Question No. 1 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #1

1. Who is known as the 'Father of Vaccine'?

(A) Robert Koch
(B) Paul Ehrlich
(C) Edward Jenner
(D) Louis Pasteur

Feedback

A. Incorrect!
He discovered the cause and nature of TB.

B. Incorrect!
He discovered the role of antitoxins.

C. Correct!
He improved the technique of Variolation and developed the first vaccine and that was for small pox (in the year 1798).

D. Incorrect!
He developed vaccines for cholera, anthrax, and rabies about 100 years after the Jenner's work.

Solution

While addressing this type of question you should always remember some points like:

- Who did the pioneer work in the given field?
- Which year the work was started?
- Novelty of the work.

Edward Jenner observed that milkmaids who had contracted cowpox were subsequently immune to small pox. He inoculated an eight year old boy the fluid from a cow pox pustule; the boy did not develop small pox. This was indeed a breakthrough finding in the field of immunology and hence he is known as the "Father of Vaccine".

Question No. 2 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #2

2. Specificity, Diversity, Memory, Self & Non-self recognition; these are the four attributes of _____.

(A) Innate Immunity
(B) Acquired Immunity
(C) Phagocytosis
(D) Passive Immunity

Feedback

A. Incorrect!
Innate immunity is non-specific and is not affected by prior contact with microorganisms or immunization.

B. Correct!
Acquired immunity is because of active functioning of person's immune system involving B-cells and T-cells activated by antigenic stimulus. It is the resistance that an individual acquires during life.

C. Incorrect!
It is the process by which cells engulf material and enclose it within a phagosome.

D. Incorrect!
The resistant that is transferred to a recipient in a readymade form. There is no active involvement of recipient's immune system.

Solution

Immune response is divided in two categories: Innate and Adaptive immune responses. Adaptive (acquired), or specific, immunity is capable of recognizing and selectively eliminating specific foreign microorganisms and foreign antigens. It is the resistance that an individual acquires during life. Adaptive immune responses are reactions to specific antigenic challenges and have four characteristic attributes by which it functions effectively; those are Specificity, Diversity, Memory, Self & Non-self recognition.

Question No. 3 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.	
 **Question #3**	**3.** The resistance to infections which an individual possesses by virtue of his genetic and constitutional make-up is called _____. (A) Innate Immunity (B) Acquired Immunity (C) Passive Immunity (D) Phagocytosis
 **Feedback**	**A**. Correct! It's a non specific immune response and varies at the level of the species, race or individual. It includes anatomic, physiologic, endocytic, phagocytic and inflammatory barriers.
	B. Incorrect! Acquired immunity is because of active functioning of person's immune system involving B-cells and T-cells activated by antigenic stimulus. It is the resistance that an individual acquires during life.
	C. Incorrect! The resistant that is transferred to a recipient in a readymade form. There is no active involvement of recipient's immune system.
	D. Incorrect! It is the process by which cells engulf material and enclose it within a phagosome.
 **Solution**	Immune response is divided in two categories: Innate and Adaptive immune responses. Innate immunity or native immunity is the resistance to infections which an individual possesses by virtue of his genetic and constitutional make-up. It is not affected by prior contact with microorganisms or immunization. Innate immunity comprise of four types of defensive barriers: anatomic, physiologic, inflammatory and phagocytic barriers.

Question No. 4 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #4

4. Who developed the first vaccine for Anthrax?

(A) Edward Jenner
(B) Louis Pasteur
(C) Elie Metchnikoff
(D) Emil von Behring

Feedback

A. Incorrect!
He started the process of vaccination, but did not develop vaccine for Anthrax.

B. Correct!
He developed the vaccine for anthrax by performing 'classic experiment' in the year 1881.

C. Incorrect!
He deduced the role of Phagocytosis in immunity.

D. Incorrect!
He gave the first insights into the mechanism of immunity.

Solution

100 years after Edward Jenner work (1798), Louis Pasteur in 1880s developed three vaccines for cholera, anthrax and rabies.

In a now called classic experiment, at Pouilly-le-Fort in 1881, he vaccinated one group of ship with heat attenuated anthrax bacillus. All the vaccinated ships survived and the unvaccinated ships died. These experiments marked the beginnings of the discipline of immunology and in this way Pasteur developed anthrax vaccine.

Question No. 5 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #5

5. One of the following Scientists is called as "Father of Cellular Immunology".

(A) Elie Metchnikoff
(B) Emil von Behring
(C) Shibasaburo Kitasato
(D) Thucydides

Feedback

A. Correct!
He Deduced the role of Phagocytosis in immunity which led to the concept of cell-mediated immunity. He earned Nobel prize in 1908 for the same.

B. Incorrect!
He deduced the role of serum antitoxins.

C. Incorrect!
He, along with Emil Von Behring gave the first insights into the mechanism of immunity.

D. Incorrect!
He was a historian of 430 BC, when the concept of Cellular Immunology was not even developed.

Solution

He observed star-fish larvae under the microscope and saw that cells seemed to be engulfing each other. He stabbed the larvae with a rose thorn, and saw that these engulfing cells then migrated towards the rose thorn and attacked it, ingesting it. The experiment led to the discovery of the mechanism 'Phagocytosis'. Hence is said that he deduced the role of Phagocytosis in immunity and lead to the concept of cell-mediated immunity. Hence he is called as "Father of Cellular Immunology".

