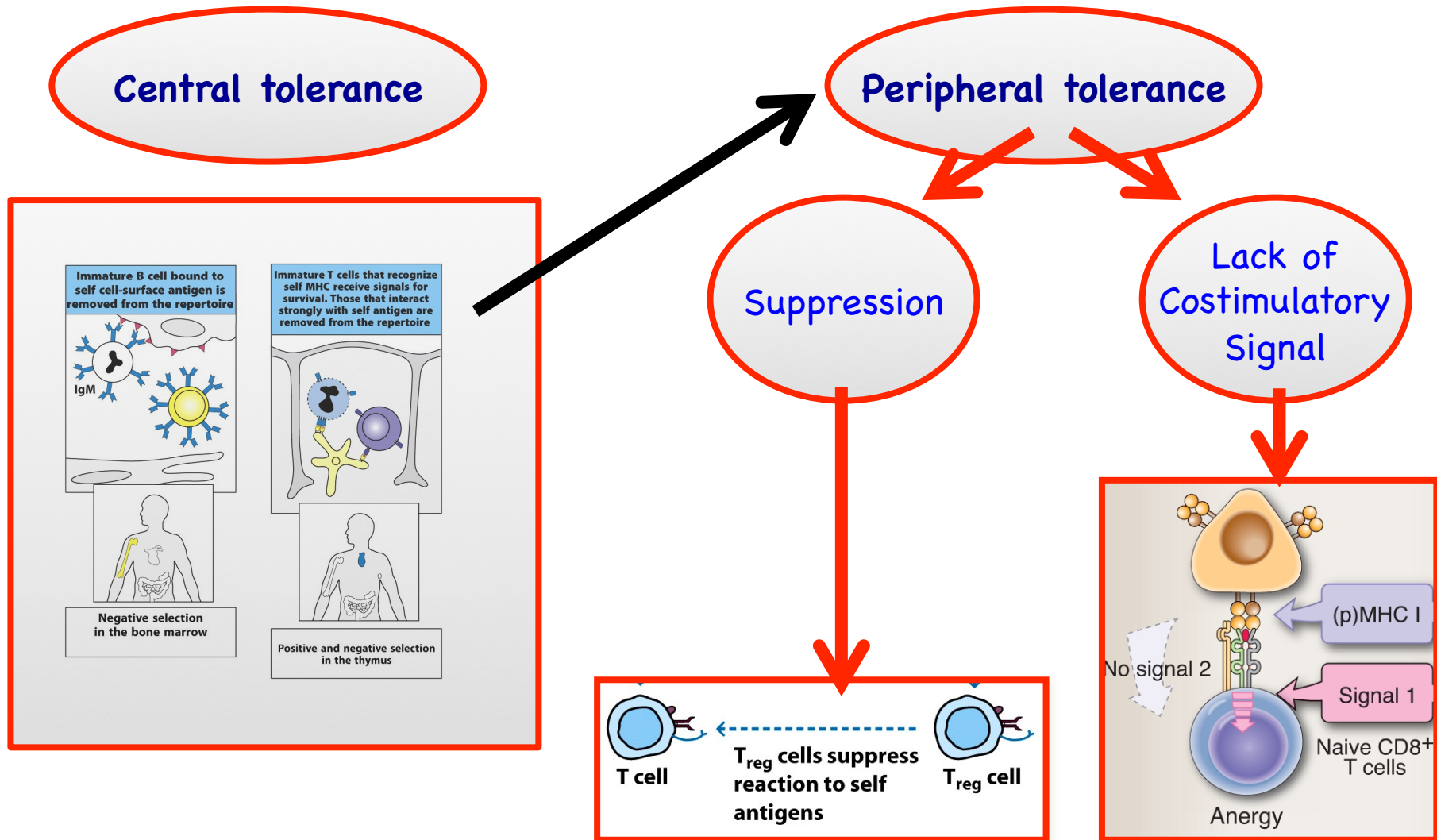


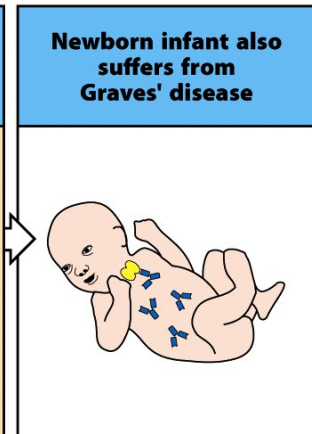
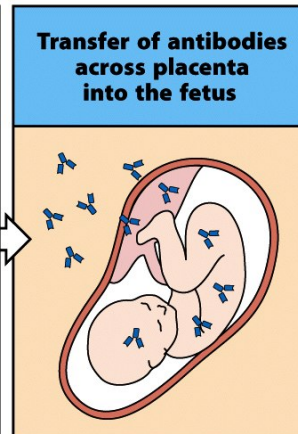
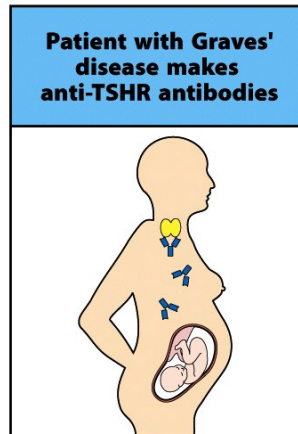
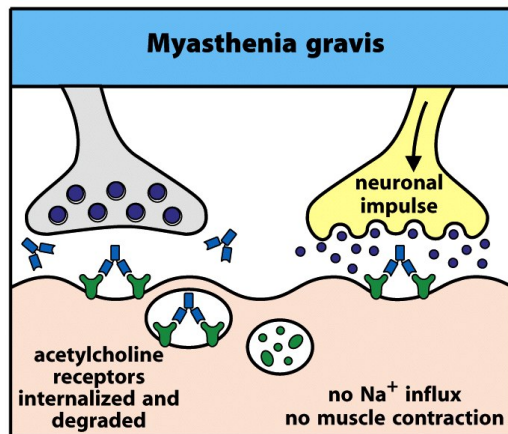
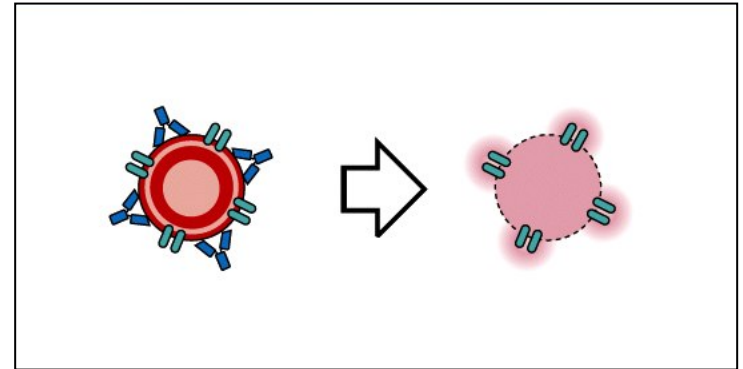
Figure 8.14 Janeway's Immunobiology, 8ed. (© Garland Science 2012)

What happens if some lymphocytes did not get educated?!

