

Sample Exam Questions

1. 1. 38-year-old man has had headaches and nausea for the past 2 months. Laboratory findings show hypercalcemia and hypophosphatemia and normal serum albumin. Urine microscopic analysis shows deposition of calcium salts in the renal tubular epithelium. Which of the following processes has most likely produced this change in the kidney?
- A) Dystrophic calcification
 - B) Renal tubular atrophy
 - C) Autophagocytosis
 - D) Metastatic calcification
 - E) Cellular aging

Answer: D

Explanation: Deposition of calcium in normal healthy tissues as a result of prolonged hypercalcemia is called metastatic calcification. This process may occur in hyperparathyroidism. Dystrophic calcification refers to calcium deposition in injured tissues, with normal serum calcium levels. Atrophy decreases cell size but is not accompanied by calcium deposition. Autophagocytosis yields more golden-brown lipofuscin pigment in the cytoplasm, particularly in hepatocytes and myocardial fibers, a process that becomes more apparent with aging.

2. A 43-year-old man has had a cough and fever for the past 2 months. A chest radiograph shows bilateral nodular densities, some with calcification, located mainly in the upper lobes of the lungs. A transbronchial lung biopsy is performed, yielding a granuloma and giant cells. Which of the following chemical mediators is most important in the pathogenesis of this lesion?

- A) Complement C5a
- B) Interferon- γ
- C) Bradykinin
- D) Nitric oxide
- E) Prostaglandin

Answer: B

Explanation: Macrophage stimulation and transformation to epithelioid cells and giant cells are characteristic of granuloma formation. Interferon- γ promotes the formation of epithelioid cells and giant cells. Complement C5a is chemotactic for neutrophils. Although occasional neutrophils are seen in granulomas, neutrophils do not form a major component of granulomatous inflammation. Bradykinin, released in acute inflammatory responses, results in pain. Macrophages can release nitric oxide to destroy other cells, but nitric oxide does not stimulate macrophages to form a granulomatous response. Prostaglandins are mainly involved in the causation of vasodilation and pain in acute inflammatory responses.

3. A 66 year-old woman sees her physician because of a lump on the right side of the neck that has been increasing in size for the past 7 months. On physical examination, the physician palpates a firm but non tender 3-cm mass in the posterior cervical lymph node. Microscopic examination of a biopsy specimen of the mass shows effacement of the nodal architecture by a monomorphous population of large cells with large, dark blue nuclei and scant cytoplasm. The peripheral blood smear and bone marrow biopsy results are normal. Which of the following is the most likely diagnosis?

- A) Lymphangioma
- B) Reactive hyperplasia
- C) Non-Hodgkin lymphoma
- D) Multiple myeloma
- E) Chronic myelogenous leukemia

Answer: C

Explanation: Non-Hodgkin lymphomas are malignant neoplasms of lymphoid tissues. They have no benign equivalent. Monomorphous proliferations that destroy the nodal architecture suggest a neoplasm. A lymphangioma is composed mostly of a proliferation of lymphatics. Reactive hyperplasias are polyclonal, controlled proliferations with a diverse cell population. A myeloma is composed of plasma cells and most often involves bone marrow. A leukemia is a neoplasm that arises in the bone marrow and spills over into peripheral blood.

4. During a routine health maintenance examination, a 46-year-old man is found to have an enlarged, nontender supraclavicular lymph node that is palpable on physical examination. The 2-cm node is excised. Histologically, the nodal architecture is effaced by a monomorphous population of small lymphocytes. Which of the following procedures would best confirm that the patient has a malignancy?

- A) Peripheral WBC count and differential cell count
- B) Flow cytometry of nodal tissue for DNA content
- C) Electron microscopy to determine cellular ultrastructure
- D) Southern blot analysis to demonstrate monoclonality
- E) Determination of the serum lactate dehydrogenase level

Answer: D

Explanation: Monoclonality is the hallmark of a malignancy. In the diagnosis of a leukemia, the WBC count is helpful but not definitive. The DNA content analysis alone cannot define a malignancy; Southern blot analysis for T- or B-cell receptor gene rearrangements can define monoclonality. Electron microscopy is an adjunct to diagnosis