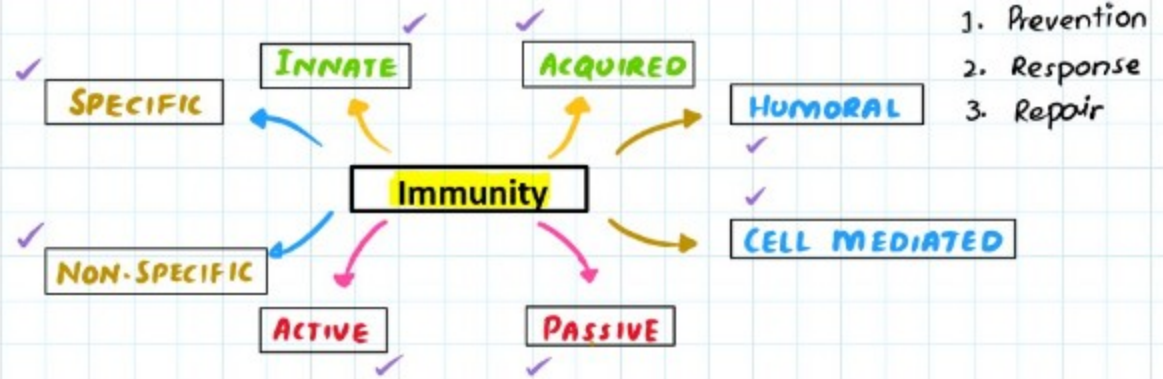
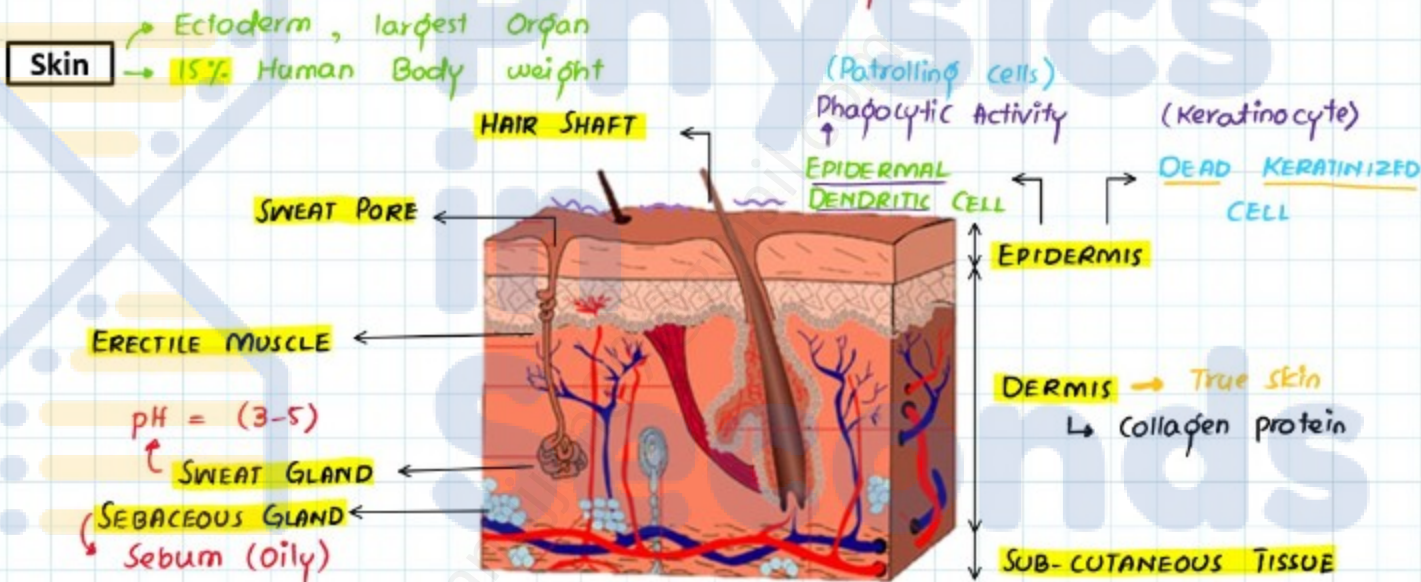


9.8 Immunity (Functions and Importance of main Components)



First Line of Defense → Layered Defence (Mechanical + Chemical) Non-Specific / Innate Immunity



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Perspiration → Sweating

→ Sweat gland activity
→ Sweat
• Salts → Salination

• Enzyme → lysozyme
Lactic Acid (Natural Antibiotic)

Mucous Membranes

- Digestive System
- Respiratory System
- Reproductive System

Sebum

→ Sebaceous / Oil glands
→ Oil prevent against pathogens
→ Provision of insulation.