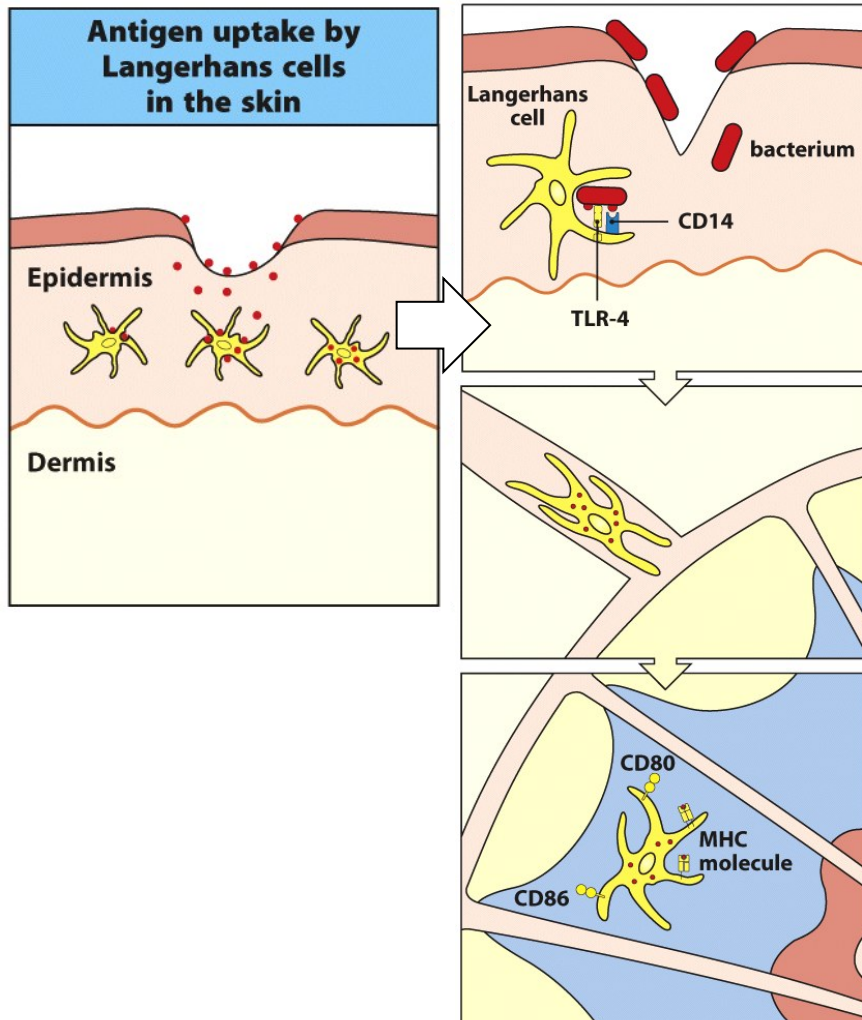


What happens if central and peripheral tolerance mechanisms fail?!

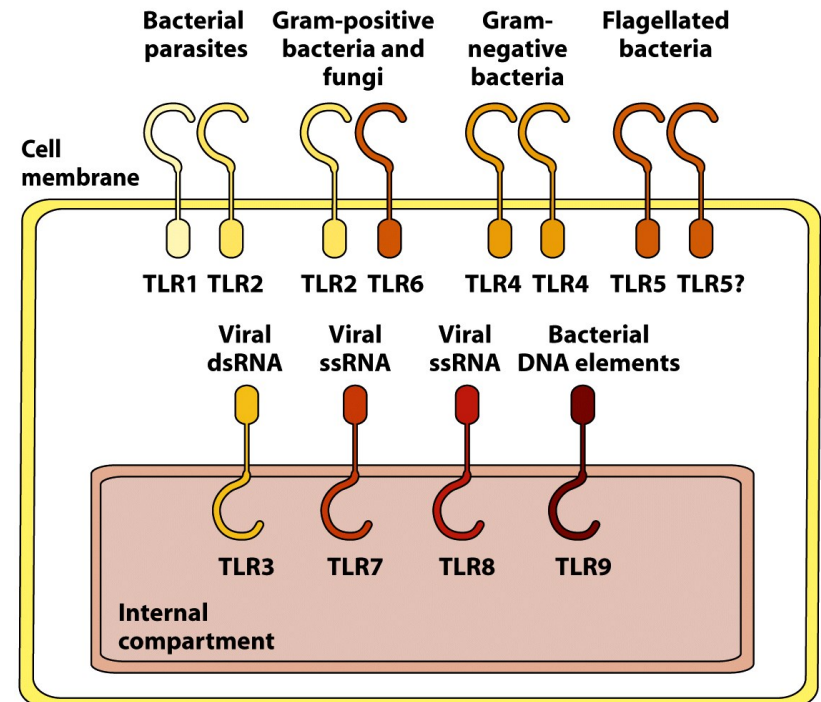
Autoimmune Diseases



What happens after infection?!



Leukocytes express a variety of **Pathogen Recognition Receptors (PRRs)** including **Toll-Like Receptors (TLRs)**, which recognize a wide range of microbial patterns



What happens after infection?!

