

Renal system

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1:

1. **Which change tends to increase urinary calcium (Ca^{++}) excretion?**
 - a. Increased plasma phosphate concentration
 - b. Increased plasma parathyroid hormone concentration
 - c. Extracellular fluid volume expansion
 - d. Decreased blood pressure
 - e. Metabolic alkalosis

2. **Surgery on the left kidney may be complicated by injury of:**
 - a. The second part of the duodenum
 - b. None of the above
 - c. The spleen
 - d. The sigmoid colon

3. **The voluntarily controlled sphincter fashioned by skeletal muscle at the point where the urethra passes through the pelvic floor is called the:**
 - a. Internal anal sphincter
 - b. External urethral sphincter
 - c. Trigone
 - d. Internal urethral sphincter
 - e. Detrusor sphincter

4. **Which of the following is not a source of atoms for purine base formation?**

- a. Tetrahydrofolate
- b. Glutamate
- c. Aspartate
- d. Glycine
- e. Respiratory CO₂

5. **A 62-year-old woman has previously had a unilateral nephrectomy after diagnosis of renal carcinoma. Her GFR (estimated from creatinine clearance) is 50 ml/min, her urine flow rate is 2.0 ml/min, and her plasma glucose concentration is 200 mg/100 ml. If she has a kidney transport maximum for glucose of 150 mg/min, what would be her approximate rate of glucose excretion?**

- a. 100 mg/min
- b. 150 mg/min
- c. Glucose excretion rate cannot be estimated from these data
- d. 200 mg/min
- e. 50 mg/min
- f. 300 mg/min
- g. 0 mg/min

6. **Embryology of the gonads. Which one of the following is TRUE?**

- a. The testes reach the inguinal region by the 24th week
- b. In female embryos, Müllerian Inhibiting Substance causes regression of the paramesonephric duct
- c. Sertoli cells secrete testosterone that plays a role in embryogenesis
- d. Hydatid of Morgagni is a remnant of the paramesonephric duct
- e. The genital ridges develop during the 12th week

7. **The enzyme used for Orotic acid synthesis from its intermediate:**

- a. NAD'
- b. ATCase
- c. DHO dehydrogenase
- d. CPS II

e. Orotate Phospho-Ribosyltransferase

8. **The kidney secretes _____, which is an enzyme hormone that raises blood pressure.**

- a. Aldosterone
- b. Angiotensinogen
- c. Renin
- d. Angiotensin II

9. **A patient has the following laboratory values: arterial pH = 7.13, plasma HCO_3^- = 15 mEq/L, plasma chloride concentration = 118 mEq/L, arterial Pco_2 = 28mm Hg, and plasma Na^+ concentration = 141 mEq/L. What is the most likely cause of his acidosis?**

- a. Diarrhea
- b. Emphysema
- c. Diabetes mellitus
- d. Salicylic acid poisoning

10. **Which diuretic inhibits $\text{Na}^+ - 2\text{Cl}^- - \text{K}^+$ co-transport in the loop of Henle as its primary action?**

- a. Spironolactone
- b. Carbonic anhydrase inhibitor
- c. Thiazide diuretic
- d. Amiloride
- e. Furosemide
- f. Osmotic diuretic

11. **The following is (are) the aim(s) of first stage repair of hypospadias:**

- a. Straightening of the penis
- b. Redistribution of penile skin for a planned second stage
- c. Correction of chordee
- d. All of the above

12. **What is the Malpighian corpuscle?**

- a. Loop of Henle
- b. Distal convoluted tubule
- c. Bowman's capsule
- d. Renal corpuscle
- e. Glomerulus

13. **The inner medulla may have:**

- a. 9 pyramids
- b. 5 pyramids
- c. 15 pyramids
- d. 25 pyramids

14. **In the nephron, tissue accumulation of sodium and chloride ions accounts for the movement of:**

- a. ATP molecules
- b. Urine
- c. Protein carriers in the cell membranes
- d. Water molecules

15. **..... Is continue with proximal convoluted tubule:**

- a. Urinary pole
- b. Glomerulus
- c. Vascular pole
- d. Mesangium

16. **All the following are functions of the hormone aldosterone except:**

- a. It stimulates the secretion of potassium from the blood
- b. It stimulates the reabsorption of sodium ions from the distal convoluted tubules

- c. It stimulates the reabsorption of water in the nephron
- d. It regulates the excretion of calcium from the peritubular capillary

17. **A simple rule concerning water and electrolyte regulation is:**

- a. Potassium passively follows sodium
- b. Water passively follows salt
- c. Salt actively follows water
- d. Water actively follows salt
- e. Salt passively follows water

18. **E. coli can colonize the periurethral area and is a common cause of cystitis.**

- a. True
- b. False

19. **Stage V Wilms tumor means:**

- a. Tumor limited to the kidney
- b. Bilateral tumor
- c. Hematogenous spread
- d. Extension beyond kidney

20. **Lesch Nyhan syndrome is due to deficiency of:**

- a. APR transferase
- b. HGPR transferase
- c. IMP dehydrogenase
- d. PRPP synthetase

21. **What is the capillary tuft of the nephron?**

- a. Distal convoluted tubule
- b. Renal corpuscle

- c. Loop of Henle
- d. Bowman's capsule
- e. Glomerulus

22. **The urinary bladder has openings to the:**

- a. Urethra and ureters
- b. Nephron and kidney
- c. Urinary meatus and glomerulus
- d. Renal vein and loop of Henle

23. **Deficiency in which enzyme, essential to the nucleotide metabolism salvage pathway, leads to a severe hereditary form of gout?**