Second Line of Defense → Non-Specific

- Phagocytic Activity
- Inflammation
- Temperature ↑↑ (Fever)

MONOCYTE (10-20 H in Blood)

Phagocytic Cells

Neutrophils

MONOCYTE (10-20 H in Blood)

✓ PATROL CELLS

Macrophages

→ 2-3%

• In tissue → Agranulocyte



Life ↑↑

→ Irregular Shaped

- Dust cells (Alveolar Macrophages) → Lungs
- Kupffer Cells → Liver
- Dendritic Cells → Skin + Kidney
- Microglial cells → CNS
- Osteoclast → Bone

Phagocytic Cells

Neutrophils

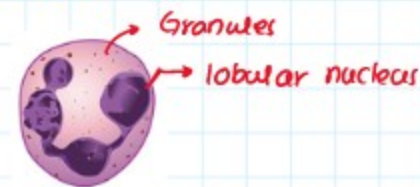
62-70%

Granulocyte

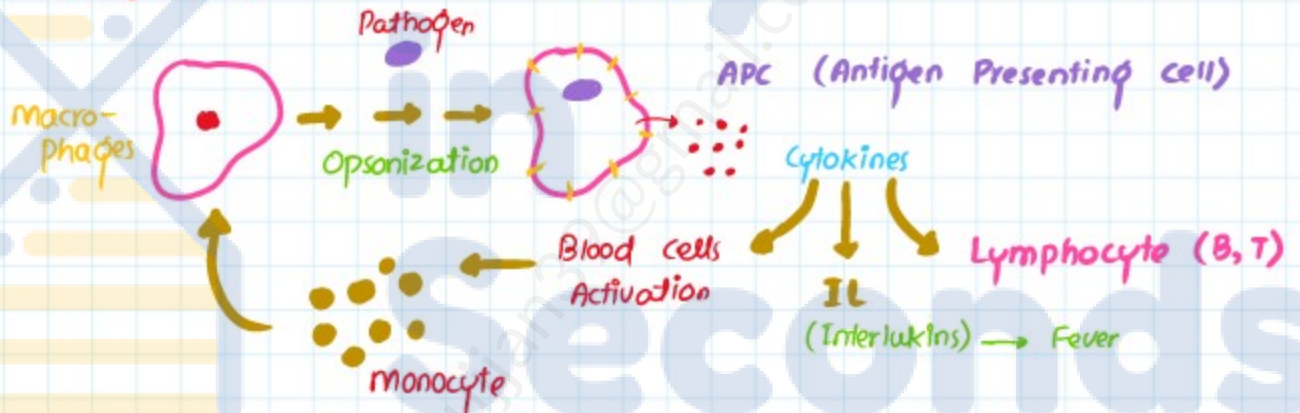
Microphages

• Blood

Life ↓↓



- Lysozyme production
- Suppination (Pus formation)



NK-cells are induced by interferons or macrophage derived cytokines

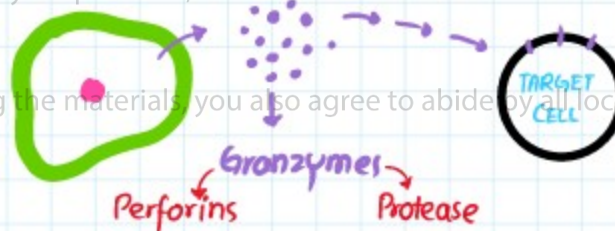
Natural Killer Cells

Part of Innate Immunity

→ Cytotoxic T-cell

→ Short termed attack

NK-Cell



- Induces apoptosis (Programmed cell death)
- Induces lysis

Protein → formed by Liver

Complement System

→ Series of Protein

20-30

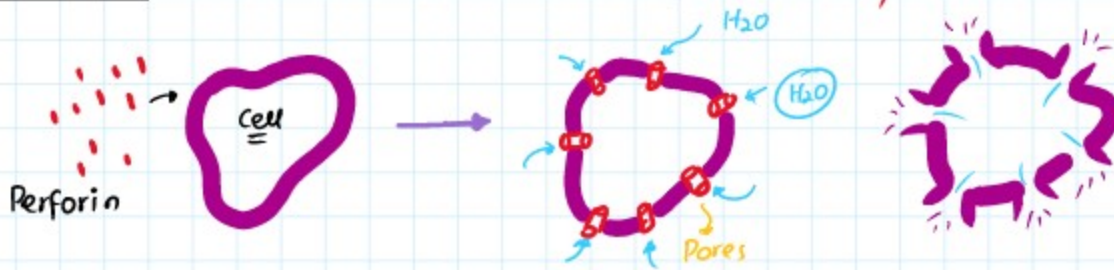
30 ↑↑ (FTE)

