**Topic 6.3: Defense Against Infectious Disease**

**Essential Idea: The human body has structures and processes that resist the continuous threat of invasion by pathogens.**

**Statements & Objectives:**

**6.3.U1 The skin and mucous membranes form a primary defense against pathogens that cause infectious disease.**

Define pathogen.

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

State that skin and mucous membranes form the first line of defense against pathogens.

**(State**: Give a specific name, value or other brief answer without explanation or calculation)

Outline the role of skin, sebaceous glands and mucous membranes in the defense against pathogens.​

(**Outline** Give a brief account or summary.)

**6.3.U2 Cuts in the skin are sealed by blood clotting.**

State two benefits of blood clotting when skin is cut.​

**(State**: Give a specific name, value or other brief answer without explanation or calculation)

**6.3.U3 Clotting factors are released from platelets.**

Outline two roles of platelets in the blood clotting cascade.​

(**Outline** Give a brief account or summary.)

**6.3.U4 The cascade results in the rapid conversion of fibrinogen to fibrin by thrombrin**.

Describe the blood clotting cascade, including the role of platelets, clotting factors, thrombin, fibrinogen and fibrin.

**(Describe**: Give a detailed account)

**6.3.U5 Ingestion of pathogens by phagocytic white blood cells gives non-specific immunity to diseases.**

State the white blood cells are the second line of defence against pathogens.

**(State**: Give a specific name, value or other brief answer without explanation or calculation)

Outline the function of phagocytic white blood cells in defense against pathogens.​

(**Outline** Give a brief account or summary.)

**6.3.U6 Production of antibodies by lymphocytes in response to particular pathogens gives specific immunity.**

Define “specific immune response.”

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Contrast antigen and antibody.

Describe the structure and function of antibodies.

**(Describe**: Give a detailed account)

State the function of plasma cells and memory cells.​

**(State**: Give a specific name, value or other brief answer without explanation or calculation)

**6.3.U7 Antibiotic blocks processes that occur in prokaryotic cells but not in eukaryotic cells**

Define antibiotic.

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

Outline the mechanisms by which antibiotics kill bacteria.

(**Outline** Give a brief account or summary.)

Explain why antibiotics are ineffective against viruses.​

(**Explain**: Give a detailed account including reasons or causes)

**6.3.U8 Viruses lack a metabolism and cannot therefore be treated with antibiotics.**

Explain why antibiotics are ineffective against viruses.

(**Explain**: Give a detailed account including reasons or causes)

**6.3.U9 Some strains of bacteria have evolved with genes that confer resistance to antibiotics and some strains of bacteria have multiple resistance.​**

List five measures that can be taken to avoid the development of antibiotic resistance.

(**List** Give a sequence of brief answers with no explanation.)

Explain why multiple drug antibiotic resistance is especially dangerous.

(**Explain**: Give a detailed account including reasons or causes)

State an example of a multidrug resistant bacteria.

**(State**: Give a specific name, value or other brief answer without explanation or calculation)

**6.3.A1 Causes and consequences of blood clot formation in coronary arteries.**

State the function of the coronary arteries.

**(State**: Give a specific name, value or other brief answer without explanation or calculation)

Define coronary thrombosis.

(**Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

List sources of arterial damage that increase the risk of coronary thrombosis.

(**List** Give a sequence of brief answers with no explanation.)

List factors that are correlated with an increased risk of coronary thrombosis and heart attack.

(**List** Give a sequence of brief answers with no explanation.)

**6.3.A2 Effects of HIV on the immune system and methods of transmission.**

Describe the consequences of the HIV on the immune system.

**(Describe**: Give a detailed account)

Outline the relationship between HIV and AIDS.

(**Outline** Give a brief account or summary.)

List ways the HIV virus is spread.

(**List** Give a sequence of brief answers with no explanation.)

**6.3.A3 Florey and Chain’s experiments to test penicillin on bacterial infections in mice.**

Explain methods and results of Florey and Chain’s experiments.​

(**Explain**: Give a detailed account including reasons or causes)

**6.3.NOS Risks associated with scientific research- Florey and Chain’s tests on the safety of penicillin would not be compliant with current protocol on testing.**

Compare allowable research risks of the past with those of the present.​

(**Compare** Give an account of the similarities and differences between two (or more) items or situations, referring to both (all) of them throughout.

**Key Terms**

Pathogen

primary defense

trachea

lysozyme

macrophage

binding site

helper-T cell

clone cell

challenge

thrombrin

plasma cell

​lymphocyte

antibodies

secondary defense

nasal passage

phagocytic

specific response

B lymphocyte

Mutate

Epitope

Response

antibiotic resistance

​​​coronary thrombosis

antibiotics

urethra

leucocyte

non-specific response

memory cell

transfusion

skin

​sebaceous glands

​platelets

​coronary arteries

​eukaryotic cell

virus

bacteria

vagina

immunity

protein

HIV

ELISA

clonal selection

​blood clot

specific immunity

Florey and Chain

​prokaryotic cell

mucus membrane

prokaryotic

cilia

phagocytosis

antigen

AIDS

Immune

Protozoa

Fibrinogen

​Penicillin

​fibrin