- a. Adenylate deaminase
- b. Xanthine oxidase
- c. Aspartate transcarbamoylase
- d. Thymidylate kinase
- e. Hypoxanthine-guanine phosphoribosyl-transferase

24. **Which of the following is true of de novo pyrimidine synthesis?**

- a. Carbamoyl phosphate donates C2 and N2 atoms
- b. Carbon-6 is donated by folic acid derivatives
- c. Glutamine is a nitrogen donor
- d. Glycine is a carbon donor
- e. Its synthesis starts with ribose-5-phosphate

25. **Which substance is filtered most readily by the glomerular capillaries?**

- a. Albumin in plasma
- b. Polyanionic dextran with a molecular weight of 25,000
- c. Neutral dextran with a molecular weight of 25,000

- d. Red blood cells
- e. Polycationic dextran with a molecular weight of 25,000

26. **A 70-year-old woman is admitted to the emergency department because of a "fainting spell" at home. She appears to have suffered no trauma from her fall, but her blood pressure is 120/60 when lying down and 60/20 when she sits up. Neurologic examination and an ECG are within normal limits when she is lying down. Questioning reveals that she has recently started taking "water pills" (diuretics) for a heart condition. Which of the following drugs is the most likely cause of her fainting spell?**

- a. Spironolactone
- b. Amiloride
- c. Acetazolamide
- d. Furosemide
- e. Hydrochlorothiazide

27. **Which blood vessel conveys blood out of the nephron?**

- a. Vasa recta
- b. Peritubular capillary
- c. Interlobular vein
- d. Efferent arteriole

28. **A young man is found comatose, having taken an unknown number of sleeping pills an unknown time before. An arterial blood sample yields the following values: pH = 7.02, HCO_3^- = 14 mEq/L, and Pco_2 = 68 mm Hg. Which of the following describes this patient's acid-base status most accurately?**

- a. Respiratory acidosis with partial renal compensation
- b. Uncompensated metabolic acidosis
- c. Respiratory acidosis with complete renal compensation
- d. Uncompensated respiratory acidosis
- e. Simultaneous respiratory and metabolic acidosis

29. **Under conditions of normal renal function, what is true of the concentration of urea in tubular fluid at the end of the proximal tubule?**

- a. It is higher than the concentration of urea in the plasma
- b. It is higher than the concentration of urea in tubular fluid at the tip of the loop of Henle
- c. It is lower than plasma urea concentration because of active urea reabsorption along the proximal tubule
- d. It is higher than the concentration of urea in the final urine in antidiuresis

30. **What is the space between the renal pyramids called?**

- a. Medullary ray
- b. Medulla
- c. Nephron
- d. Renal columns
- e. Lobe

31. **The most accurate single investigation for diagnosing bladder cancer is:**

- a. Ascending cystogram
- b. Bladder wash cytology
- c. Bimanual examination under anesthesia and cystoscopic biopsy
- d. CT Scan

32. **Because the usual rate of phosphate filtration exceeds the transport maximum for phosphate reabsorption, which statement is true?**

- a. Phosphate in the tubules can contribute significantly to titratable acid in the urine
- b. The “threshold” for phosphate is usually not exceeded
- c. All the phosphate that is filtered is reabsorbed
- d. More phosphate is reabsorbed than is filtered
- e. Parathyroid hormone must be secreted for phosphate reabsorption to occur

33. **The tube connecting the renal hilus of the kidney to the bladder is the:**

- a. Distal convoluted tubule

- b. Ureter
- c. Urethra
- d. Proximal convoluted tubule
- e. Collecting duct

34. **The probable metabolic defect in gout is:**

- a. An underproduction of purines, leading to defective genetic material
- b. A defect in the kidney's ability to excrete uric acid
- c. An overproduction of pyrimidines
- d. Elevated calcium levels leading to the deposition of calcium urate
- e. An overproduction of uric acid

35. **The peritubular capillaries arise from the _____, which drains the glomerulus.**

- a. Afferent arteriole
- b. Bowman's capsule
- c. Glomerulus
- d. Loop of Henle
- e. Efferent arteriole

36. **The site of origin of prostate cancer is:**

- a. Peripheral zone
- b. Transition zone
- c. Central zone
- d. Fibrous stroma

37. **If the renal clearance of substance X is 300 ml/min and the glomerular filtration rate is 100 ml/min, it is most likely that substance X is:**

- a. Bound to tubular proteins
- b. Bound to plasma proteins

- c. Filtered freely but not secreted or reabsorbed
- d. Clearance of a substance cannot be greater than the GFR
- e. Reabsorbed
- f. Secreted

38. **Which of the following would be the most likely cause of hypernatremia associated with a small volume of highly concentrated urine (osmolarity = 1400 mOsm/L) in a person with normal kidneys? **

- a. Diabetes mellitus
- b. Diabetes insipidus
- c. Dehydration due to insufficient water intake and heavy exercise
- d. Liddle's syndrome
- e. Primary aldosteronism
- f. Bartter's syndrome

39. **What would tend to decrease GFR by more than 10% in a normal kidney? **

- a. 50% decrease in afferent arteriolar resistance
- b. 50% increase in the glomerular capillary filtration coefficient
- c. Decrease in renal arterial pressure from 100 to 85 mm Hg
- d. 50% decrease in efferent arteriolar resistance
- e. Decrease in plasma colloid osmotic pressure from 28 to 20 mm Hg