Perforins

→ Make pores on Host cell. / Permeability Enhancement

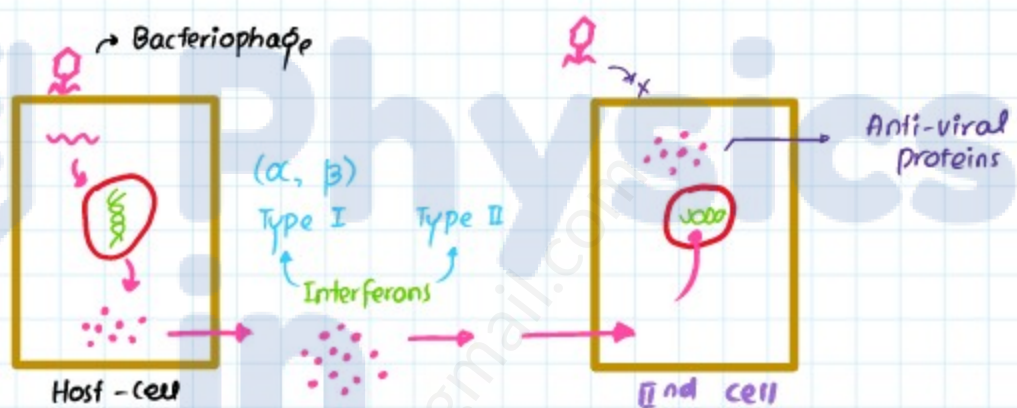
• H₂O

Perforins → Make pores on Host cell. / Permeability Enhancement



Interferons

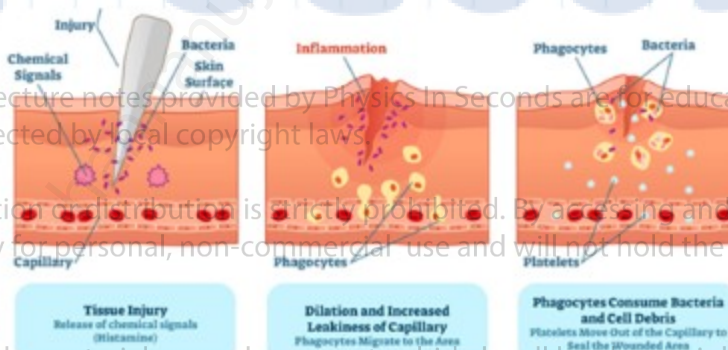
Produced by viral infection



Localized Response → **Inflammatory Response** → Non-specific

Tissue Injury

- Histamines
- Serotonin
- Bradykinin
- Prostaglandin



CLASSICAL SIGNS

- HEAT
- RED
- PAIN
- SWELLING
- LOSS OF FUNCTION

Edema

Marker for malfunctioning

Fever → **Pyrexia**, Raised body temperature (Normal temp → 37°C)

Non-specific Response

marker that there is something wrong in body

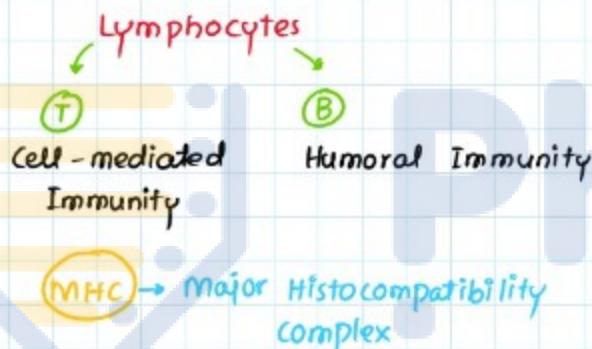
Pathogens → **Pyrogens** → Hypothalamus thermostat (Higher Set Point)

Endogenous (WBC)

Endogenous
(WBC)

- HIGH TEMP :**
- Phagocytic activity $\uparrow\uparrow$
 - Iron concentration in Blood $\downarrow\downarrow$
 - Growth of Bacteria $\downarrow\downarrow$

IMMUNE SYSTEM \rightarrow **Third Line of Defense** \rightarrow SPECIFIC RESPONSE
ACQUIRED IMMUNITY



• **ANTIGEN** (Proteins/Substances produced from pathogen)

Against Generating

ANTIGEN

- All antigens are not immunogens.
- \rightarrow Not necessarily activate immune response.

