



CHAPTER 7.2.1 | HUMAN HEALTH AND DISEASE

Innate Immunity

The Body's First Line of Defense

A visual exploration of the four non-specific barriers protecting the human body from birth.

[Non-Specific]

[Present at Birth]

[Exam-Focused]

What is Innate Immunity?

Innate immunity is a defense mechanism that is active immediately upon infection. It serves as the initial fortress wall, relying on specialized physical and chemical barriers to prevent the entry of foreign agents into the body.



Present at Birth

Innate immunity is inherited and functional from the moment of birth, unlike acquired immunity which develops over time.



Non-Specific Defense

It provides a general, uniform response against all foreign invaders, without targeting specific microscopic pathogens.

The Outer Defenses: Blocking Entry & Growth

Physical Barriers

The structural blockades that prevent physical entry.



- **Skin:** The main barrier on the body preventing micro-organism entry.



- **Mucus:** Coating the epithelium lining of the respiratory, gastrointestinal, and urogenital tracts to trap entering microbes.

Physiological Barriers

The chemical deterrents that create a hostile environment.



- **Stomach acid:** Destroys microbes ingested with food.



- **Saliva:** Prevents microbial growth in the mouth.



- **Tears:** Protects the eyes from bacterial colonization.



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Cellular Barriers: The Phagocytic Defenders

Specific leukocytes (white blood cells) that actively phagocytose (engulf) and destroy microbes.

[Blood]

PMNL-neutrophils

Polymorpho-nuclear leukocytes that actively hunt pathogens.



[Blood]

Monocytes

Large phagocytic white blood cells circulating the body.



[Blood]

Natural killer cells

A specialized type of lymphocyte that destroys infected cells.



[Tissues]

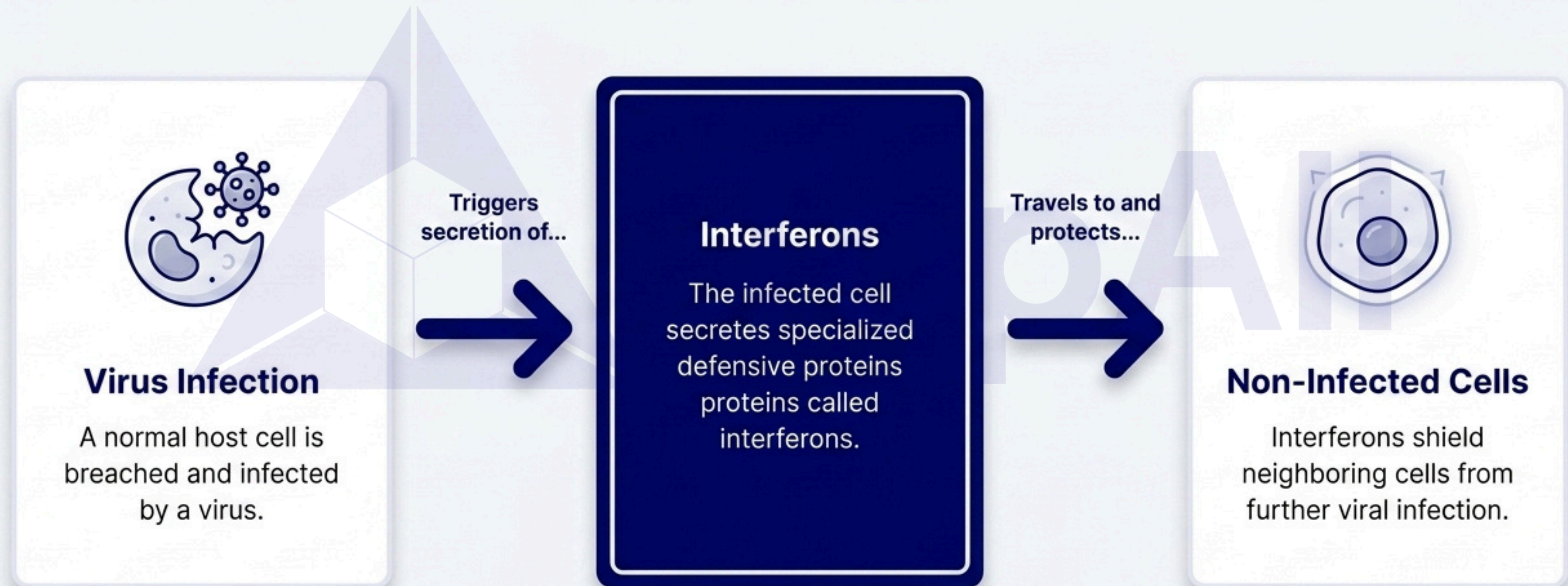
Macrophages

Large, specialized phagocytic cells stationed directly within the organs.



Cytokine Barriers: The Warning Beacons

How virus-infected cells protect their healthy neighbors from further spread.



The Four Barriers of Innate Immunity

Barrier Type	Primary Function	Key Examples
Physical barriers	Blocks entry / Traps microbes	Skin, Mucus (Respiratory, GI, Urogenital tracts)
Physiological barriers	Prevents microbial growth	Stomach acid, Saliva, Tears
Cellular barriers	Phagocytose & destroy microbes	PMNL-neutrophils, Monocytes, Natural killer cells, Macrophages
Cytokine barriers	Protects against viral spread	Interferons (secreted by infected cells)

Key Takeaways



Birthright Defense

Innate immunity is a non-specific defense mechanism present in the human body from the exact moment of birth.

Structural & Chemical Shields

Physical barriers (skin, mucus) physically block entry, while **physiological barriers** (stomach acid, saliva, tears) create hostile environments to halt microbial growth.

Active Internal Combat

If surface defenses are breached, **cellular barriers** (macrophages, PMNL-neutrophils, NK cells) engulf invaders, while **cytokine barriers** (interferons) act as chemical alarms to halt viral replication.

Mastery achieved: You now understand the four pillars of innate defense.



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