40. **A patient's urine is collected for 2 hours, and the total volume is 600 milliliters during this time. Her urine osmolarity is 150 mOsm/L, and her plasma osmolarity is 300 mOsm/L. What is her "free water clearance"? **

- a. -2.5 ml/min
- b. +2.5 ml/min
- c. -5.0 ml/min
- d. 0.0 ml/min
- e. +5.0 ml/min

41. **Which of the following is a source of atoms for pyrimidine bases?**

- a. Asparagine
- b. Respiratory CO₂
- c. Aspartate
- d. Glutamine

42. **What would cause the greatest degree of hyperkalemia?**

- a. Increase in potassium intake from 60 to 180 mmol/day in a person with normal kidneys and a normal aldosterone system
- b. Chronic treatment with a diuretic that inhibits loop of Henle Na⁺-2Cl⁻-K⁺ co-transport
- c. Chronic treatment with a diuretic that inhibits sodium reabsorption in the collecting ducts
- d. Decrease in sodium intake from 200 to 100 mmol/day
- e. Chronic treatment with a diuretic that inhibits the action of aldosterone

43. **A 63-year-old man presents to the emergency department with worsening heart failure following a myocardial infarction 2 weeks previously. The patient complains of shortness of breath. Physical exam reveals 12 pitting edema in his ankles. Past medical history is significant for an allergic reaction following exposure to trimethoprim–sulfamethoxazole. The physician wants to prescribe furosemide as part of this patient's regimen. Which drug should she prescribe him?**

- a. Mannitol
- b. Hydrochlorothiazide
- c. Ethacrynic acid
- d. The best drug to use in this case is furosemide and spironolactone
- e. Acetazolamide

44. **The following are TRUE about Klinefelter's syndrome except:**

- a. Affected male has 47, XXY genotype
- b. Seminomatous germ cell tumours are more common in these patients
- c. Karyotyping is used for diagnosis
- d. Androgen replacement may be needed as patient ages

e. It affects 1 in 650 males

45. **All of the following are incontinent urinary diversions, except:**

- a. Colon conduit
- b. Ileal W-neobladder
- c. Ileal loop conduit
- d. Cutaneous vesicostomy

46. **A young woman is diagnosed with acute uncomplicated bacterial cystitis. The most likely pathogen is:**

- a. *Proteus vulgaris*
- b. *Escherichia coli*
- c. *Streptococcus faecalis*
- d. *Staphylococcus aureus*

47. **Which substance is filtered most readily by the glomerular capillaries?**

- a. Albumin in plasma
- b. Polyanionic dextran with a molecular weight of 25,000
- c. Red blood cells
- d. Polycationic dextran with a molecular weight of 25,000
- e. Neutral dextran with a molecular weight of 25,000

48. **... are chemoreceptors that transfer to the JG cells data on the osmolarity of fluid in the distal convoluted tubule:**

- a. Glomerulus
- b. Polar cushion cells
- c. Juxta-glomerular cells
- d. Macula densa

49. **Which one of the following is NOT one of the functions of the kidneys:**

- a. Convert vitamin D from its inactive to its active form
- b. Regulate blood volume
- c. Dispose of metabolic waste products
- d. Produce hormones that assist in digestion
- e. Manufacture urine

50. **Extracellular fluid is found everywhere in the body EXCEPT:**

- a. Cerebrospinal fluid
- b. Interstitial fluid
- c. Humors of the eye and lymph
- d. Blood plasma
- e. Within living cells

51. **If a patient has a creatinine clearance of 90 ml/min, a urine flow rate of 1 ml/min, a plasma K⁺ concentration of 4 mEq/L, and a urine K⁺ concentration of 60 mEq/L, what is the approximate rate of K⁺ excretion?**

- a. 0.36 mEq/min
- b. 3.6 mEq/min
- c. 0.30 mEq/min
- d. 60 mEq/min
- e. 0.06 mEq/min

52. **This is the activity of Atrial Natriuretic peptide (ANP):**

- a. Decreases reabsorption of sodium
- b. Decreases reabsorption of water
- c. All of these
- d. Inhibits aldosterone and ADH secretion

53. **Which change, compared with normal, would be expected to occur, under steady-state conditions, in a patient whose severe renal disease has reduced the number of functional nephrons to 25% of normal?**

- a. Decreased urine flow rate in the surviving nephrons
- b. Decreased urinary creatinine excretion rate
- c. Decreased urinary excretion of sodium
- d. Increased urine-concentrating ability
- e. Increased GFR of the surviving nephrons

54. **If the average hydrostatic pressure in the glomerular capillaries is 50 mm Hg, the hydrostatic pressure in the Bowman's space is 12 mm Hg, the average colloid osmotic pressure in the glomerular capillaries is 30 mm Hg, and there is no protein in the glomerular ultrafiltrate, what is the net pressure driving glomerular filtration?**

- a. 92 mm Hg
- b. 48 mm Hg
- c. 8 mm Hg
- d. 60 mm Hg
- e. 32 mm Hg

55. **Anatomy of the penis. Which one of the following is TRUE?**

- a. The corpus spongiosum is attached to the inferior ischiopubic rami at the root of the penis
- b. The cavernosal nerve provides sensory supply to the penile skin
- c. The arcuate subpubic ligament helps to maintain the erect penis in an upright position
- d. Buck's fascia is continuous with Colles' fascia in the perineum
- e. The cavernosal artery supplies the urethra, glans and spongiosum

56. **Patient with suspect pelviureteric junction obstruction is best diagnosed by:**