IMMUNOGEN

- All immunogens are antigens
- \rightarrow Always activate immune response

T-Lymphocytes

Thymus gland

- **Helper T-lymphocyte** (Messenger b/w macrophages & lymphocytes)
- **Cytotoxic T-lymphocyte** (Natural Killer Cells)

Produce cytotoxins \rightarrow Destruction of Pathogen

- **Suppressor T-lymphocytes** (Secretes proteins \rightarrow Avoid proliferation of T-cells)
- **Memory T-lymphocytes** (Memorizes sequences of pathogens)



Types of Immunity

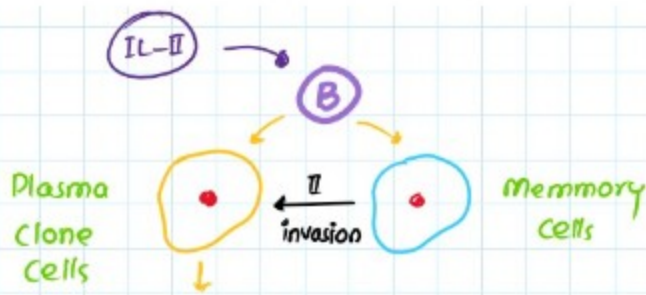
Secretion

Humoral Immunity

- **B-Lymphocytes** (Bursa of Fabricius) (RER $\uparrow\uparrow$)
- Have secretory ability of anti-bodies

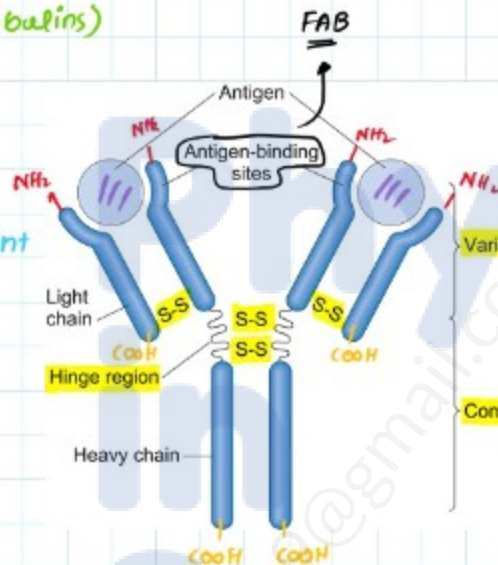
Cell Mediated Immunity

- **T-Lymphocytes**



Anti-bodies
(Immuno-globulins)

- D → Ig D
- G → Ig G (most important)
- A → Ig A
- M → Ig M
- E → Ig E



Disulphid Bridges

- Heavy chain - Heavy chain
- Heavy chain - light chain
- Light chain - light chain X

Variable portion → No. of A-Acid varies
(110-150 A-Acid)

Constant portion → Fixed no. of A-Acids

Antigen-Antibody Complex



Degradation of Antigen-Antibody Complex

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Antigen →

Active Immunity

- Slow
- Long lasting

Natural

Disease

- Chicken Pox
- Mumps
- Measels

Artificial

Weak Pathogen

- Vaccination
- Immunization

Antibody →

Passive Immunity

- Rapid
- Short termed

Natural

Mother

- ↓ milk
- Baby**
- Colostrum (First milk)

Artificial

- Antiseras
- Anti toxin
- Anti venom

Blood - Cell = Plasma

Plasma - C-F = Serum

Serum + A+B = Anti Serum

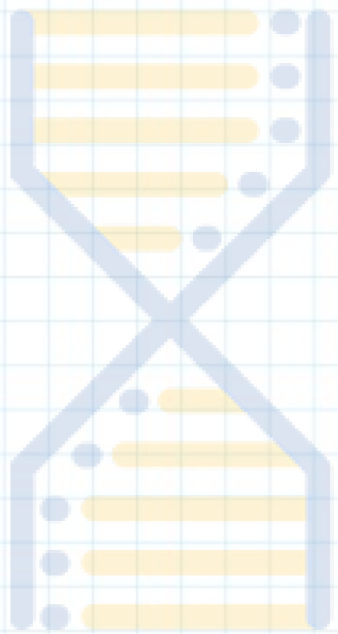
(First milk)

Plasma - C-F = Serum

Serum + A-B = Anti Serum

• P° - Immune Response → 5-10 days after infection

S° - Immune Response → 3-5 days (Presence of memory cell)



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