



EXERCISES

Remember to check your answers carefully with the Answers to Exercises, page 571.

A Name the structure or fluid based on the meaning provided.

1. stationary lymphatic tissue along the path of lymph vessels all over the body

2. large lymph vessel in the chest that drains lymph from the lower part and left side of the body above the diaphragm _____
3. organ near the stomach that produces, stores, and eliminates blood cells _____
4. mass of lymphatic tissue in the nasopharynx _____
5. organ in the mediastinum that conditions T lymphocytes and helps in the immune response

6. tiniest lymph vessels _____
7. large lymph vessel in the chest that drains lymph from the upper right part of the body

8. fluid present between cells that becomes lymph as it enters lymph capillaries

B Give the locations of the following lymph nodes.

1. inguinal nodes _____
2. axillary nodes _____
3. cervical nodes _____
4. mediastinal nodes _____

7. Which condition may indicate an AIDS virus infection?
- High blood sugar
 - Oral leukoplakia
 - Fungal infection of the mouth

SHORT CLINICAL CASES

Circle the correct answer for the diagnosis.

1. John was healthy until the age of 22 months, when he developed angioedema [swelling induced while eating cookies containing peanut butter]. The symptoms disappeared in about an hour. A month later, while eating the same type of cookies, he started to vomit, became hoarse, had great difficulty in breathing, started to wheeze, and developed a swollen face. He was taken immediately to the ED of Children's Hospital, where he was given a subcutaneous injection of epinephrine [adrenaline]. Within minutes of the epinephrine injection, John's hoarseness decreased, the wheezing diminished, and his breathing was less labored. His parents were advised to avoid giving him foods containing peanuts in any form.

Diagnosis: (multiple myeloma, acute systemic anaphylaxis, acquired immunodeficiency syndrome)

2. Mark Scott is a 48-year-old band leader who has always been in good health. Six months ago he went to the ED at the local hospital complaining of fever and a swollen right hand from a cat scratch. He was admitted to the hospital for the hand infection. His blood lymphocyte count was very low, so a blood sample was sent to be tested for antibodies against HIV. Both ELISA and a Western blot revealed presence of anti-HIV antibodies. His CD4⁺ T-cell count was very low at 170 [normal is 500-1600]. Mr. Scott told his doctor that he had several homosexual encounters before his marriage. His physician prescribed trimethoprim-sulfamethoxazole for prophylaxis against *Pneumocystis pneumonia*, and Mark also was given HAART. After 5 weeks of therapy, his HIV viral load declined to undetectable levels and his CD4⁺ T cell count rose. He remains well and active and works full time.

Diagnosis: (T cell lymphoma, severe combined immunodeficiency disease, acquired immunodeficiency syndrome)

3. Mrs. Archer is a 55-year-old housewife who began to experience excessive fatigue. A blood sample revealed mild anemia and slightly lowered white blood cell count. Her sedimentation rate was elevated, and electrophoresis of serum proteins showed marked elevation of IgG. She returned for regular visits to her physician, and on each occasion serum IgG levels were gradually increasing. After she experienced sudden onset of upper back pain, a thoracic spine MRI study was performed and showed destruction of a portion of a vertebra. A bone marrow biopsy specimen showed a proliferation of plasma cells. She was given chemotherapy (vincristine, Adriamycin, and Decadron), but a year later she developed fever and chest pain. Chest x-ray revealed pneumonia, and antibiotics were given. Her outlook for survival is poor.

Diagnosis: (Hodgkin disease, hemolytic anemia, multiple myeloma)

C Circle the correct answer in each sentence.

1. Cytotoxic T cells are (**T8 cells, helper T cells, suppressor T cells**) and directly kill foreign cells.
2. Lymphocytes, formed in the thymus gland, that directly act on antigens are (**B cells, T cells, macrophages**).
3. CD4⁺ cells are (**helper T cells, Tregs, B cells**) that are deficient in people with AIDS.
4. Lymphocytes that transform into plasma cells and secrete antibodies are (**B cells, T cells, macrophages**).

D Match the following cell names with their meanings as given below.

dendritic cell	helper T cell	plasma cell
complement system	macrophage	suppressor T cell

1. cell that originates from a B lymphocyte and secretes antibodies _____
2. large phagocyte found in lymph nodes and other tissues of the body _____
3. T4 cell that aids B cells in recognizing antigens _____
4. Treg cell that inhibits the activity of B and T lymphocytes _____
5. proteins that help antibodies and T cells kill their target _____
6. cell that digests foreign cells and helps B and T cells mark antigens for destruction

E Match the terms in Column I with their descriptions in Column II. Write your answers in the spaces provided.

COLUMN I

1. immunoglobulins _____
2. toxins _____
3. helper T cells _____
4. suppressor T cells _____
5. cytotoxic T cells _____
6. plasma cells _____
7. interferons _____

COLUMN II

- A. Antibodies—IgA, IgE, IgG, IgM, IgD
- B. Lymphocyte that aids B cells; also called T4 or CD4⁺ cell
- C. Poisons (antigens)
- D. T cell lymphocytes that inhibit the activity of B and T cell lymphocytes (Tregs)
- E. Antiviral proteins secreted by T cells
- F. Transformed B cells that secrete antibodies
- G. T lymphocytes that directly kill foreign cells (T8 cells)

F Use the given definitions to build medical terms.

1. removal of the spleen _____
2. enlargement of the spleen _____
3. formation of lymph _____
4. tumor of the thymus gland _____
5. inflammation of lymph glands (nodes) _____
6. deficiency of lymph cells _____
7. pertaining to poison _____
8. disease of lymph glands (nodes) _____

G Match the following terms with their meanings below.

