# USMLE Step 1 Pathology Practice Test (Sample)

## Study Guide


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# Questions

**1. An extremely high ACTH test result can indicate which of the following conditions?**

**A. Sarcoidosis**

**B. Small cell carcinoma of lung**

**C. Pheochromocytoma**

**D. Adenocarcinoma of the pancreas**

**2. Endometrioid tumors are associated with which type of glands?**

**A. Ovarian-like glands**

**B. Pseudostratified columnar glands**

**C. Endometrial-like glands**

**D. Squamous cell glands**

**3. Which of the following is a feature of von Hippel-Lindau disease?**

**A. Hemangiomas in the skin**

**B. Bilateral renal cell carcinomas**

**C. Increased serum calcium levels**

**D. High-frequency hearing loss**

**4. What is a consequence of osmotic damage in peripheral nerves due to high glucose levels?**

**A. Increased myelin production**

**B. Peripheral neuropathy**

**C. Enhanced nerve regeneration**

**D. Increased sensory perception**

**5. What is the name for the proportion of positive test results that accurately identify true positives?**

**A. Positive predictive value**

**B. Negative predictive value**

**C. Incidence**

**D. Odds ratio**

**6. Which well-known genetic syndrome is associated with an abnormality on the X chromosome?**

**A. Turner syndrome**

**B. Fragile X syndrome**

**C. Marfan syndrome**

**D. Barth syndrome**

**7. Hypercalcemia due to increased PTHrP is commonly associated with which type of cancers?**

**A. Breast and ovarian cancer**

**B. Renal and bladder carcinoma**

**C. Both squamous cell of lung and head and neck**

**D. All of the above**

**8. What deficiency is associated with poor wound healing and loss of taste and smell?**

**A. Iron**

**B. Vitamin C**

**C. Zinc**

**D. Vitamin D**

**9. What is the most common cause of death in Chronic Lymphocytic Leukemia (CLL)?**

**A. Heart failure**

**B. Infection**

**C. Bleeding complications**

**D. Renal failure**

**10. For a patent ductus arteriosus, which medication is often used?**

**A. Indomethacin**

**B. Aspirin**

**C. Ibuprofen**

**D. Prostaglandin E1**

# Answers

**1. B**
**2. C**
**3. B**
**4. B**
**5. A**
**6. B**
**7. D**
**8. C**
**9. B**
**10. A**

# Explanations

## 1. An extremely high ACTH test result can indicate which of the following conditions?

**A. Sarcoidosis**

**B. Small cell carcinoma of lung**

**C. Pheochromocytoma**

**D. Adenocarcinoma of the pancreas**

**A significantly elevated ACTH (adrenocorticotropic hormone) level is primarily associated with conditions that lead to an increase in cortisol production, most notably in forms of Cushing's syndrome. Among the listed conditions, small cell carcinoma of the lung, also known as small cell lung cancer, is a well-known cause of ectopic ACTH production. This means that the tumor cells produce ACTH independently of the normal regulatory mechanisms governing its secretion. In small cell lung cancer, the cancerous cells can mistakenly produce hormones that lead to excessive adrenal stimulation, resulting in excessive cortisol levels in the body, which ultimately leads to the various symptoms associated with Cushing's syndrome, such as weight gain, hypertension, and hyperglycemia. The presence of high ACTH levels in the context of a lung neoplasm strongly suggests an ectopic secretion source and aligns well with the clinical picture of this cancer. Other conditions listed, like sarcoidosis, pheochromocytoma, and adenocarcinoma of the pancreas, do not typically lead to significant ACTH elevation in the same manner. Sarcoidosis can involve hypercalcemia and granulomatous inflammation but is less commonly associated with elevated ACTH and cortisol than small cell lung cancer. Pheochrom**

## 2. Endometrioid tumors are associated with which type of glands?

**A. Ovarian-like glands**

**B. Pseudostratified columnar glands**

**C. Endometrial-like glands**

**D. Squamous cell glands**

**Endometrioid tumors are indeed associated with endometrial-like glands. These tumors are typically found in the endometrium and can also occur in the ovaries. The histological features of endometrioid tumors resemble normal endometrial tissue, characterized by the presence of tubular glands and stroma that mimic the endometrial environment. The resemblance to endometrial tissue is particularly pertinent because endometrioid carcinomas often arise in a background of endometriosis or hyperplasia, conditions linked to abnormalities in the endometrial lining. This similarity is essential for pathologists when diagnosing these tumors, as they rely heavily on the appearance of the glands under microscopic examination. In contrast, other gland types mentioned in the options, such as ovarian-like glands, pseudostratified columnar glands, and squamous cell glands, do not describe the specific characteristics of endometrioid tumors. Each of these gland types has distinct histological features and associations with different types of tumors or tissues, emphasizing why endometrial-like glands are the correct association in this context.**

