**Topic 11.1: Antibody Production and Vaccination**

**Essential Idea: Immunity is based on recognition of self and destruction of foreign material.**

**Statements & Objectives:**

**11.1.U1 Every organism has unique molecules on the surface of its cells.**

Define antigen.

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

List example antigen molecules.

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

**11.1.U2 B-lymphocytes are activated by T lymphocytes in mammals.**

Explain the “challenge and response” mechanism of specific immunity.

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

Describe activation of helper T lymphocytes by the macrophage.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

Describe activation of B cell lymphocytes by the helper T cells.​

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**11.1.U3 Plasma cells secrete antibodies.**

Outline the structure and function of plasma B cells.​

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

**11.1U4 Activated B cells multiply to form clones of plasma cells and memory cells.**

Describe clonal selection of plasma B cells.​

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**11.4.U5 Antibodies aid the destruction of pathogens.**

Outline four modes of antibody action.​

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

**11.1.U6 Immunity depends upon the persistence of memory cells.**

Define immunity.

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

State two mechanisms of immunity.

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

Explain the differences between the primary and secondary immune responses.

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

**11.1.U7 Vaccines contain antigens that trigger immunity but do not cause the disease.**

Explain the principle of vaccination.​

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

**11.1.U8 Pathogens can be species-specific although others can cross species barriers.**

Outline mechanisms that prevent some pathogens from crossing species.

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

Define zoonosis.

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

List three examples of zoonotic diseases.

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

**11.1.U9 White cells release histamine in response to allergens.**

State the source and function of histamine proteins.

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

**11.1.U10 Histamines cause allergic symptoms.**

List allergic symptoms caused by histamines.

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

State the function of an anti-histamine.​

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

**11.1.U11 Fusion of a tumor cell with an antibody-producing plasma cell creates a hybridoma cell.**

Explain the production of hybridoma cells.

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

**11.1.U12 Monoclonal antibodies are produced by hybridoma cells.**

Define “monoclonal antibody.”

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

Describe the production of monoclonal antibodies in hybridoma cells.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

Outline the use of monoclonal antibodies in diagnosis and treatment.​

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

**11.1.A1 Antigens on the surface of red blood cells stimulate antibody production in a person with a different blood group.**

Outline the difference between the ABO blood antigens.

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

State the fours human ABO blood types

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

Describe the consequence of mismatched blood transfusions, including agglutination and hemolysis.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**11.1.A2 Smallpox was the first infectious disease of humans to have been eradicated by vaccination.**

Describe the global initiative used to eradicate smallpox.​

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**11.1.A3 Monoclonal antibodies to HCG are used to pregnancy test kits.**

Describe a pregnancy test strip works, including the role of free and immobilized monoclonal antibodies.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**11.1.S1 Analysis of epidemiological data related to vaccination programs.**

Define epidemiology.

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

Outline the role of an epidemiologist in vaccination programs.

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

**11.1.NOS Consider ethical implications of research- Jenner tested his vaccine for smallpox in a child.**

Describe how Jenner tested his smallpox vaccine.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

List reasons when Jenner’s test would not be approved today.

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

**Key Terms**

Antibody

memory cells

primary immunity

zoonosis

​hybridoma cells

​hemolysis

​epidemiology

​myeloma cells

immunity

B-lymphocytes

secondary immunity

​histamine

​ABO blood antigens

smallpox

Jenner

Antigen

T lymphocytes

​vaccination​

​anti-histamine

​red blood cells

​eradicate

​opsonization

​

​challenge and response

helper T cells

​pathogen

​allergic symptoms

​​monoclonal antibody

​pregnancy

​blood transfusion

​macrophage

​plasma B cells

​crossing species

​tumor cell

​agglutination

​HCG

​toxin