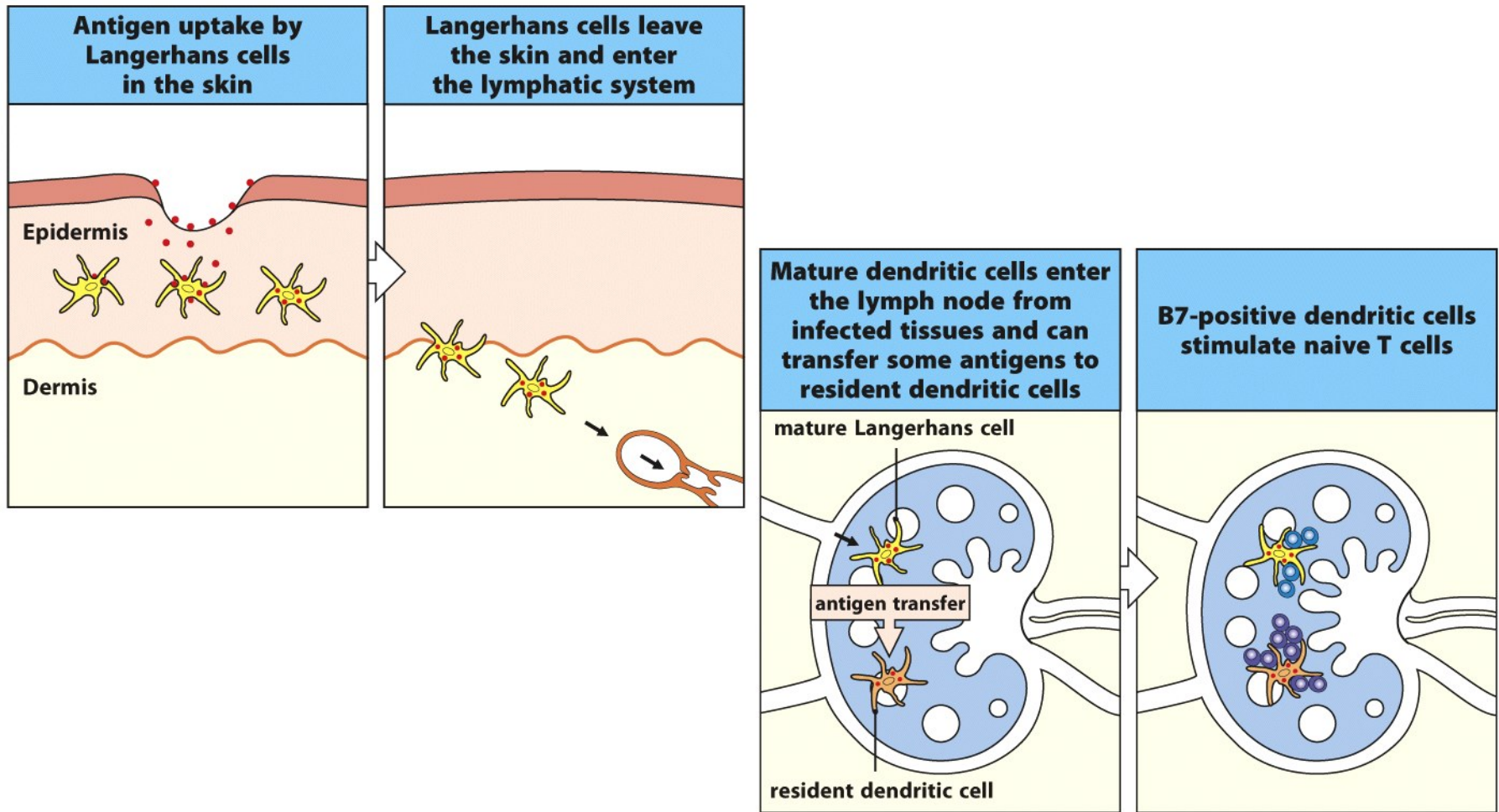
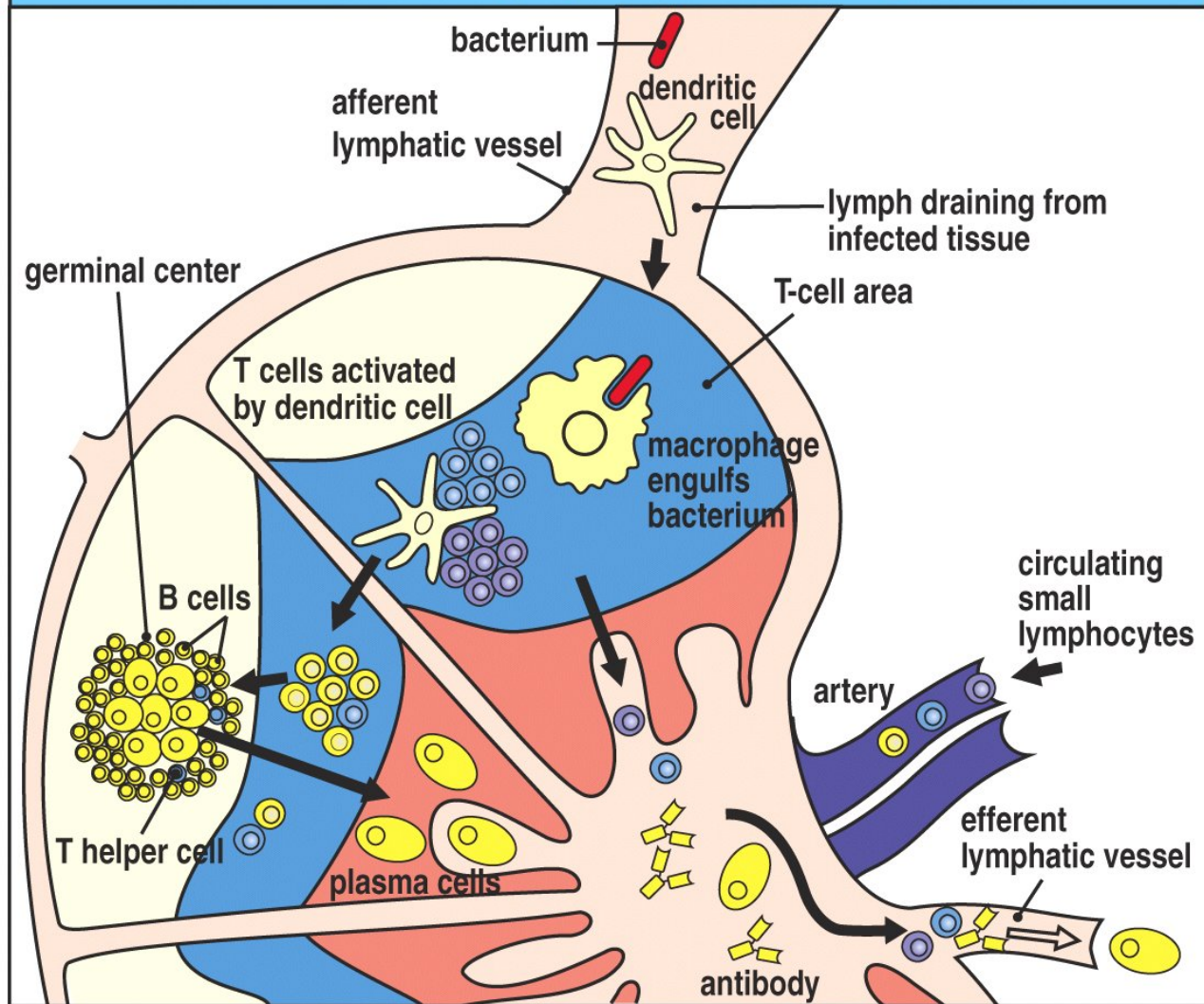


