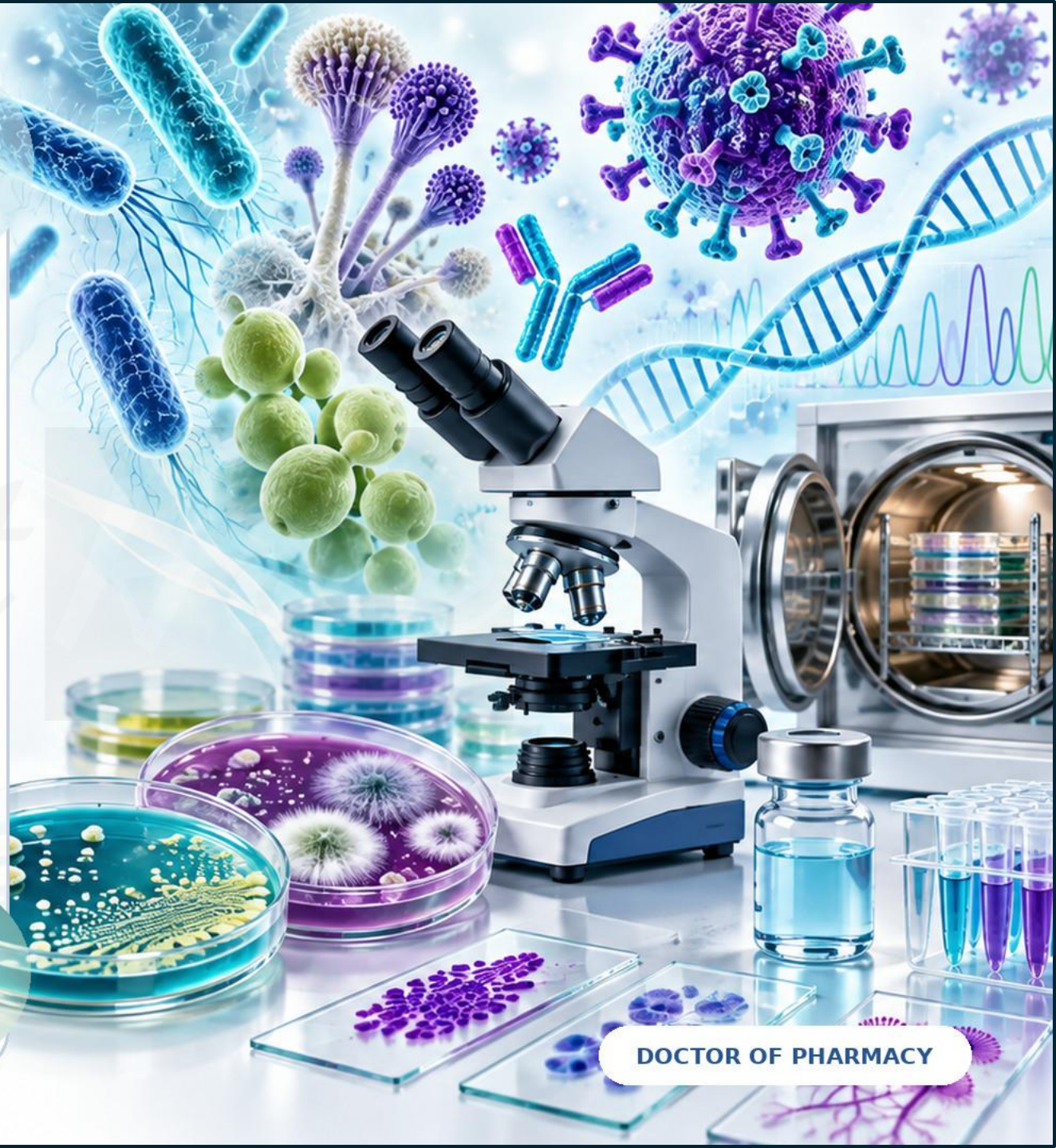
PHARM.D • YEAR 2

Pharmaceutical Microbiology

CHAPTER 7

Immunology: Immunity, Antigens, Antibodies and Vaccines

PPT CHAPTER COVER

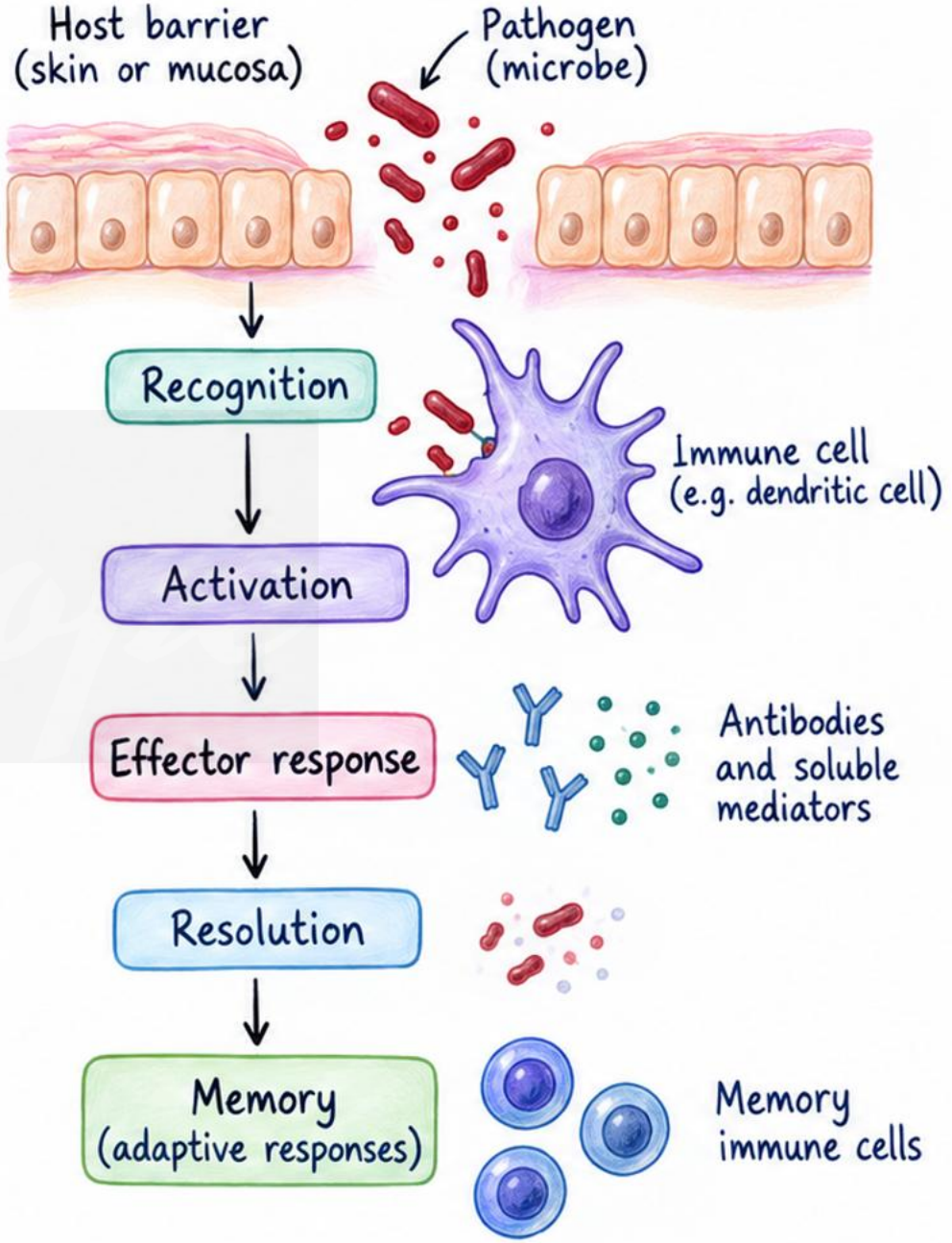


DOCTOR OF PHARMACY

The Immune Response

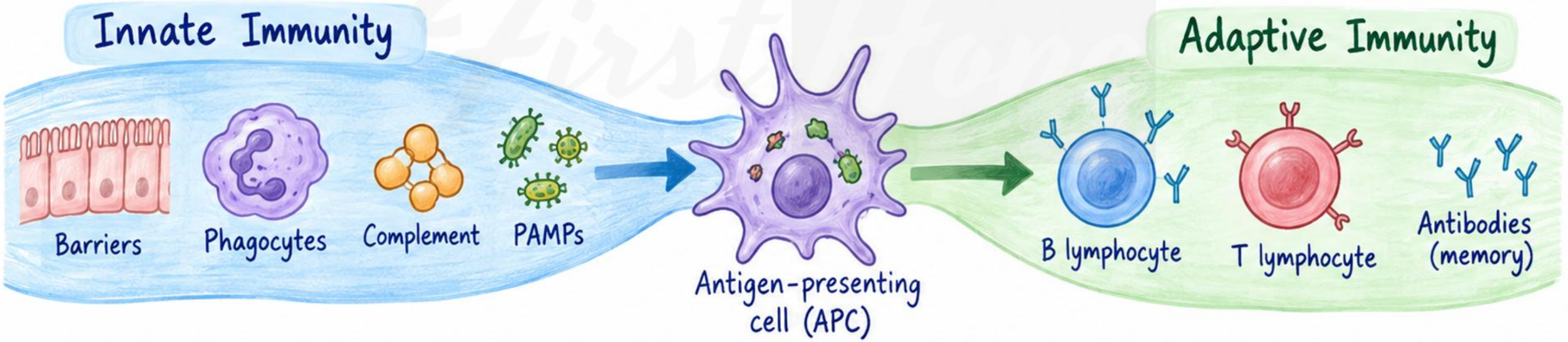
Immunity is the body's capacity to recognize and respond to harmful agents while limiting damage to itself. A response has **recognition**, **activation** and **effector** phases, followed by resolution and, for adaptive responses, memory. Barriers, immune cells and soluble mediators cooperate. A strong response is not automatically beneficial if it causes excessive inflammation or attacks self-tissue.

