Name _____ Date _____

AIDS and Its Effect on the Immune Response

31-1 LAB

EXPLORATION

Acquired Immune Deficiency Syndrome (AIDS) is a disease that results in the destruction of an individual's immune system. The virus that causes AIDS is passed from an infected individual to another person by means of body fluids such as blood, semen, or vaginal secretions. The virus itself, however, does not cause the life-threatening symptoms associated with the disease. Instead, the virus weakens a person's immune response to other pathogens that invade the body. The person usually dies from these secondary infections.

How does AIDS destroy the immune system? The body's immune response involves white blood cells called lymphocytes. Lymphocytes recognize antigens, foreign proteins on the surfaces of disease-causing microbes. There are two main kinds of lymphocytes involved in the immune response: T cells and B cells. Certain kinds of T cells destroy pathogens directly. B cells produce antibodies with the help of other kinds of T cells. The antibodies enter the bloodstream and tissue fluid and destroy the invading pathogens. When the AIDS virus enters the body, it destroys the T cells that help in the production of antibodies. Thus the immune system's ability to fight disease organisms is impaired.

OBJECTIVES

- Plot a graph that demonstrates a healthy body's normal immune response.
- Plot a graph that demonstrates an AIDS-infected body's immune response.
- Compare and interpret these two different immune responses.

MATERIALS

colored pencils (red and blue)
graph paper (2 pieces)

PROCEDURE

Immune Response as used in Tables 1 and 2 refers to the response of the entire immune system. This is actually a hypothetical index that summarizes all the activity of the immune system, such as antibody production and the direct attack on the invaders. The numbers of microbes and viruses in Tables 1 and 2 are also hypothetical.

Part A. The Normal Immune Response

Examine Table 1.

2. On a piece of graph paper, construct a graph of the data in Table 1. Number the vertical axis from 1 to 10 000 in multiples of 500. Label the horizontal axis with the number of days from 0 to 10. Use a red pencil to plot the number of microbes on the vertical axis against the number of days. Use a blue pencil to plot the immune response on the vertical axis against the number of days. Label your graph *Normal Immune Response.*

Figure 1.