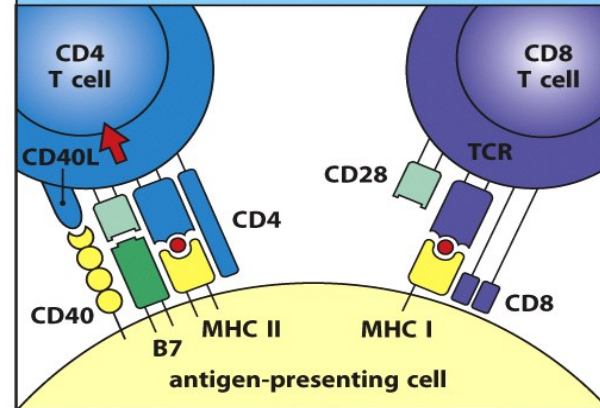
Figure 9.13 Janeway's Immunobiology, 8ed. (© Garland Science 2012)

What happens in the lymph node?!

Cellular traffic in the lymph node draining an infection



APC stimulates effector CD4 T cell, to induce CD40L and IL-2



Stimulation of APC through CD40 increases B7 and 4-1BBL, which co-stimulates naive CD8 T cell

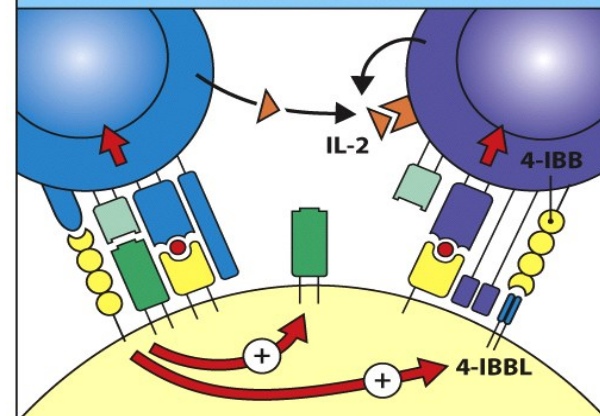


Figure 9.27 Janeway's Immunobiology, 8ed. (© Garland Science)

Figure 1-18 The Immune System, 2/e (© Garland Science 2005)

What happens in the lymph node?!

Cytokines

Cytokines

Cytokines

Cytokines

Cytokines

Cytokines

Cytokines

Cytokines

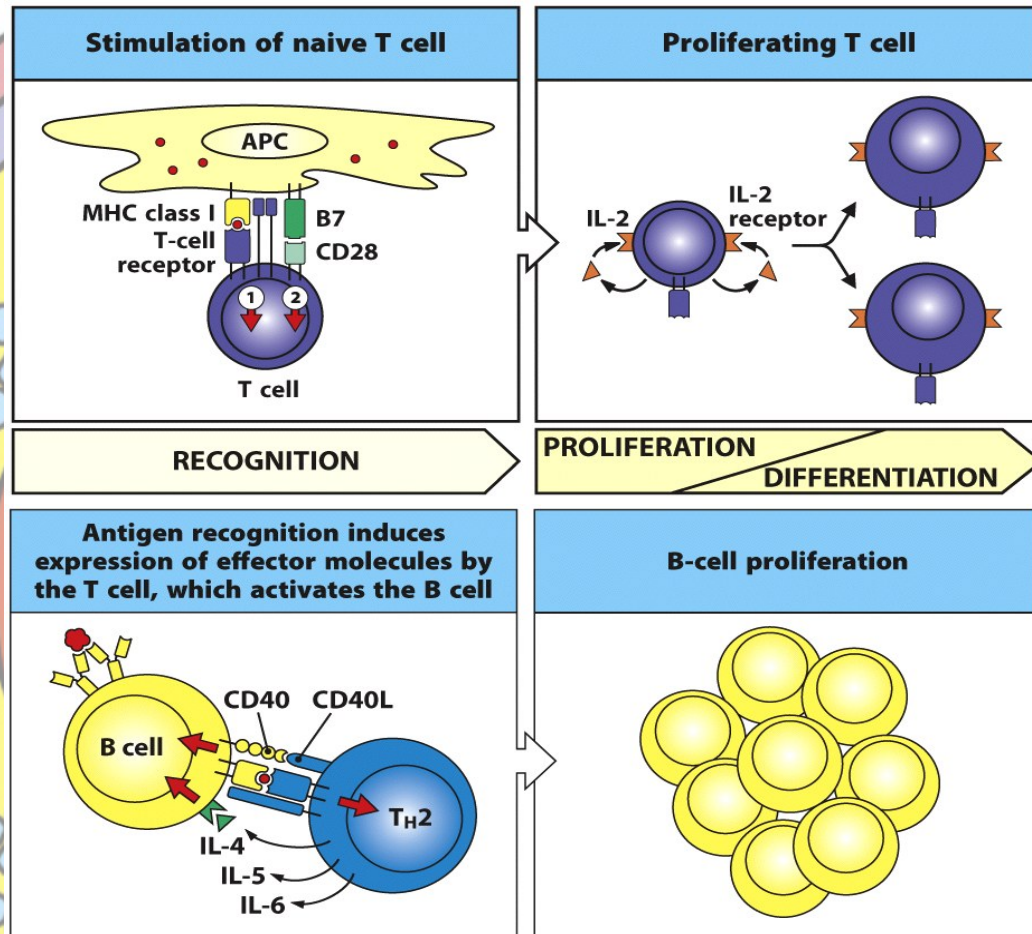
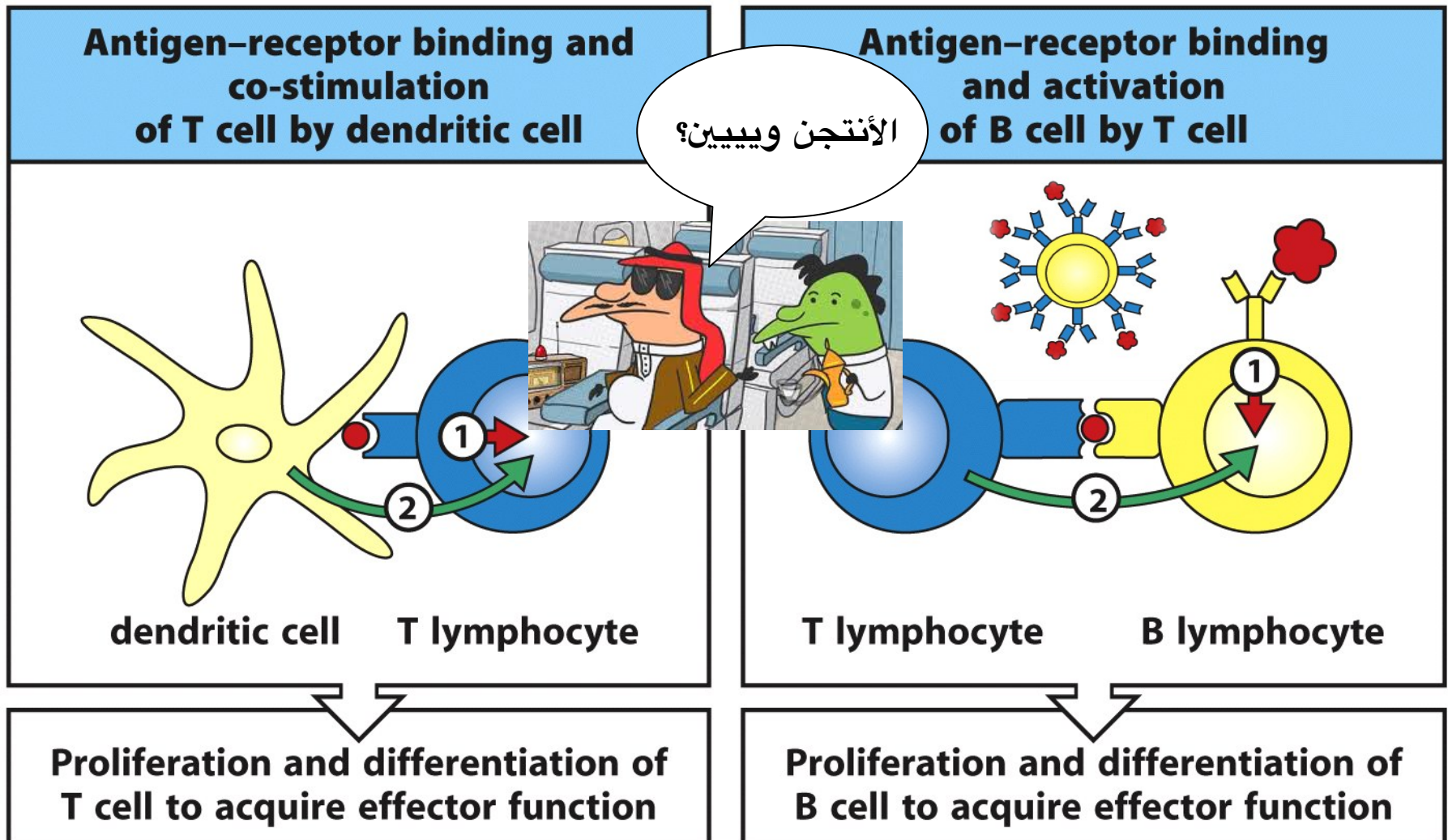


