

Session 5: Immune Defense Mechanisms in Health and Disease

Text Chapters 10 and 11

Time: 4 Class periods

Objectives: You should be able to understand the functioning immune system and how, when it is operating correctly, it works to defend the host against infectious disease. You will understand innate defense mechanisms, generation of adaptive immunity, and, lastly, how immunological memory is initiated and maintained. As always, the concepts are very important and the molecular details less so. You should be able to go through the entire chapter with little difficulty as you have covered all the details in previous chapters. Now is the time to synthesize, and put the entire immune system into perspective.

You should be able to understand the functioning immune system and how, when it is not operating correctly, it fails to defend the host against infectious disease. You will understand how particularly devious pathogens avoid immune clearance even in the face of a competent immune system, and how routine pathogens avoid clearance when the immune system is not functioning correctly. Lastly, you will understand the basic immunological and biological features of infection with Human Immunodeficiency Virus and the terminal stage of HIV infection, AIDS.

Chapter 10 – The Body's Defenses Against Infection

Intro *Read* Differentiate: Innate and adaptive immunity. *Review* Chaps 2 and 3 if time permits.

Part I – Preventing Infection at Mucosal Surfaces

Intro *Read* *Review* Figs 10.1 & 10.2.

10-1 *Read* *Read*.

10-2 *Read* *Read carefully* Fig 10.4.

10-3 *Read carefully* *Read carefully* Fig 10.6. *Review* Fig 10.7.

10-4 *Read* *Read* Fig 10.8.

10-5 *Read* *Read* Fig 10.10. Do not worry about excess details.

10-6 *Review* Note the last paragraph.

10-7 *Read carefully* *Read* Fig 10.12 and understand functions of IgA.

10-8 *Review* *Review* Fig 10.13.

10-9 *Read* *Review* Fig 10.14. Qualitative and quantitative IgA deficiencies are very common.

10-10 *Summarize*.

10-11 *Read carefully* *Review* Fig 10.16

Summ *Read*.

Part 2 - Immunological Memory and the Secondary Immune Response

Intro *Read* Define: Secondary immune response.

10-12 *Read carefully* *Read carefully* Fig 10.18.

10-13 *Read carefully* Understand memory. *Read* Fig 10.19.

10-14 *Read carefully* *Read* Fig 10.20. 75 years?

10-15 *Read carefully* *Read* Fig 10.21.

10-16 *Read* Understand Fig 10.22.

10-17	<i>Read carefully</i>	<i>Read carefully</i> Fig 10.23. Is there anything contradictory between Fig 10.22 and 10.23?
10-18	<i>Read carefully</i>	Understand Fig 10.24.
10-19	<i>Read</i>	Define: Original antigenic sin. Work on Fig 10.25.
10-20	<i>Read</i>	Understand the concepts, and <i>Review</i> Fig 10.27.
10-21	<i>Review</i>	<i>Review</i> Fig 10.29.
10-22	<i>Review</i>	
Summ	<i>Read</i>	Understand the concepts involved in induction and maintenance of memory.

Part 3 – Bridging Innate and Adaptive Immunity

Intro	<i>Read</i>	
10-23	<i>Read</i>	Recall the functions of B1 B cells and gamma delta T cells.
10-24	<i>Read</i>	Review Fig 10.32. Understand function and mechanism of action of NK cells.
10-25	<i>Read</i>	Review Fig 10.34.
10-26	<i>Review</i>	
10-27	<i>Review</i>	
10-28	<i>Review</i>	Review Fig 10.39.
10-29	<i>Review</i>	

Summary to Chapter 10 *Read*, and *Review* Fig 10.41.

Chapter 11 - Failures of the Body's Defenses

Intro *Read*

Part 1 - Evasion and Subversion of the Immune System by Pathogens

Intro *Read*

- 11-1 *Read* Define: Serotypes. Understand Fig 11.1.
- 11-2 *Read carefully* Define: Antigenic drift and shift. Understand Figs 11.2 & 11.3 and significance of this.
- 11-3 *Read* Define: VSG's. Does the mechanism sound (somewhat) familiar? *Review* Fig 11.4.
- 11-4 *Read* Understand: Latency.
- 11-5 *Read carefully* *Read* (for perspective) Fig 11.6. This is very important, but not to be memorized.
- 11-6 *Read carefully* Understand mechanism of action of Superantigens. Understand Fig 11.8.
- 11-7 *Read*

Summ *Read*

Part 2 - Inherited Immunodeficiency Disease

Intro *Read*

Define: Immunodeficiency.

- 11-8 *Read* *Read* (for perspective only) Fig 11.9.
- 11-9 *Read carefully*
- 11-10 *Read* *Review* Fig 11.10.
- 11-11 *Read* *Review* Fig 11.11. Recall Btk.
- 11-12 *Review*
- 11-13 *Review*
- 11-14 *Read carefully* Define: CGD and C-H Syndrome. *Read* Fig 11.14.
- 11-15 *Read carefully* Understand diverse mechanisms behind SCID.
- 11-16 *Read* *Review* Fig 11.16.
- 11-17 *Read* Define: GVHS. Try Fig 11.18.

Summ *Read*

Part 3 - Acquired Immune Deficiency Syndrome

Intro *Read carefully*

Review Fig 11.19.

- 11-18 *Read carefully* Understand Figs 11.20 and 11.21.
- 11-19 *Read carefully* Understand Fig 11.22.
- 11-20 *Read carefully* Understand Fig 11.23.
- 11-21 *Read* Understand role of co-receptor. How does this discovery affect immunization?
- 11-22 *Review*
- 11-23 *Read* *Review* Figs 11.26 thru 11.29.
- 11-24 *Read*
- 11.25 *Read very carefully* *Read* Fig 11.30

Summ *Read*

As you read Part 3 try to make connections between the information on AIDS, the functioning immune system, and the pathogenesis of other infectious diseases.

Summary to Chapter 9

Read