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QUESTION 1

A 45-year-old female comes to the physician with joint pain, swelling and morning stiffness which improves with use. She also reports weight loss of 3 kg (6.6 lbs). Laboratory tests reveal the presence of serum rheumatoid factor. Before prescribing etanercept, the physician should obtain a:

A. complete blood count

B. electrocardiogram

C. liver function test

D. purified protein derivative test

E. thyroid function test

Correct Answer: D

Explanation:

This patient most likely has rheumatoid arthritis (RA) which is an autoimmune disease characterized by inflammation and erosion of articular cartilage and bone. It presents with weight loss, fatigue, joint pain, swelling and morning stiffness which lasts longer than an hour and improves with use. It usually involves the metacarpophalangeal joints, proximal interphalangeal joints and the wrist joints. Joint findings include soft tissue swelling, joint space narrowing and subchondral cysts. Management of RA includes treatment with NSAIDs, glucocorticoids, methotrexate, hydroxychloroquine and biologic agents like TNF-alpha inhibitors such as etanercept. Etanercept is a fusion protein which comprises of a decoy receptor for TNF-alpha and the Fc portion of IgG. It is produced by recombinant DNA and approved for use in rheumatoid arthritis, psoriasis and ankylosing spondylitis. TNF-alpha inhibitors predispose patients to developing tuberculosis due to the reactivation of latent TB hence a purified protein derivative (PPD) test is required before etanercept is prescribed.

QUESTION 2

A new antifungal medication is being tested in Phase I clinical trials. Examination of the pharmacokinetic

properties of the drug reveals that the half-life of the drug is 6 hours.

If a continuous intravenous infusion of this drug were started on a research subject, how long

would it take to reach 75% of steady state?

A. 3 hours

B. 6 hours

C. 9 hours

D. 12 hours

E. 18 hours

F. 24 hours

Correct Answer: D

Explanation:

The rule of thumb is that the plasma concentration will reach 50% in one half-life, 75% in two half-lives, 87.5% in three half-lives, etc., so that the difference between the current drug level and 100% halves with each half-life. In this instance, it takes two half-lives to reach 75%. The half-live of this drug is 6 hours, so two half-lives is 12 hours.

QUESTION 3

A 14-year-old boy is brought to the physician for a physical examination prior to participating in sports. He appears reluctant to remove his shirt for the examination, and says that he is embarrassed because he has grown breasts during the past year. He is at the 50th percentile for height and weight. Physical examination shows bilateral 1.5-cm fibroglandular masses located beneath the nipple-areolar complex and normal penis and testes. Pubic hair development is Tanner stage 3. Serum concentrations of gonadotropic hormones, estrogens, and testosterone are within the reference ranges. Which of the following is the most likely cause of this patient\\'s breast enlargement?

A. Breast adenocarcinoma

B. Estradiol-secreting Leydig cell tumor

C. Peutz-Jeghers syndrome

D. Seminiferous tubule dysgenesis (Klinefelter syndrome)

E. Normal development

Correct Answer: E

QUESTION 4

Which of the following is not an activated carrier?

A. ATP

B. SAM

C. TPP

D. GMP

Correct Answer: D

QUESTION 5

Which of the following matches the definition: the justification of behaviors using reason other than the real reason?

A. Compensation

B. Projection

C. Rationalization

D. Dysphoria

Correct Answer: C

QUESTION 6

Capillary loops located in the medulla are also known as _____.

A. Vasa recta

B. Urea collectors

C. Trigone

D. Macula densa

Correct Answer: A

QUESTION 7

Which of the following is not directly related with Alzheimer\\'s disease?

A. Senile plaques

B. Diabetes mellitus

C. Tangles

D. Dementia

Correct Answer: B

QUESTION 8

The Tzanck test is not used on which of the following viruses?

A. VZV

B. HSV-2

C. HHV-8

D. HSV-1

Correct Answer: C

QUESTION 9

A 31-year-old woman comes to the physician because of a 2-week history of malaise, nausea, vomiting, and decreased appetite. She is a known user of intravenous heroin. She appears chronically ill. She is 165 cm (5 ft 5 in) tall and weighs 47kg (103 lb); BMI is 17 kg/m2. Her temperature is 36.7°C (98.1°F), pulse is 90/min, respirations are 18/min, and blood pressure is 114/68 mmHg. Physical examination shows scleral icterus and a liver span of 16 cm. The spleen is not palpable. Serum studies show: Which of the following is the most likely outcome of this patient\\'s infection?

Total bilirubin	3.2 mg/dL
AST	774 U/L
ALT	820 U/L
HIV antibody	negative
Hepatitis B surface antigen	negative
Hepatitis B surface antibody	positive
Anti-hepatitis B core antibody	positive
Hepatitis B DNA	negative
Anti-hepatitis C virus	positive
Hepatitis C RNA	positive

A. Complete resolution of infection

B. Latent infection with intermittent viremia

C. Lifelong persistent infection

D. Patient death from acute infection

Correct Answer: C

QUESTION 10

A genotypic male (XY) is born with feminized external genitalia. The testes are retained within the abdominal cavity, and the internal reproductive tracts exhibit the normal male phenotype. Which of the following could account for this abnormal development?