Figure 10.3 Janeway's Immunobiology, 8ed. (© Garland Science 2012)

B cells and T cells recognize different antigens in different ways?!



MHC is involved in Ag recognition by T cell?!

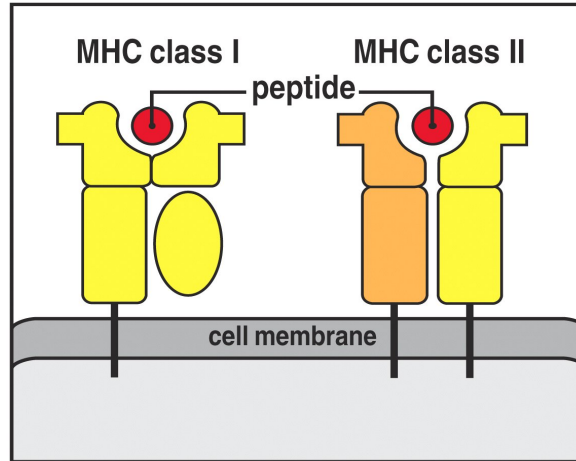
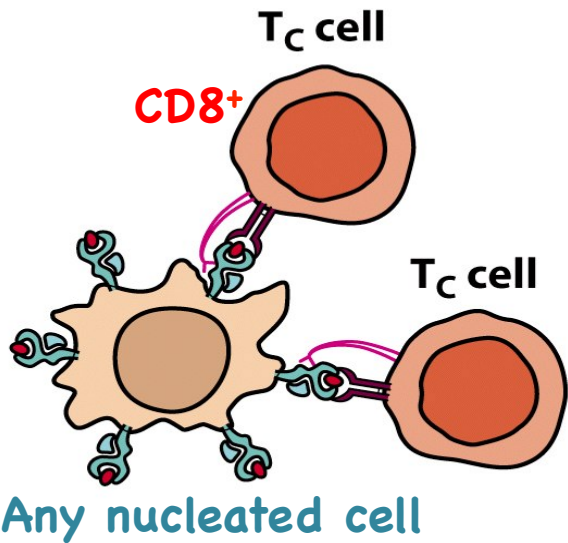
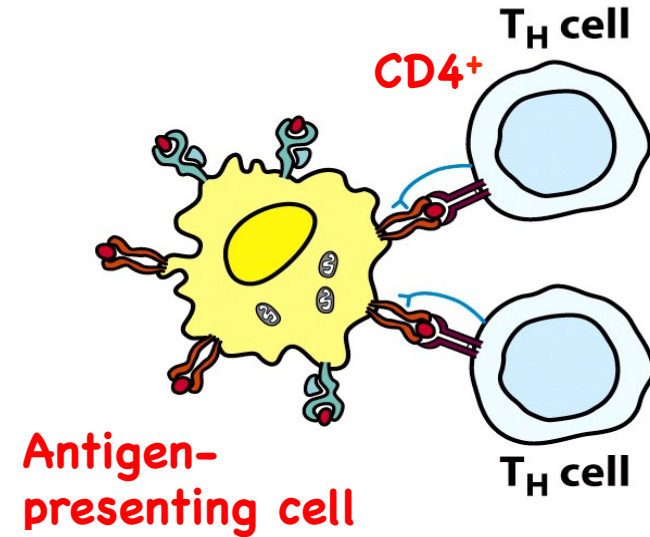


Figure 1-25 The Immune System, 2/e (© Garland Science 2005)



MHC restriction		
<p>T cell</p> <p>TCR</p> <p>MHC^a</p> <p>antigen-presenting cell</p> <p>Recognition</p>	<p>T cell</p> <p>TCR</p> <p>MHC^b</p> <p>antigen-presenting cell</p> <p>No recognition</p>	<p>T cell</p> <p>TCR</p> <p>MHC^c</p> <p>antigen-presenting cell</p> <p>No recognition</p>