- a. IVU
- b. CT angiogram
- c. MAG3

d. DMSA

57. **What vessel is formed from an aggregation of the glomerular capillaries?**

- a. Afferent arteriole
- b. Vasa recta
- c. Peritubular capillaries
- d. Capillary tuft
- e. Efferent arteriole

58. **Urine passes through the:

- a. Glomerulus to ureter to renal tubule
- b. Renal hilum to the bladder to the ureter
- c. Hilum to urethra to bladder
- d. Pelvis of the kidney to ureter to bladder to urethra

59. **Which one of the following is NOT true of urine under normal healthy conditions:

- a. It is more dense than water
- b. It is slightly aromatic
- c. It typically contains ammonia
- d. It is sterile
- e. It is slightly alkaline

60. **The degenerative condition in which blisterlike sacs (cysts) containing urine form on the kidneys and obstruct urine drainage is called:

- a. Dysuria
- b. Cystitis
- c. Epispadias
- d. Polycystic kidney
- e. Hypospadias

61. **A risk factor for complicated UTIs is:**

- a. Pregnancy
- b. None of these
- c. Diabetes mellitus
- d. All of these
- e. Indwelling urinary catheter

62. **A patient has the following laboratory values: arterial pH = 7.04, plasma HCO_3^- = 13 mEq/L, plasma chloride concentration = 120 mEq/L, arterial Pco_2 = 30 mm Hg, and plasma sodium = 141 mEq/L. What is the most likely cause of his acidosis?**

- a. Diabetes mellitus
- b. Emphysema
- c. Salicylic acid poisoning
- d. Methanol poisoning
- e. Diarrhea

63. **Select the correct statement about urinary development:**

- a. The mesonephros will develop into the kidneys
- b. The pronephros (first tubule system) develops during the tenth week of gestation
- c. Kidneys develop from urogenital ridges
- d. The metanephric ducts will become the urethras

64. **Thin segment of Loop of Henle Lined with.....:**

- a. Modified epithelial cells
- b. Simple squamous epithelium
- c. Simple cubical epithelium
- d. Basement membrane

65. **Asymptomatic bacteriuria can occur in all age groups.**

- a. False
- b. True

66. **Which change tends to increase GFR? **

- a. Increased glomerular capillary filtration coefficient
- b. Increased afferent arteriolar resistance
- c. Decreased glomerular capillary hydrostatic pressure
- d. Increased Bowman's capsule hydrostatic pressure
- e. Decreased efferent arteriolar resistance

67. **The mechanism of water reabsorption by the renal tubules is _____.**

- a. Osmosis
- b. Cotransport with sodium ions
- c. Active transport
- d. Solvent drag

68. **The countercurrent multiplier mechanism occurs at the _____.**

- a. Loop of Henle
- b. Proximal convoluted tubule
- c. Collecting ducts
- d. Distal convoluted tubule

69. **The urinary bladder lies:**

- a. Anterior to the transverse colon
- b. Anterior to the rectum
- c. Lateral to the kidneys
- d. Posterior to the pubic symphysis

70. **A female patient has unexplained severe hypernatremia (plasma Na^+ = 167 mmol/L) and reports frequent urination and large urine volumes. A urine specimen reveals that the Na^+ concentration is 15 mmol/L (very low) and the osmolarity is 155 mOsm/L (very low). Laboratory tests reveal the following data: plasma renin activity = 3 ng angiotensin I/ml/h (normal = 1.0), plasma ADH = 30 pg/ml (normal = 3 pg/ml), and plasma aldosterone = 20 ng/dl (normal = 6 ng/dl). Which of the following is the most likely reason for her hypernatremia?**

- a. Central diabetes insipidus
- b. Syndrome of inappropriate ADH
- c. Simple dehydration due to decreased water intake
- d. Primary aldosteronism
- e. Nephrogenic diabetes insipidus
- f. Renin-secreting tumor

71. **A 62-year-old woman has previously had a unilateral nephrectomy after diagnosis of renal carcinoma. Her GFR (estimated from creatinine clearance) is 50 ml/min, her urine flow rate is 2.0 ml/min, and her plasma glucose concentration is 200 mg/100 ml. If she has a kidney transport maximum for glucose of 150 mg/min, what would be her approximate rate of glucose excretion?**

- a. 0 mg/min
- b. Glucose excretion rate cannot be estimated from these data
- c. 100 mg/min
- d. 150 mg/min
- e. 50 mg/min
- f. 300 mg/min
- g. 200 mg/min

72. **Acute renal failure after ingesting poisonous mushrooms that caused renal tubular necrosis?**

- a. Decreased plasma potassium concentration
- b. Decreased blood urea nitrogen concentration
- c. Metabolic acidosis
- d. Increased plasma bicarbonate concentration
- e. Decreased hydrostatic pressure in Bowman's capsule

73. **Where are most micro-villi found?**

- a. Loop of Henle
- b. Loop of Henle
- c. Distal convoluted tubule
- d. Proximal convoluted tubule

74. **Emphysematous pyelonephritis has a low mortality rate of around 20%.**

- a. True
- b. False

75. **Eating large amounts of meat will increase the levels of _____ in the blood.**

- a. Urea
- b. Uric acid
- c. Protein
- d. Creatinine

76. **The following drugs cause acute interstitial nephritis EXCEPT for:**

- a. Bicalutamide
- b. Ciprofloxacin
- c. Nonsteroidal anti-inflammatory drugs
- d. Cephalosporins
- e. Rifampin