AIDS
allergen
anaphylaxis

Hodgkin disease
hypersplenism
lymphedema

lymphoid organs
thymectomy

1. syndrome marked by enlargement of the spleen and associated with anemia, leukopenia, and thrombocytopenia _____
2. an extraordinary hypersensitivity to a foreign protein; marked by hypotension, shock, and respiratory distress _____
3. an antigen capable of causing allergy (hypersensitivity) _____
4. disorder in which the immune system is suppressed by exposure to HIV _____
5. removal of a mediastinal organ _____
6. malignant tumor of lymph nodes and spleen marked by the presence of Reed-Sternberg cells in lymph nodes _____
7. tissue that produces lymphocytes—spleen, thymus, tonsils, and adenoids _____
8. swelling of tissues due to interstitial fluid accumulation _____

H Match the following terms or abbreviations related to AIDS with their meanings below.

CD4⁺ cells
ELISA
HAART
HIV

Kaposi sarcoma
opportunistic infections
protease inhibitor

reverse transcriptase inhibitor
viral load test
wasting syndrome

1. a malignant condition associated with AIDS (purplish skin nodules appear)

2. human immunodeficiency virus; the retrovirus that causes AIDS _____
3. white blood cells that are destroyed by the AIDS virus _____
4. group of infectious diseases associated with AIDS _____
5. measures the amount of HIV in blood _____
6. weight loss with decreased muscular strength, appetite, and mental activity

7. drug used to treat AIDS by blocking the growth of HIV _____
8. drug used to treat AIDS by blocking the production of a proteolytic enzyme

9. use of combinations of drugs to treat AIDS _____
10. test to detect anti-HIV antibodies _____

I Complete the following terms according to the definitions provided. Pay close attention to the proper spelling of each term.

1. chronic, disabling diseases caused by abnormal production of antibodies to normal tissue:
auto_____ diseases
2. a hypersensitivity or allergic state with an inherited predisposition: a_____
3. a malignant tumor of lymph nodes; follicular and large cell are types of this disease:
non-_____
4. fluid that lies between cells throughout the body: inter_____ fluid
5. formation of lymphocytes or lymphoid tissue: lympho_____
6. chronic swelling of a part of the body due to collection of fluid between tissues secondary to obstruction of lymph vessels and nodes: lymph_____
7. an unusual or exaggerated allergic reaction to a foreign protein: ana_____
8. introduction of altered antigens to produce an immune response and protection from disease:
vac_____
9. test that separates immunoglobulins: immuno_____

J Circle the correct term(s) to complete each sentence.

1. Mr. Blake had been HIV-positive for 5 years before he developed (*Pneumocystis pneumonia*, **thymoma**, **multiple myeloma**) and was diagnosed with (**Hodgkin disease**, **non-Hodgkin lymphoma**, **AIDS**).
2. Mary developed rhinitis, rhinorrhea, and red eyes every spring when pollen was prevalent. She consulted her doctor about her bad (**hypersplenism**, **allergies**, **lymphadenitis**).
3. Paul felt some marble-sized lumps in his left groin. His doctor told him that he had an infection in his foot and had developed secondary (**axillary**, **cervical**, **inguinal**) lymphadenopathy.
4. Mr. Jones was referred to a dermatologist and an oncologist when his primary physician noticed purple spots on his arms and legs. Because he had AIDS, his physician was concerned about the possibility of (**Kaposi sarcoma**, **splenomegaly**, **thrombocytopenic purpura**).
5. Fifteen-year-old Peter was allergic to peanuts. His allergy was so severe that he carried epinephrine with him at all times to prevent (**acquired immunity**, **anaphylaxis**, **immunosuppression**) in case he came in contact with peanut butter at school.
6. When she was in her mid-20s, Rona was diagnosed with a lymph node malignancy known as (**sarcoidosis**, **Kaposi sarcoma**, **Hodgkin disease**). Because the disease was primarily in her chest, her (**inguinal**, **mediastinal**, **axillary**) lymph nodes were irradiated (radiation therapy), and she was cured. When she developed lung cancer in her mid-40s, her oncologist told her she had a/an (**iatrogenic**, **hereditary**, **metastatic**) radiation-induced secondary tumor.
7. Mary has suffered from hay fever, asthma, and chronic dermatitis ever since she was a young child. She has been particularly bothered by the severely pruritic (itching), erythematous (reddish) patches on her hands. Her dermatologist gave her topical steroids for her (**toxic**, **atopic**, **opportunistic**) dermatitis and told her to avoid soaps, cosmetics, and irritating chemicals.
8. Bernie noticed pain in his pelvis, spine, and ribs and was evaluated by his physician. Blood tests showed high levels of plasma cells and abnormal globulins. Increased numbers of plasma cells were revealed on (**chest x-ray**, **stem cell transplantation**, **bone marrow biopsy**). Radiologic studies showed bone loss. The physician's diagnosis was multiple (**sclerosis**, **thymoma**, **myeloma**).
9. AIDS is caused by (**herpes simplex virus**, **monoclonal antibodies**, **human immunodeficiency virus**). Lymphocytes called (**CD4⁺ cells**, **suppressor cells**, **B cells**) are destroyed, leading to (**anaphylaxis**, **atopy**, **opportunistic infections**).
10. Drugs used to treat AIDS are (**immunosuppressants**, **protease inhibitors**, **interferons**). Other anti-AIDS drugs are (**reverse transcriptase inhibitors**, **monoclonal antibodies**, **immunoglobulins**).