Figure 5-20 Immunobiology, 7ed. (© Garland Science 2008)

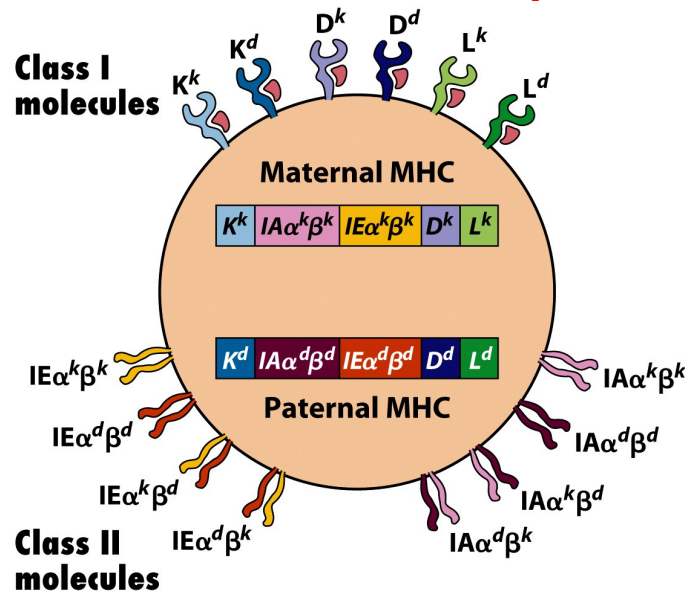
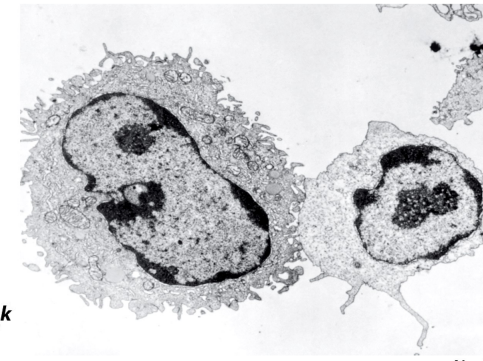


Figure 8-12
Kuby IMMUNOLOGY, Sixth Edition



What happens after infection?!

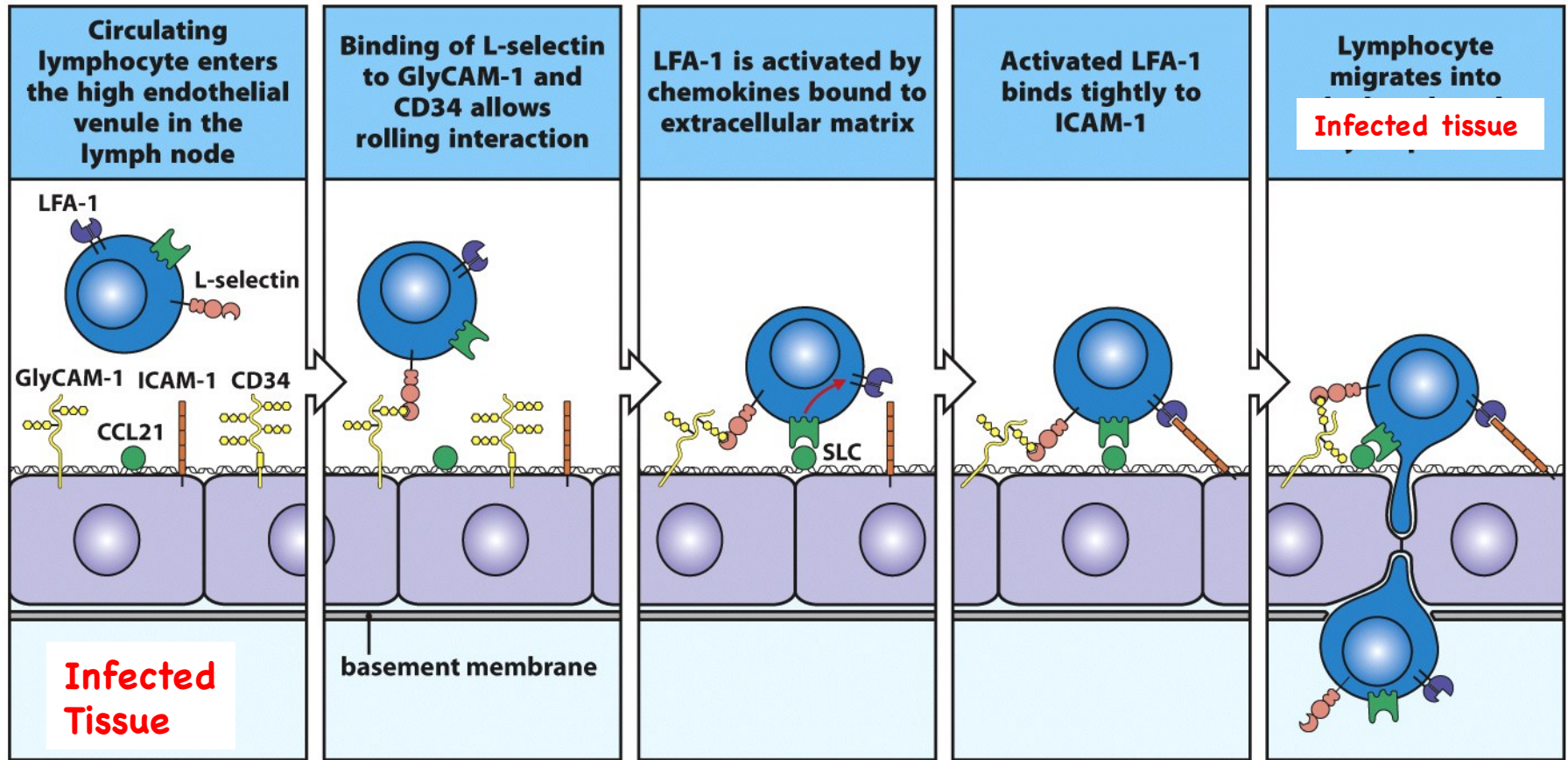


Figure 9.8 Janeway's Immunobiology, 8ed. (© Garland Science 2012)

What happens after infection?!