77. **If a person has a kidney transport maximum for glucose of 350 mg/min, a GFR of 100 ml/min, a plasma glucose level of 150 mg/dl, a urine flow rate of 2 ml/min, and no detectable glucose in the urine, what would be the approximate rate of glucose reabsorption, assuming normal kidneys?**

- a. 0.50 mg/min
- b. 0 mg/min
- c. Glucose reabsorption cannot be estimated from these data

- d. 150 mg/min
- e. 350 mg/min

78. **The following definitions are correct except:**

- a. Endopyelotomy means endoscopic incision of pelvi-ureteric junction obstruction (PUJO)
- b. Cystolitholapaxy means removal of a bladder stone by open surgery
- c. Cystolithotomy means removal of a bladder stone by open surgery
- d. Hypospadias means abnormal presence of the external urethral meatus on the under surface of the penis

79. **Two THFA-requiring steps of purine biosynthesis are:**

- a. Formation of formylglycinamide ribonucleotide and aminoimidazole carboxamide ribonucleotide
- b. Formation of formamidoimidazole carboxamide ribonucleotide
- c. Formation of phosphoribosylamine and glycinamide ribonucleotide
- d. Formation of aminoimidazole carboxylic acid ribonucleotide and inosinic acid from formylglycinamide ribonucleotide
- e. Formation of inosinic acid and adenylosuccinic acid

80. **Which of the following is one component of Muscle layer In the upper 2/3 of the ureter:**

- a. Outer longitudinal
- b. Transitional epithelium
- c. Transitional epithelium
- d. Outer circular

81. **Diabetes mellitus is a known risk factor for urinary tract infections.**

- a. True
- b. False

82. **The process of emptying the bladder is referred to as voiding or:**

- a. Tubular reabsorption
- b. Incontinence
- c. Tubular secretion
- d. Filtration
- e. Micturition

83. **Which of the following would likely lead to hyponatremia?**

- a. Excess aldosterone secretion
- b. Administration of 2 liters of 0.9% NaCl solution
- c. Excessive ADH secretion
- d. Restriction of fluid intake
- e. Administration of 2 liters of 3% NaCl solution

84. **.... Is The apex of renal pyramid:**

- a. Major calyces
- b. Minor calyces
- c. Renal Lobule
- d. Renal papilla

85. **Regarding Na reabsorption in thick ascending limb of loop of henle:**

- a. It occurs by passive reabsorption
- b. All of the above are correct
- c. Only 5% of filtered Na is reabsorbed
- d. It result in sympport of K &CL & antiport of H

86. **Which of the flowing is true abut Proximal Convolutd Tubule With LM:**

- a. The basal border has microvilli
- b. It's small diameter
- c. The apical border of the cells has brush border

d. The wall is formed of large numbers of pyramidal cells

87. **The degradation pathways of pyrimidines generally result in the production of which of the following?**

- a. Uric acid
- b. Lactate
- c. Ammonium (NH_4^+)
- d. Ketone bodies

88. **Most nephrons are located within the renal:**

- a. Medulla
- b. Cortex
- c. Pelvis
- d. Calyces
- e. Pyramids

89. **If the T_m for a particular amino acid is 120mg/100ml and the concentration of that amino acid in the blood is 230mg/100ml the amino acid:**

- a. Will be reabsorbed by secondary active transport
- b. Will appear in the urine
- c. Will be completely reabsorbed by the tubule cells
- d. Will be actively secreted into the filtrate

90. **A group of college students is planning a mountain climbing trip to the Andes. Which is most appropriate for them to take to prevent altitude sickness?**

- a. A thiazide diuretic such as hydrochlorothiazide
- b. A loop diuretic such as furosemide
- c. A carbonic anhydrase inhibitor such as acetazolamide
- d. An anticholinergic such as atropine

91. **In a patient with very high levels of aldosterone and otherwise normal kidney function, approximately what percentage of the filtered load of sodium would be reabsorbed by the distal convoluted tubule and collecting duct?**

- a. 20% to 40%
- b. <10%
- c. 40% to 60%
- d. 10% to 20%
- e. >66%

92. **Furosemide (Lasix) is a diuretic that also produces natriuresis. Which of the following is an undesirable side effect of furosemide due to its site of action on the renal tubule?**

- a. Hypokalemia
- b. Dehydration
- c. Decreased ability to concentrate the urine
- d. Hypercalcemia

93. **As the renal artery approaches the kidney, it branches to supply the renal tissue. Place the following in correct sequence starting from the renal artery: 1. segmental 2. cortical radiate 3. arcuate 4. interlobar.**

- a. 1,4,3,2
- b. 1,2,3,4
- c. 1,4,2,3
- d. 3,1,4,2

94. **What name is given to the blood vessel that drains blood from the glomerulus after filtration?**

- a. Afferent arteriole
- b. Efferent vein
- c. Efferent arteriole
- d. Vasa recta

95. **If the GFR suddenly decreases from 150 ml/min to 75 ml/min and tubular fluid reabsorption simultaneously decreases from 149 ml/min to 75 ml/min, which change will occur (assuming that the changes in GFR and tubular fluid reabsorption are maintained)?**

- a. Urine flow rate will not change
- b. Urine flow rate will increase by 50%
- c. Urine flow rate will decrease to 0
- d. Urine flow rate will decrease by 50%

96. **Renal calculi are usually comprised of the following except which one?**

- a. Uric acid
- b. Calcium oxalate
- c. Cholesterol
- d. Magnesium phosphate

97. **An elderly patient reports muscle weakness and lethargy. A urine specimen reveals a Na^+ concentration of 600 mmol/L and an osmolarity of 1200 mOsm/L. Additional laboratory tests provide the following information: plasma Na^+ concentration = 167 mmol/L, plasma renin activity = 4 ng angiotensin I/ml/h (normal = 1), plasma ADH = 60 pg/ml (normal = 3 pg/ml), and plasma aldosterone = 15 ng/dl (normal = 6 ng/dl). What is the most likely reason for this patient's hypernatremia?**