A. Complete androgen resistance

B. 5?-reductase deficiency

C. 17?-hydroxylase deficiency

D. Sertoli-only syndrome

E. Testicular dysgenesis

Correct Answer: B

Explanation:

In utero differentiation of the Wolffian ducts into the normal male phenotypic internal reproductive tract requires testosterone, but not dihydrotestosterone. On the other hand, differentiation of the indifferent external genital slit into the penis, prostate, and scrotum does require dihydrotestosterone. A congenital absence of 5?-reductase in these tissues will result in feminization. If left untreated, the affected individuals are generally phenotypic females until puberty, at which time increased amounts of testosterone result in virilization ("penis-at-twelve" syndrome). If discovered early, a male gender assignment can be supported with administration of dihydrotestosterone to increase penis size. If discovered after infancy, a female gender assignment can be supported with estrogen substitution therapy and prophylactic orchiectomy. With complete androgen resistance, the external genitalia are feminized, but neither the male-type nor the female-type internal tracts develop. In the absence of the androgen receptor, the Wolffian ducts will degenerate. The Müllerian ducts will also degenerate because of the normal effect of testicular Müllerian regression factor. With 17a-hydroxylase deficiency, the testes cannot synthesize testosterone, resulting in feminization of the external genitalia and degeneration of the Wolffian ducts. Normal secretion of Müllerian regression factor should also cause the degeneration of the Müllerian ducts. Because of the excessive secretion of deoxycorticosterone by the adrenal cortex, these individuals are usually hypertensive. The Sertoli-only syndrome refers to the situation in which only the Sertoli cells of the seminiferous tubules are present (germinal cell aplasia). Spermatogenesis is absent in these individuals, who also show increased plasma levels of FSH because of decreased Sertoli cell secretion of inhibin. They may exhibit both male-type and female-type internal tracts because of the absence of Müllerian regression factor. The Leydig cells, however, have normal function and result in normal secretion of testosterone, so that both male-type internal tracts and external genitalia develop. Testicular dysgenesis results in poor in utero development of the testes with concomitantly decreased secretion of testosterone and Müllerian regression factor. The Wolffian duct structures may degenerate, and the external genitalia may be feminized. Female-type internal tracts may develop because of the decreased secretion of Müllerian regression factor.

QUESTION 11

Wrist extensors are primarily controlled by what nerve?

A. Radial

B. Ulnar

C. Median

D. Tibial

Correct Answer: A

QUESTION 12

Which of the following drugs aids in gastric emptying?

A. Cisapride (Propulsid)

B. Ranitidine (Zantac)

C. Famotidine (Pepcid)

D. Tranylcypromine sulfate (Parnate)

Correct Answer: A

QUESTION 13

Which of the following matches the definition: The maximum volume of air that can be exhaled after taking the deepest breath possible?

A. Expiratory reserve volume

B. Inspiratory capacity

C. Inspiratory reserve volume

D. Vital capacity

Correct Answer: D

QUESTION 14

A 35-year-old male comes to the physician due to fatigue. He recently returned from a trip to Japan. Laboratory results are as follows:

Hemoglobin – 9 g/dL Mean corpuscular volume – 108 fl MCHC – 33 g/dL Mean corpuscular hemoglobin – 35 pg

A peripheral blood smear is obtained which reveals enlarged red blood cells and hypersegmented neutrophils. These findings were most likely caused by

A. Diphyllobothrium latum

B. Echinococcus granulosus

C. Onchocerca volvulus

D. Schistosoma haematobium

E. Taenia solium

Correct Answer: A

Explanation:

Diphyllobothrium latum is a tapeworm which can cause vitamin B12 deficiency because it competes for this vitamin in the small intestine. Infection with this tapeworm occurs after consumption of raw or undercooked fresh water fish. Vitamin B12 deficiency may occur in infected patients and presents with fatigue due to the macrocytic megaloblastic anemia with hypersegmented neutrophils. Treatment of the infection is with praziquantel.

QUESTION 15

A 33-year-old woman comes to the physician because of a 2-day history of mild nausea, increased urinary urgency and frequency, and constipation. She also has had a 4.5-kg (10-lb) weight loss during the past 2 weeks and a 3-week history of vaginal bleeding. Pelvic examination shows a nodular cervix with an irregular, friable posterior lip, and a rock-hard, irregular, immobile pelvic mass that extends across the pelvis. Examination of biopsy specimens from the cervix and anterior wall of the vagina show well-differentiated keratinizing squamous cell carcinoma. Which of the following best describes the pathogenesis of this patient\\'s disease?

A. Inactivation of celluar p53

B. Insertion of viral promotors adjacent to cellular growth factor genes

C. Specialized transduction

D. Transactivation of cellular growth factor genes by TAX

E. Translocation of CMYC to an Ig gene promoter

Correct Answer: A