## 3. Which of the following is a feature of von Hippel-Lindau disease?

**A. Hemangiomas in the skin**

**B. Bilateral renal cell carcinomas**

**C. Increased serum calcium levels**

**D. High-frequency hearing loss**

**Von Hippel-Lindau (VHL) disease is a hereditary condition characterized by the predisposition to develop several types of tumors and cysts in various organs, primarily affecting the central nervous system, eyes, and abdomen. One of the hallmark features of VHL disease is the development of bilateral renal cell carcinomas (RCC), particularly clear cell type. This predisposition is due to mutations in the VHL tumor suppressor gene, which plays a critical role in cellular oxygen response and regulation of angiogenesis. Individuals with VHL often develop multiple tumors, including pheochromocytomas, hemangioblastomas of the retina and central nervous system, pancreatic tumors, and the aforementioned renal cell carcinomas. The bilateral nature of renal cell carcinomas in this condition is a distinct feature, as sporadic renal cell carcinomas typically occur unilaterally. While other options present various conditions that could be seen in different disease contexts, they do not specifically correlate with the classic features seen in VHL disease. For example, skin hemangiomas are not a feature of VHL, nor is there a consistent association of increased serum calcium levels or high-frequency hearing loss with this syndrome. Rather, high-frequency hearing loss may associate with other neurological conditions but**

## 4. What is a consequence of osmotic damage in peripheral nerves due to high glucose levels?

**A. Increased myelin production**

**B. Peripheral neuropathy**

**C. Enhanced nerve regeneration**

**D. Increased sensory perception**

**Osmotic damage in peripheral nerves due to high glucose levels is primarily linked to the development of peripheral neuropathy. This condition arises when elevated glucose levels lead to increased levels of sorbitol and fructose in nerve tissues, facilitated by the enzyme aldose reductase. This accumulation creates osmotic and oxidative stress within the nerves, which disrupts normal cellular function and ultimately contributes to nerve damage. Peripheral neuropathy manifests as symptoms such as numbness, tingling, pain, or weakness in the extremities. This deterioration occurs particularly in the distal nerves because they are more vulnerable to metabolic changes associated with diabetes. Therefore, the connection between high glucose and the development of peripheral neuropathy is well-established in medical literature, demonstrating how osmotic damage can lead to clinical manifestations of nerve dysfunction.**

## 5. What is the name for the proportion of positive test results that accurately identify true positives?

**A. Positive predictive value**

**B. Negative predictive value**

**C. Incidence**

**D. Odds ratio**

**The proportion of positive test results that accurately identify true positives is known as positive predictive value (PPV). This statistic reflects the probability that individuals who receive a positive test result actually have the condition being tested for. In clinical practice, a high positive predictive value indicates that the test is effective at correctly identifying those with the disease, which is crucial for making informed treatment decisions and minimizing false-positive results. Positive predictive value is influenced by the specificity of the test along with the prevalence of the disease in the population being tested. When the disease is more prevalent, the positive predictive value increases, as more of the positive results are likely to be true positives. Thus, understanding PPV is vital for assessing test accuracy and ultimately improving patient care and outcomes. The other concepts such as negative predictive value, incidence, and odds ratio pertain to different aspects of epidemiology and diagnostic testing. Negative predictive value pertains to the likelihood that individuals with a negative result truly do not have the disease. Incidence refers to the number of new cases of a disease in a given population over a specified period. The odds ratio is a measure of association used in case-control studies to compare the odds of an outcome occurring in an exposed group versus a non-exposed group. Each of these**

## 6. Which well-known genetic syndrome is associated with an abnormality on the X chromosome?

**A. Turner syndrome**

**B. Fragile X syndrome**

**C. Marfan syndrome**

**D. Barth syndrome**

**Fragile X syndrome is indeed associated with an abnormality on the X chromosome, specifically a mutation in the FMR1 gene. This condition is characterized by a trinucleotide repeat expansion (CGG repeat) in the 5' untranslated region of the gene. In fragile X syndrome, when the number of repeats exceeds a certain threshold (typically over 200), it leads to hypermethylation and silencing of the FMR1 gene, resulting in the absence of the fragile X mental retardation protein (FMRP). This absence is crucial for normal neuronal development and synaptic function, leading to a range of cognitive impairments, behavioral issues, and physical features associated with the syndrome. The relevance of this genetic basis not only establishes a clear link to the X chromosome but also highlights the inheritance pattern, as the syndrome is X-linked and affects males more severely than females due to the presence of one X chromosome in males versus two in females. This contributes to the phenotypic expression of the disorder. In contrast, Turner syndrome is primarily a condition where there is a complete or partial absence of one of the X chromosomes but does not involve a mutation affecting a specific gene like FMR1. Marfan syndrome is caused by mutations in the**