The outcome reflects both microbial properties and host regulation. An appropriate response clears danger while limiting collateral tissue damage and restoring balance.



Innate and Adaptive Immunity

Innate defenses respond rapidly using barriers, phagocytes, complement and other broadly recognizing systems. Adaptive immunity uses antigen-specific B and T lymphocytes and develops memory after exposure. The systems are linked: innate sensing and antigen presentation help initiate adaptive responses, while antibodies can enhance phagocytosis and complement activation.



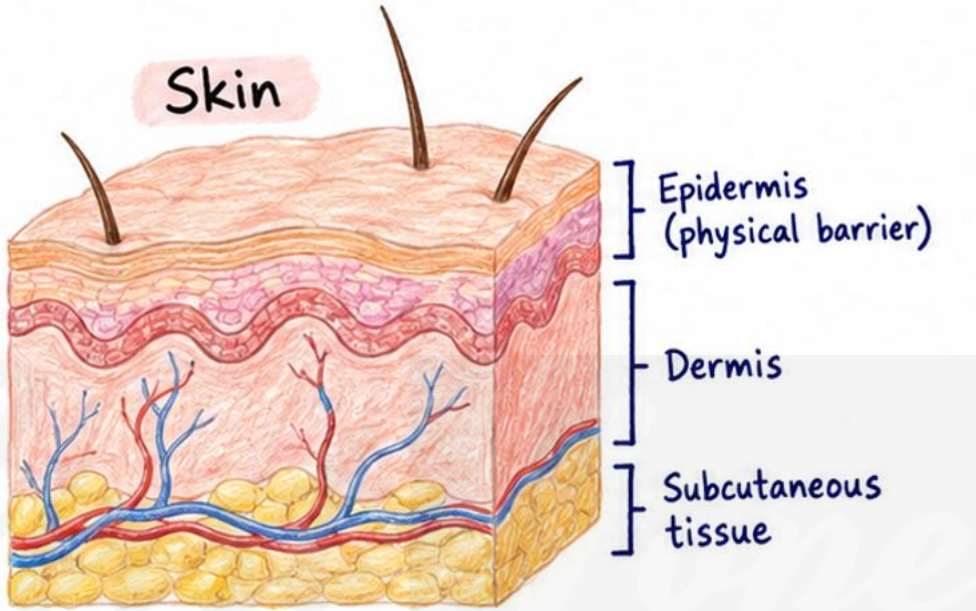
Innate recognition is broad but not random: receptors detect shared danger patterns. Adaptive specificity develops through selected lymphocyte clones and memory.

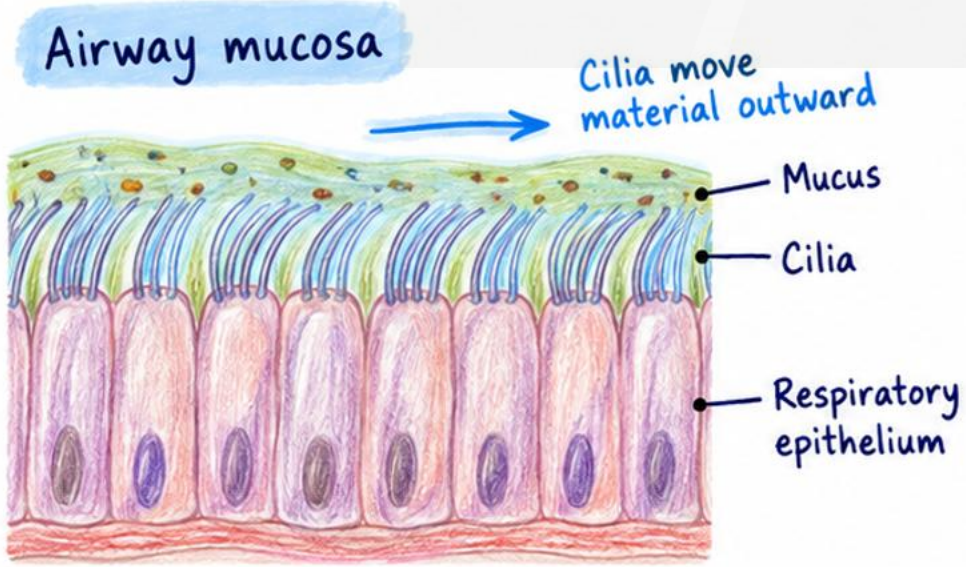
First-Line Barriers

Intact skin and mucous membranes obstruct entry.