- a. Nephrogenic diabetes insipidus
- b. Renin-secreting tumor
- c. Syndrome of inappropriate ADH
- d. Dehydration caused by decreased fluid intake
- e. Primary aldosteronism

98. **The most common cause of urinary tract infections (UTIs) is:**

- a. Staphylococcus aureus
- b. Escherichia coli
- c. Pseudomonas aeruginosa
- d. Candida albicans
- e. Enterococcus faecalis

99. **Stage V Wilms tumor means:**

- a. Tumor limited to the kidney
- b. Bilateral tumor
- c. Hematogenous spread
- d. Extension beyond kidney

100. **Which of the following is true of de novo pyrimidine synthesis?**

- a. Carbamoyl phosphate donates C2 and N2 atoms
- b. Carbon-6 is donated by folic acid derivatives
- c. Glutamine is a nitrogen donor
- d. Glycine is a carbon donor
- e. Its synthesis starts with ribose-5-phosphate

101. **Which changes would you expect to find after administering a vasodilator drug that caused a 50% decrease in afferent arteriolar resistance and no change in arterial pressure?**

- a. Increased renal blood flow, increased GFR, and no change in peritubular capillary hydrostatic pressure
- b. Increased renal blood flow, increased FR, and decreased peritubular capillary hydrostatic pressure
- c. Increased renal blood flow, increased GFR, and increased peritubular capillary hydrostatic pressure
- d. Decreased renal blood flow, decreased GFR, and increased peritubular capillary hydrostatic pressure
- e. Decreased renal blood flow, decreased GFR, and decreased peritubular capillary hydrostatic pressure

102. **Which of the following prevention strategies has the highest level of evidence for reducing the risk of contrast-induced nephropathy (CIN) using intravenous low-osmolar contrast media (LOCM)?

- a. Ascorbic Acid plus IV saline
- b. N-acetylcysteine alone
- c. IV sodium bicarbonate alone
- d. N-acetylcysteine plus IV sodium bicarbonate

e. Intravenous saline alone

103. **The following are TRUE about Klinefelter's syndrome except:**

- a. Affected male has 47, XXY genotype
- b. Seminomatous germ cell tumours are more common in these patients
- c. Karyotyping is used for diagnosis
- d. Androgen replacement may be needed as patient ages
- e. It affects 1 in 650 males

104. **All of the following are incontinent urinary diversions, except:**

- a. Colon conduit
- b. Ileal W-neobladder
- c. Ileal loop conduit
- d. Cutaneous vesicostomy

105. **A young woman is diagnosed with acute uncomplicated bacterial cystitis. The most likely pathogen is:**

- a. *Proteus vulgaris*
- b. *Escherichia coli*
- c. *Streptococcus faecalis*
- d. *Staphylococcus aureus*

106. **Which substance is filtered most readily by the glomerular capillaries?**

- a. Albumin in plasma
- b. Polyanionic dextran with a molecular weight of 25,000
- c. Red blood cells
- d. Polycationic dextran with a molecular weight of 25,000
- e. Neutral dextran with a molecular weight of 25,000

107. **... are chemoreceptors that transfer to the JG cells data on the osmolarity of fluid in the distal convoluted tubule:**

- a. Glomerulus
- b. Polar cushion cells
- c. Juxta-glomerular cells
- d. Macula densa

108. **Which one of the following is NOT one of the functions of the kidneys:**

- a. Convert vitamin D from its inactive to its active form
- b. Regulate blood volume
- c. Dispose of metabolic waste products
- d. Produce hormones that assist in digestion
- e. Manufacture urine

Renal system

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2023

2:

1. Glomerular Filtration Rate (GFR) and Plasma Concentration

Question: The GFR of a 26-year-old man with glomerulonephritis decreases by 50% and remains at that level. For which substance would you expect to find the greatest increase in plasma concentration?

Answer:

- a. Phosphate
- b. Creatinine
- c. Na^+
- d. H^+
- e. K^+
- f. Glucose

2. Magnesium Reabsorption in the Nephron

Question: Which nephron segment is the primary site of magnesium reabsorption under normal conditions?

Answer:

- a. Distal convoluted tubule
- b. Proximal tubule
- c. Descending limb of the loop of Henle
- d. Collecting ducts
- e. Ascending limb of the loop of Henle

3. Unilateral Ureteric Obstruction (UUO)

Question: Which of the following is TRUE in unilateral ureteric obstruction (UUO)?

Answer:

- a. Administration of endothelin antagonists limits the reduction of RBF but increases GFR in rats during and after release of UUO
- b. Infusion of Captopril, an ACE inhibitor attenuates the declines in RBF and GFR in UUO

- c. Renal blood flow (RBF) increases during the first 1.5 to 4 hours along with an increase in the ureteric pressure
- d. In a second phase lasting between 3 and 5 hours, these pressure parameters remain elevated but RBF begins to rapidly decline
- e. A third phase beginning about 5 hours after obstruction is associated with a further drop in RBF and a gradual but small rise in collecting system pressure

4. Radical Nephrectomy

Question: During radical nephrectomy, we remove all of the following except:

Answer:

- a. The ipsilateral adrenal gland in large upper pole renal tumors
- b. The whole ureter and a bladder cuff
- c. The kidney harboring the tumor
- d. The perirenal fascia (Gerota's fascia)

5. Physiological Changes in Dehydration

Question: Which change would you expect to find in a dehydrated person deprived of water for 24 hours?