## 7. Hypercalcemia due to increased PTHrP is commonly associated with which type of cancers?

**A. Breast and ovarian cancer**

**B. Renal and bladder carcinoma**

**C. Both squamous cell of lung and head and neck**

**D. All of the above**

**Hypercalcemia due to increased parathyroid hormone-related peptide (PTHrP) is a paraneoplastic syndrome commonly seen in various malignancies. PTHrP mimics the action of parathyroid hormone (PTH) and leads to elevated calcium levels through increased bone resorption, renal tubular reabsorption of calcium, and increased intestinal calcium absorption. Breast and ovarian cancers are known to secrete PTHrP, contributing to hypercalcemia in patients. Similarly, squamous cell carcinomas of the lung and head and neck region also produce PTHrP, causing the same physiological effects. Renal and bladder carcinomas can include paraneoplastic syndromes, but are more typically associated with other mechanisms of hypercalcemia. Because PTHrP can be released by all of these cancer types, the presence of hypercalcemia can manifest through different cancers, which supports the association of elevated calcium levels with breast, ovarian, and squamous cell carcinomas among others. Hence, it is correct that hypercalcemia due to increased PTHrP can be associated with all of these cancers.**

## 8. What deficiency is associated with poor wound healing and loss of taste and smell?

**A. Iron**

**B. Vitamin C**

**C. Zinc**

**D. Vitamin D**

**The deficiency associated with poor wound healing and loss of taste and smell is zinc. Zinc plays a crucial role in various biological processes, including cell division, protein synthesis, and immune function. It is an important cofactor for many enzymes that facilitate wound healing, and its deficiency can delay the healing process by impairing the proliferation of fibroblasts and keratinocytes, which are essential for tissue repair. Additionally, zinc is vital for maintaining proper sensory function, and individuals with zinc deficiency often experience taste abnormalities (dysgeusia) and smell disturbances (hyposmia or anosmia). These symptoms arise because zinc is involved in the maintenance of taste buds and olfactory functions. In contrast, while vitamin C is important for collagen synthesis and wound healing, its deficiency primarily leads to scurvy, which is characterized by other specific symptoms rather than loss of taste and smell. Iron deficiency can lead to anemia and fatigue but does not specifically cause the aforementioned symptoms. Vitamin D deficiency is associated with bone health, but not directly with wound healing or sensory loss. Thus, the connection of zinc deficiency to the clinical presentation described makes it the correct answer.**

## 9. What is the most common cause of death in Chronic Lymphocytic Leukemia (CLL)?

**A. Heart failure**

**B. Infection**

**C. Bleeding complications**

**D. Renal failure**

**In Chronic Lymphocytic Leukemia (CLL), the most common cause of death is indeed infections. This is primarily due to the immunosuppressed state that CLL patients experience as a result of the disease and its treatment. CLL is characterized by the accumulation of functionally incompetent lymphocytes, which leads to decreased production and functioning of normal immune cells. This impaired immune response renders patients more susceptible to various infections, including bacterial, viral, and fungal pathogens. While other factors such as heart failure, bleeding complications, and renal failure can occur in CLL patients, they are not the predominant causes of mortality. The risk of infections is significantly heightened because the malignant lymphocytes do not function effectively to mount an immune response, and chemotherapeutic agents used in treatment can further exacerbate this immunosuppressed state. Consequently, despite advancements in targeted therapies and supportive care, infections remain a leading cause of mortality in this patient population.**

## 10. For a patent ductus arteriosus, which medication is often used?

**A. Indomethacin**

**B. Aspirin**

**C. Ibuprofen**

**D. Prostaglandin E1**

**Indomethacin is commonly used to treat a patent ductus arteriosus (PDA), particularly in premature infants. This medication is a nonsteroidal anti-inflammatory drug (NSAID) that works by inhibiting the cyclooxygenase (COX) enzymes, leading to a decrease in prostaglandin synthesis. Prostaglandins are crucial for keeping the ductus arteriosus open, so by reducing their levels, indomethacin can promote the closure of the patent ductus arteriosus. In the case of neonates, especially those who are premature, a PDA can lead to significant complications such as congestive heart failure and pulmonary overcirculation. By administering indomethacin, physicians can effectively manage this condition and aid in the ductus closure without the need for surgical intervention in many cases. While other options like aspirin or ibuprofen can have some anti-inflammatory effects, they are not the first-line treatment for a PDA closure. Prostaglandin E1, on the other hand, is actually used to maintain ductal patency in certain congenital heart defects rather than induce closure. Thus, indomethacin is considered the most appropriate medication for achieving closure of a patent ductus arteriosus in**