He earned Noble prize in 1908 with Paul Ehrlich.

Question No. 6 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #6

6. 'Vaccination' is a type of _____.

(A) Innate Immunity
(B) Active immunity
(C) Immune response
(D) Passive Immunity

Feedback

A. Incorrect!
Vaccination is a type of acquired immunity.

B. Correct!
Body's immune system is actively involved. It's an artificial active immunity.

C. Incorrect!
Immune response is developed after the vaccination is done.

D. Incorrect!
It's not a readymade form of immunity.

Solution

Vaccination is one of the important applications of immunological principles to human health. In this process an altered preparations of microbes are used to generate enhanced immunity against the fully virulent organism. Vaccination involves adaptive immunity, which is used to produce antigenic preparations from the pathogen that are safe to administer, can induce right sort of immunity and affordable by the mass.

First vaccine was named after vaccina, the cowpox virus (Jenner pioneered its use 200 years ago). 100 years after Edward Jenner work (1798), Louis Pasteur in 1880s developed three vaccines for cholera, anthrax and rabies.

Question No. 7 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #7

7. Antigen presenting cells, B-lymphocytes and T-lymphocytes are the primary cells of which immune response?

(A) Adaptive immune response
(B) Innate Immune response
(C) Phagocytosis
(D) All of the above

Feedback

A. Correct!
These are the cells which are actively involved in immune response and present Specificity, Diversity, Memory, Self & Non-self recognition, the attributes of adaptive immunity.

B. Incorrect!
It involves anatomic and physiologic barriers and these cells.

C. Incorrect!
Phagocytosis is a mechanism which involves macrophages.

D. Incorrect!
These cells are part of only one type of immune response.

Solution

Adaptive immune responses work with the help of lymphocytes. Lymphocytes are divided into two categories: T lymphocytes or B lymphocytes. Antigen presenting cells, B-lymphocytes and T- lymphocytes are the primary cells of the adaptive immune responses. They specifically recognize individual pathogens, whether they are present inside the cells or outside in the tissue fluids or blood.

B lymphocytes combat extracellular pathogens and their products by releasing antibodies.

T lymphocytes are involved in the control of B lymphocyte development and antibody production; they interact with phagocytic cells and help to destroy the pathogens they have engulfed. They also help in recognization of virus infected cells and destroy those cells.

Question No. 8 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #8

8. Who discovered the cause and nature of Tuberculosis?

(A) Louis Pasteur
(B) Edward Jenner
(C) Karl Landsteiner
(D) Robert Koch

Feedback

A. Incorrect!
He developed the vaccines for Anthrax, Rabies and cholera.

B. Incorrect!
He introduced the technique of Vaccination to the world.

C. Incorrect!
He discovered human blood groups.

D. Correct!
He identified a causative microorganism (Micobacterium tuberculosis) and proved its role in Tuberculosis; got Nobel Prize in 1905, for Cellular immunity to Tuberculosis.

Solution

In 1880s Robert Koch started his work on Tuberculosis. He identified a microorganism, cultured the microorganism out of the body, injected it into an animal and the animal got the disease. He was able to explain the cause and nature of Tuberculosis (TB).

Got Noble prize in 1905, for Cellular immunity to TB.

Question No. 9 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.

Question #9

9. Who got the Nobel Prize in 1930 for the discovery of human blood groups?

(A) Karl Landsteiner
(B) Jules Bordet
(C) Susumu Tonegawa
(D) Max Theiler

Feedback

A. Correct!
He was the first to discover that there are four different blood groups in human beings.

B. Incorrect!
His work was on Complement-mediated bacteriolysis.

C. Incorrect!
His work was on Gene rearrangement in antibody production.

D. Incorrect!
He developed the yellow fever vaccine in 1951.

Solution

Karl Landsteiner started his work on blood grouping in 1900s. He observed the interactions between the red cells and plasma of a large number of cases and demonstrated four (A, B, AB and O blood groups) different blood groups in human beings.

Question No. 10 of 10

Instructions: (1) Read the problem statement and answer choices carefully; (2) Work the problems on paper as needed; (3) Pick the correct answer; and (4) Go back to review the core concept tutorial as needed.	
 **Question #10**	**10.** Non-specificity, Fast action and 'First line of defense', these are the attributes of _____. (A) Active Immunity (B) Innate Immunity (C) Passive Immunity (D) All of the above
 **Feedback**	A. Incorrect! It shows Specificity, Diversity, Memory, Self & Non-self recognition and requires some time to set in.
	B. Correct! Innate immunity is non-specific and provides the first line of defense during the critical period just after the host's exposure to a pathogen.
	C. Incorrect! Fast action can be its attribute, but not first line of defense and non-specificity.
	D. Incorrect! All are different and have different attributes.
 **Solution**	Innate immune responses are primitive non-specific recognition system which allows them to bind to a variety of microbial products and hence in effect they are acting as a first line of defence against infection.