Answer:

- a. Increased plasma atrial natriuretic peptide concentration
- b. Decreased plasma antidiuretic hormone concentration
- c. Increased water permeability of the collecting duct
- d. Decreased plasma renin activity

6. Medications Associated with Retroperitoneal Fibrosis

Question: The following medications are associated with retroperitoneal fibrosis EXCEPT:

Answer:

- a. Alpha-blockers
- b. Hydralazine

- c. Phenacetin
- d. Methysergide
- e. Haloperidol

7. Purine Synthesis

Question: The purine precursor that accepts CO₂ in purine synthesis is:

Answer:

- a. Inosinic acid
- b. Aminoimidazole ribonucleotide-5
- c. α -N-Formylglycinamide ribonucleotide
- d. Glycinamide ribonucleotide

8. Urethral Sphincter

Question: The voluntarily controlled sphincter fashioned by skeletal muscle at the point where the urethra passes through the pelvic floor is called the:

Answer:

- a. External urethral sphincter
- b. Trigone
- c. Internal urethral sphincter
- d. Detrusor sphincter
- e. Internal anal sphincter

9. Changes in Urine Flow Rate due to GFR Reduction

Question: If the GFR suddenly decreases from 150 ml/min to 75 ml/min and tubular fluid reabsorption simultaneously decreases from 149 ml/min to 75 ml/min, which change will occur?

Answer:

- a. Urine flow rate will increase by 50%
- b. Urine flow rate will not change
- c. Urine flow rate will decrease by 50%

d. Urine flow rate will decrease to 0

10. Potassium Secretion in a High-K⁺ Diet

Question: In a person on a high-potassium (200 mmol/day) diet, which part of the nephron would be expected to secrete the most potassium?

Answer:

- a. Ascending loop of Henle
- b. Early distal tubule
- c. Proximal tubule
- d. Collecting tubules
- e. Descending loop of Henle

11. Nephron and Reabsorption

Question: What part of the nephron performs the majority of the reabsorption of materials from the filtrate?

Answer:

- a. The proximal convoluted tubule
- b. The Bowman's capsule and glomerulus
- c. The distal convoluted tubule and collecting duct
- d. The loop of Henle (the nephron loop)

12. Functions of the Kidneys

Question: Which one of the following is NOT one of the functions of the kidneys?

Answer:

- a. Dispose of metabolic waste products
- b. Produce hormones that assist in digestion
- c. Convert vitamin D from its inactive to its active form
- d. Manufacture urine
- e. Regulate blood volume

13. Side Effects of Furosemide (Lasix)

Question: Furosemide (Lasix) is a diuretic that also produces natriuresis. Which of the following is an undesirable side effect due to its site of action on the renal tubule?

Answer:

- a. Hypercalcemia
- b. Heart failure
- c. Edema
- d. Hyperkalemia
- e. Decreased ability to concentrate the urine

14. Hypokalemia Causes

Question: Which of the following would cause the most serious hypokalemia?

Answer:

- a. Treatment with spironolactone
- b. A decrease in potassium intake from 150 mEq/day to 60 mEq/day
- c. An increase in sodium intake from 100 to 200 mEq/day
- d. Excessive aldosterone secretion plus low sodium intake
- e. Excessive aldosterone secretion plus high sodium intake
- f. A patient with Addison's disease
- g. Treatment with a β -adrenergic blocker

15. Urine Abnormalities

Question: The presence of pus in urine is called:

Answer:

- a. Hematuria
- b. Proteinuria
- c. Glycosuria
- d. Pyuria

e. Bilirubinuria

16. Glucose and Amino Acid Reabsorption

Question: Reabsorption of high levels of glucose and amino acids in the filtrate is accomplished by:

Answer:

- a. Secondary active transport
- b. Facilitated diffusion
- c. Passive transport
- d. Countertransport

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Medical Questions and Answers

Question 17

If a patient has a creatinine clearance of 90 ml/min, a urine flow rate of 1 ml/min, a plasma K⁺ concentration of 4 mEq/L, and a urine K⁺ concentration of 60 mEq/L, what is the approximate rate of K⁺ excretion?

Answer:

- a. 0.36 mEq/min
- b. 0.30 mEq/min
- c. 60 mEq/min
- d. 0.06 mEq/min
- e. 3.6 mEq/min

Question 18

If the T_m for a particular amino acid is 120 mg/100 ml and the concentration of that amino acid in the blood is 230 mg/100 ml, the amino acid:

Answer:

- a. Will be completely reabsorbed by the tubule cells

- b. Will be actively secreted into the filtrate
- c. Will appear in the urine
- d. Will be reabsorbed by secondary active transport

Question 19

A patient with suspected pelviureteric junction obstruction is best diagnosed by:

Answer:

- a. DMSA
- b. CT angiogram
- c. IVU
- d. MAG

Question 20

Which of the following does not serve as a source of atoms for the formation of pyrimidine bases?

Answer:

- a. Aspartate
- b. Respiratory CO₂
- c. Asparagine
- d. Glutamine

Question 21

The key substance in pyrimidine biosynthesis is:

Answer:

- a. Carbamoyl phosphate
- b. ATP
- c. Thiouracil
- d. NADP⁺
- e. Ribose-5-phosphate

Question 22

What are the foot processes on podocytes?