Mucus, cilia, acidic environments and antimicrobial molecules add chemical and mechanical defense.

These barriers differ by body site and may be weakened by injury, devices or illness. A breach creates an opportunity for microbes, but infection still depends on organism, dose and host response.





Cilia move trapped material outward from airways; gastric acidity reduces many swallowed organisms.

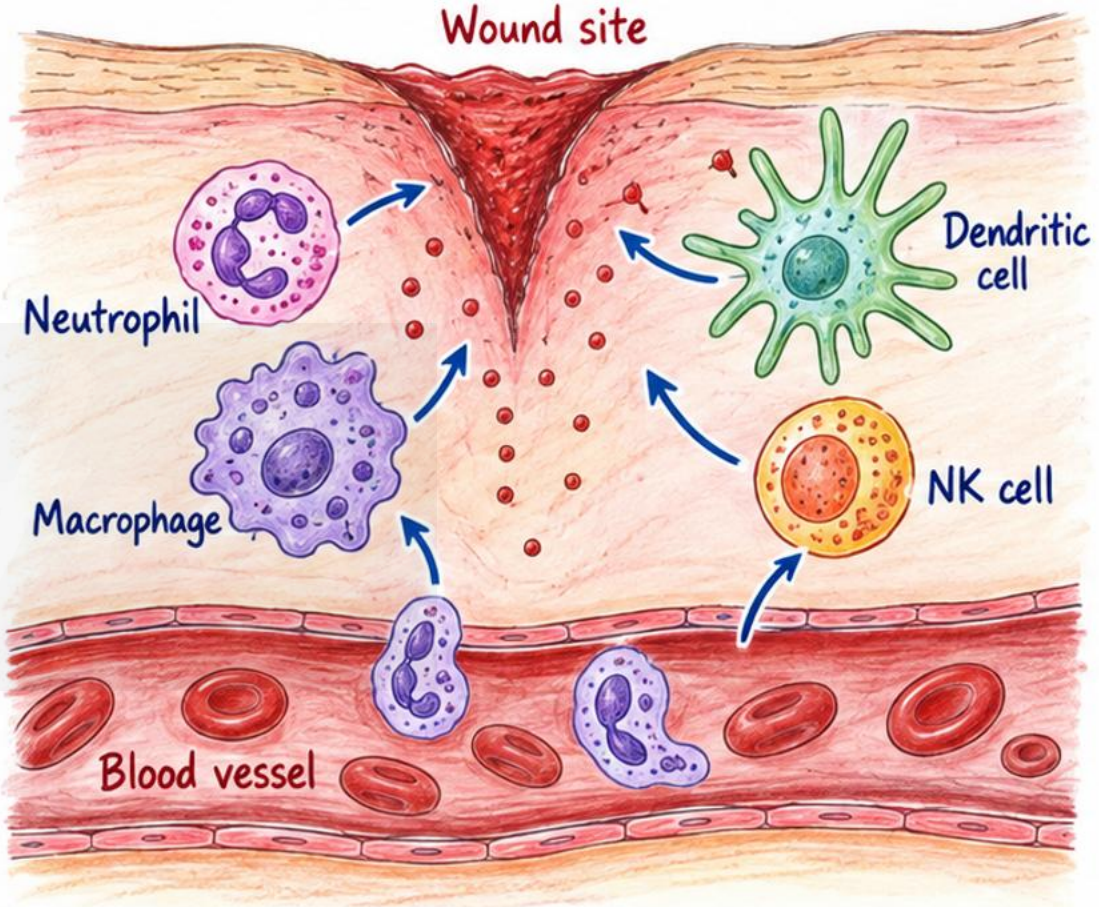
Devices can bypass these anatomical defenses.

Innate Cells and Inflammation

Neutrophils and macrophages ingest microbes; dendritic cells sample antigens and support T-cell activation. Natural killer cells respond to some infected or altered cells.

Inflammation recruits cells and plasma proteins to damaged tissue. Fever and complement are systemic or soluble components.

Controlled inflammation helps defense; excessive inflammation can injure host tissue.



Local redness, warmth, swelling and pain reflect vascular and cellular changes. They signal a response, not necessarily a bacterial infection.

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