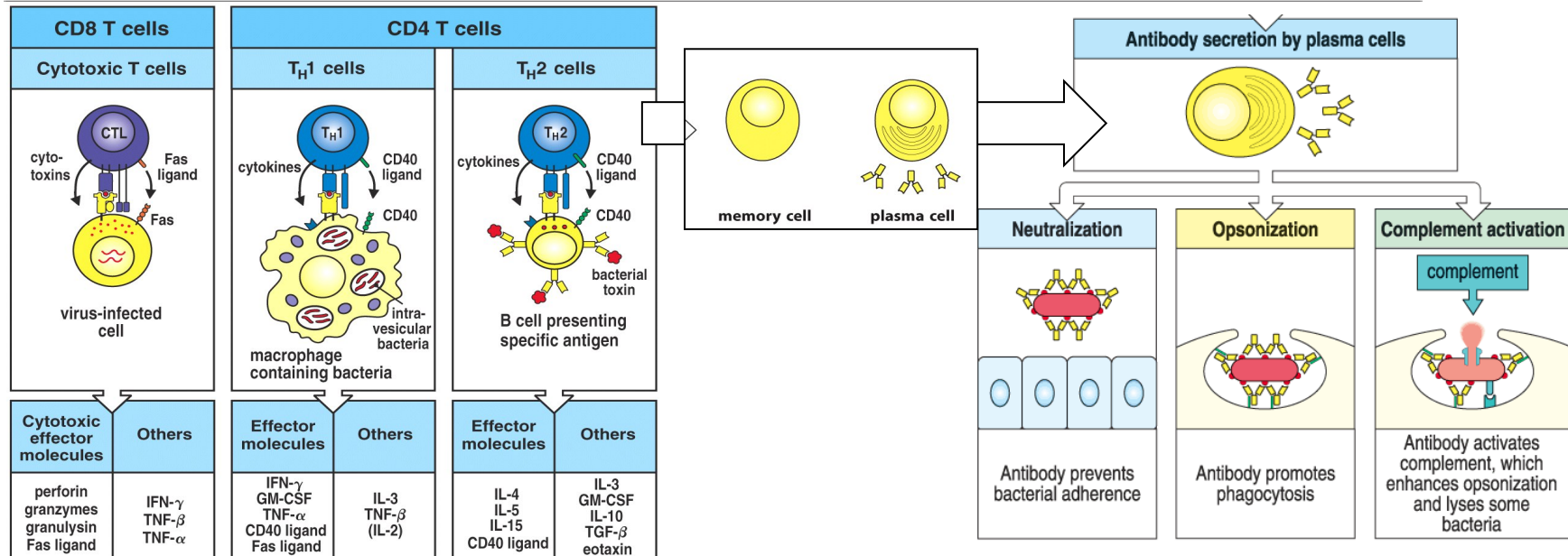
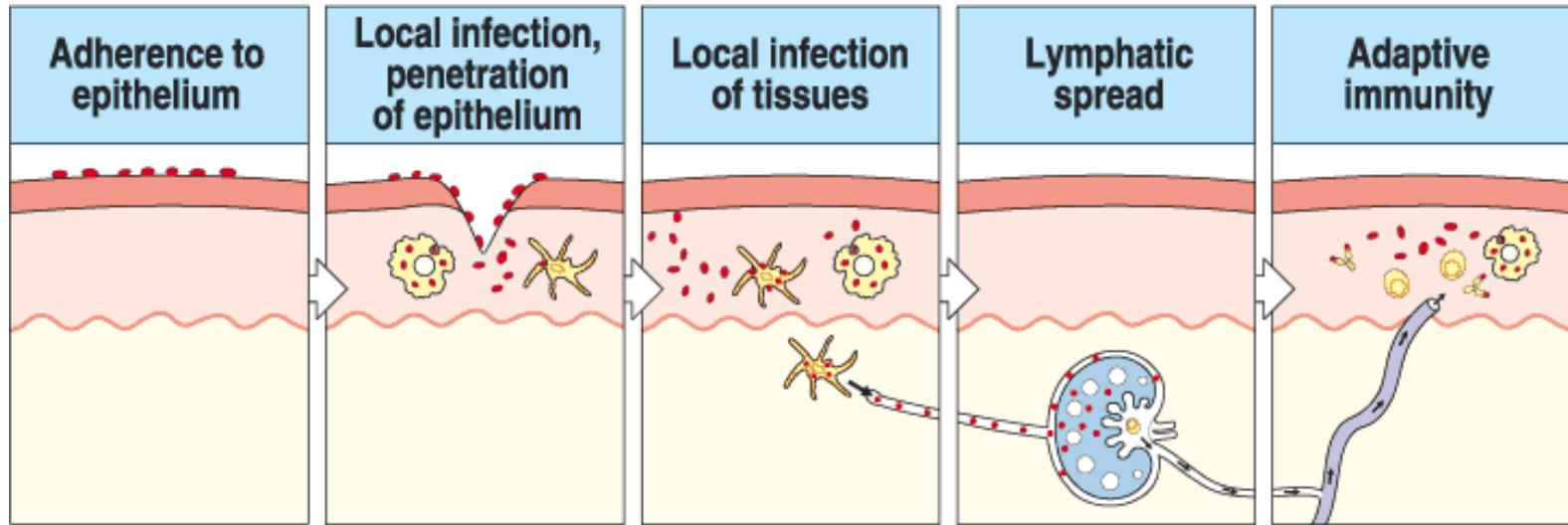


Figure 6-26 The Immune System, 2/e (© Garland Science 2005)

Fig 9.1 © 2001 Garland Science

How can we utilize the memory attribute?!