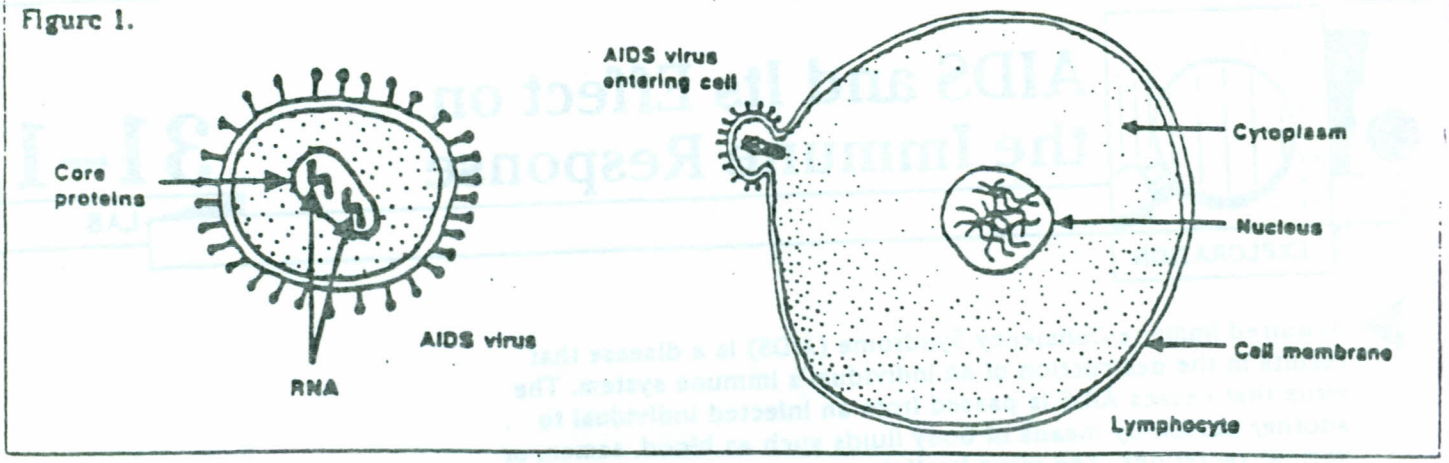
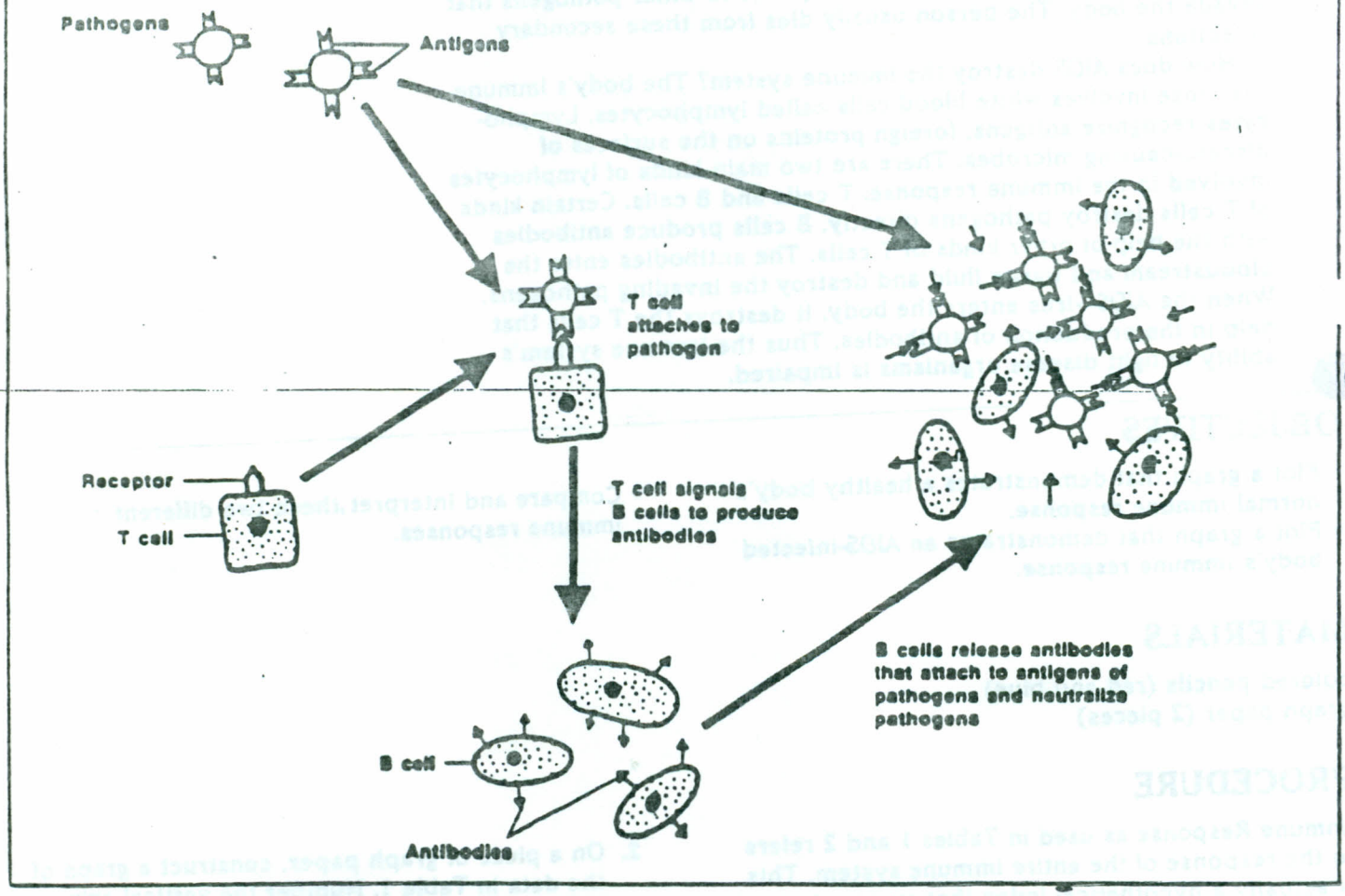


Figure 2.



Part B. The Immune Response in a Person with AIDS

1. Examine Table 2.
2. On a second piece of graph paper, construct a graph of the data in Table 2. Number the axes as in your first graph, but label the horizontal axis with the number of years. Use a red pencil to plot the number of viruses against the number of years. Use a blue pencil to plot the immune response against the number of years. Label your graph *Immune Response in Person with AIDS.*

Name _____ Date _____

DATA AND OBSERVATIONS

Table 1.

Normal Immune Response		
Days	Number of microbes	Immune response (units)
0	1	0
1	1000	0
2	10 000	1
3	1000	100
4	10	1000
5	1	1000
6	0	1000
7	0	100
8	0	10
9	0	1
10	0	1

Table 2.

Immune Response in Person with AIDS		
Years	Number of viruses	Immune response (units)
0	1	0
1	100	1
2	10 000	50
3	10	1000
4	1	10 000
5	1	10 000
6	1	1000
7	10	500
8	100	100
9	1000	1
10	10 000	0

ANALYSIS

Examine your graph of the normal immune response.

1. What happens to the number of microbes:

   during the first 2 days? _____

   during days 3 through 5? _____

2. What happens to the immune response:

   during the first 2 days? _____

   during days 3 through 5? _____

3. Summarize what happens during a normal immune response. _____

   _____

Examine your graph of the immune response of a person with AIDS and compare it with the graph of the normal response.

4. How do the time periods plotted in the two graphs differ? _____

   _____