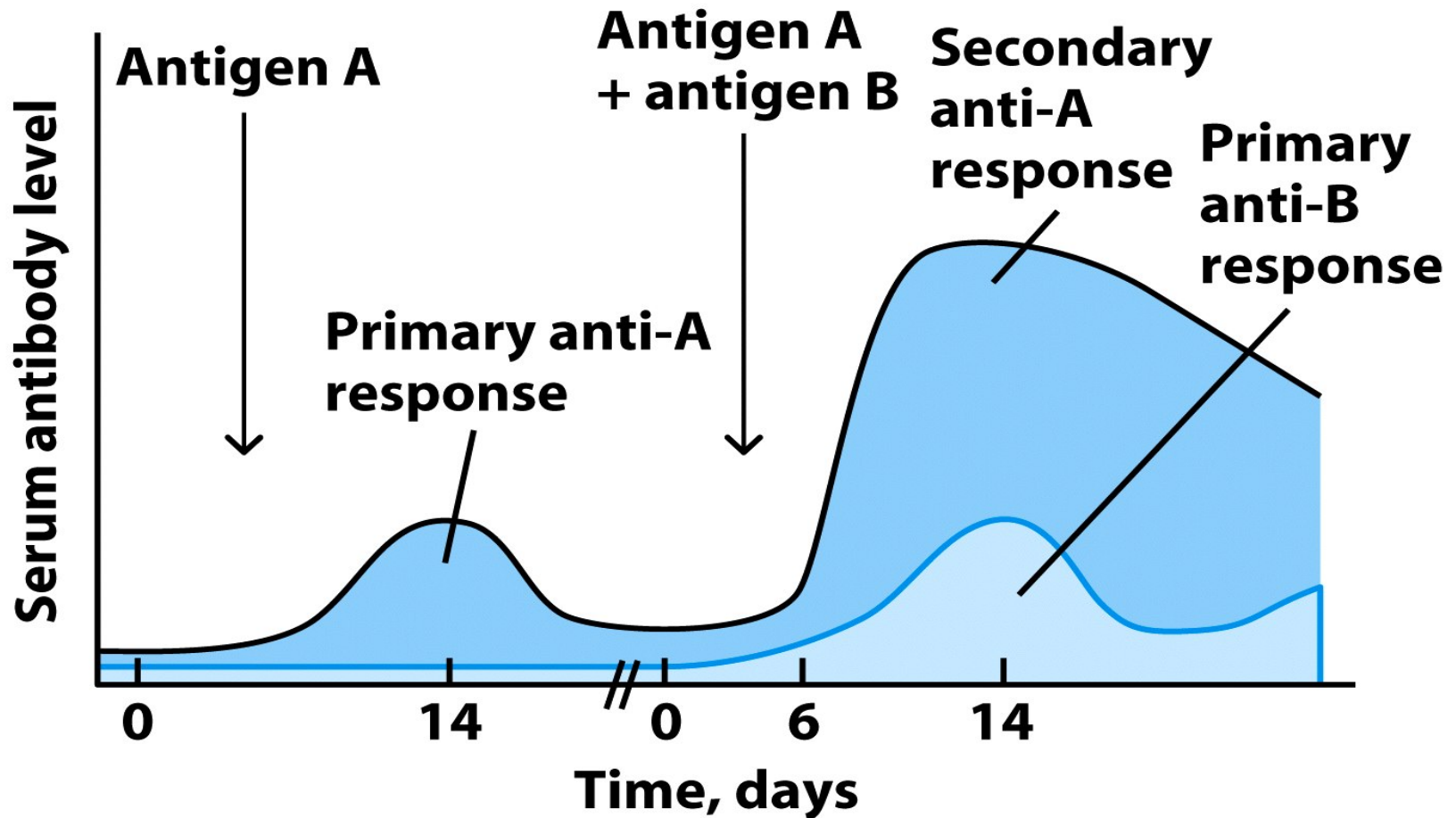


Figure 1-13
Kuby IMMUNOLOGY, Sixth Edition
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What if the response was against allergen?!

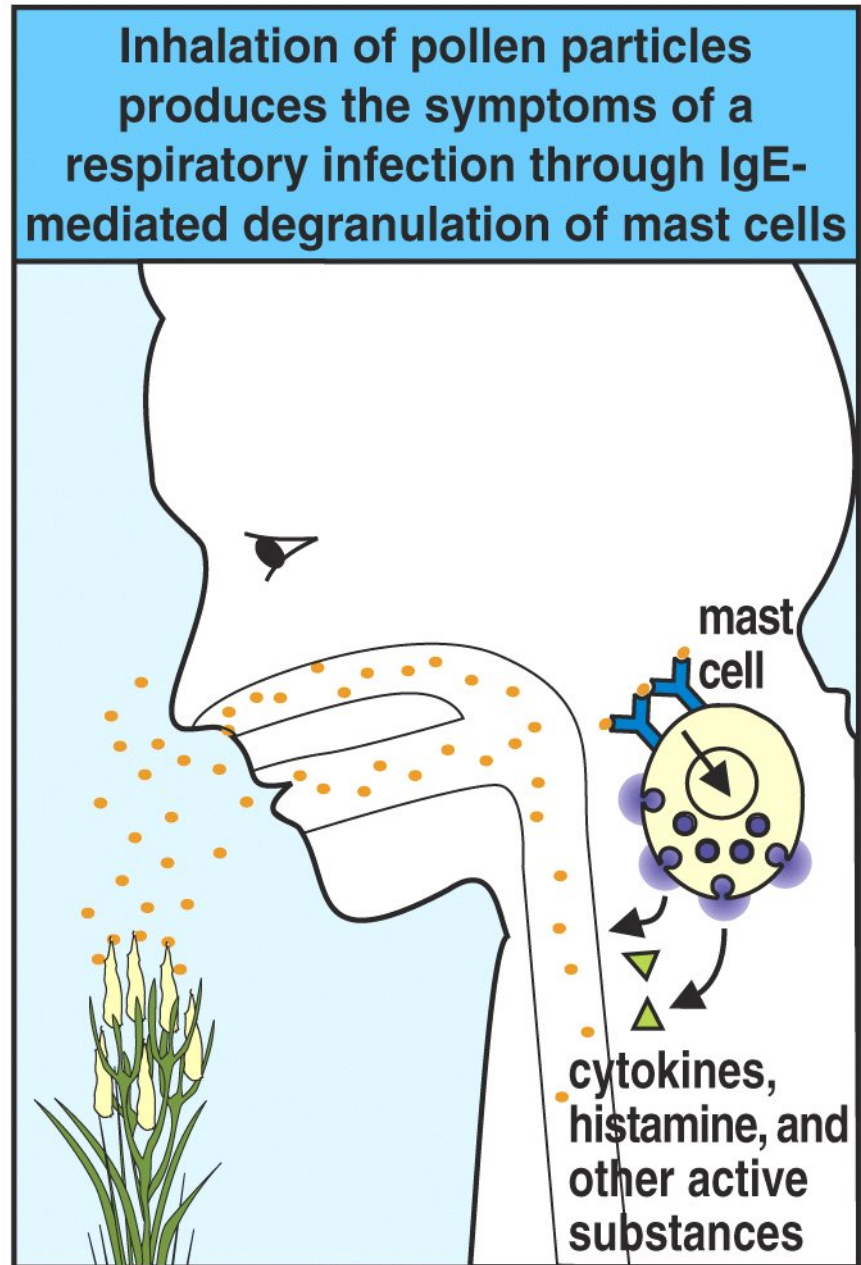


Figure 1-32 The Immune System, 2/e (© Garland Science 2005)

Sometimes the immune response cure diseases and sometimes it causes diseases

Antigen	Effect of response to antigen	
	Normal response	Deficient response
Infectious agent	Protective immunity	Recurrent infection
Innocuous substance	Allergy	No response
Grafted organ	Rejection	Acceptance
Self organ	Autoimmunity	Self tolerance
Tumor	Tumor immunity	Cancer

Figure 1.32 Janeway's Immunobiology, 8ed. (© Garland Science 2012)

You are now able to:

- ✓ Understand how different components of the immune system interact in health and disease