Answer:

- a. Visceral layer of Bowman's capsule
- b. Parietal layer of Bowman's capsule
- c. Juxtaglomerular cells
- d. Pedicels
- e. Macula densa

Question 22

What are the foot processes on podocytes?

Answer:

- a. Visceral layer of Bowman's capsule
- b. Parietal layer of Bowman's capsule
- c. Juxtaglomerular cells
- d. Pedicels
- e. Macula densa

Question 23

As venous blood is drained from the kidney, which path does it follow?

Answer:

- a. Renal vein, segmental veins, interlobar veins, arcuate veins, cortical radiate veins
- b. Cortical radiate veins, arcuate veins, interlobar veins, segmental veins, renal vein
- c. Arcuate veins, cortical radiate veins, interlobar veins, renal vein
- d. Renal vein, interlobar veins, segmental veins, arcuate veins
- e. Cortical radiate veins, arcuate veins, interlobar veins, renal vein

Question 24

Regarding renal tubular handling of K:

Answer:

- a. K is secreted only

- b. K is both reabsorbed & secreted
- c. K is neither reabsorbed nor secreted
- d. K is reabsorbed only

Question 25

If the renal clearance of substance X is 300 ml/min and the glomerular filtration rate is 100 ml/min, it is most likely that substance X is:

Answer:

- a. Secreted
- b. Filtered freely but not secreted or reabsorbed
- c. Clearance of a substance cannot be greater than the GFR
- d. Reabsorbed
- e. Bound to plasma proteins
- f. Bound to tubular proteins

Question 26

A female patient has unexplained severe hypernatremia. What is the most likely reason for her hypernatremia?

Answer:

- a. Syndrome of inappropriate ADH
- b. Simple dehydration due to decreased water intake
- c. Primary aldosteronism
- d. Nephrogenic diabetes insipidus
- e. Renin-secreting tumor
- f. Central diabetes insipidus

Question 27

Juvenile (Type 1) diabetes mellitus is often diagnosed because of polyuria and polydipsia.

What is the cause?

Answer:

- a. Increased delivery of glucose to the collecting duct interferes with the action of antidiuretic hormone

- b. When the filtered load of glucose exceeds the renal threshold, a rising glucose concentration in the proximal tubule decreases the osmotic driving force for water reabsorption
- c. Increased glomerular filtration of glucose increases Na^+ reabsorption via the sodium-glucose cotransporter
- d. High plasma glucose concentration stimulates ADH release from the posterior pituitary
- e. High plasma glucose concentration decreases thirst

Question 28

Which IV solution would result in increased ECF volume, decreased ICF volume, and increased total body water?

Answer:

- a. 1 liter of 0.45% NaCl solution
- b. 1 liter of 5% dextrose solution
- c. 1 liter of 0.9% sodium chloride (NaCl) solution
- d. 1 liter of 3% NaCl solution
- e. 1 liter of pure water

Question 29

The rate of reabsorption of water from the collecting duct is determined by which hormone?

Answer:

- a. Antidiuretic hormone
- b. Cortisone
- c. Oxytocin
- d. Lactogenic hormone

Question 30

What vessel supplies blood to the glomerulus?

Answer:

- a. Afferent arteriole
- b. Capillary tuft
- c. Peritubular capillaries

- d. Vasa recta
- e. Efferent arteriole

Question 31

What is the best medication to prevent altitude sickness for mountain climbers?

Answer:

- a. A carbonic anhydrase inhibitor such as acetazolamide
- b. An anticholinergic such as atropine
- c. A loop diuretic such as furosemide
- d. A thiazide diuretic such as hydrochlorothiazide

Question 32

A patient has metabolic acidosis. What is the most likely cause?

Answer:

- a. Methanol poisoning
- b. Diabetes mellitus
- c. Salicylic acid poisoning
- d. Emphysema
- e. Diarrhea

Question 33

Peyronie's disease is associated with:

Answer:

- a. Diabetes
- b. TGF- α
- c. Poor salvage surgery outcomes
- d. Complex surgical correction always performed with saphenous vein grafts
- e. More common in the Afro-Caribbean population

Question 34

Which statement is NOT true of urine under normal healthy conditions?

Answer:

- a. It is slightly aromatic

- b. It typically contains ammonia
- c. It is sterile
- d. It is slightly alkaline
- e. It is more dense than water

Question 35

An adrenal tumor that causes excess aldosterone secretion would tend to _____ plasma K⁺ concentration, _____ plasma pH, _____ renin secretion, and _____ blood pressure.

Answer:

- a. Decrease, increase, decrease, increase
- b. Increase, increase, decrease, increase
- c. Decrease, decrease, decrease, increase
- d. Decrease, decrease, decrease, decrease
- e. Decrease, increase, increase, increase
- f. Increase, decrease, decrease, increase

Question 36

A risk factor for urinary tract infections in women is:

Answer:

- a. Frequent sexual intercourse
- b. High pH urine
- c. Circumcision
- d. Long urethra
- e. Strong pelvic floor muscles

Question 37

Which of the following is a contraindication of endoscopic transurethral resection of the prostate (TURP)?

Answer:

- a. Calcular prostatitis
- b. Bladder stone of 1 cm in diameter
- c. Bleeding tendency
- d. Fibrous prostate

Question 38

The Prostatic urethra is lined with:

Answer:

- a. Stratified columnar
- b. Transitional epithelium
- c. Stratified squamous
- d. Pseudostratified columnar

Question 39

Emphysematous pyelonephritis has a low mortality rate of around 20%.

Answer:

- a. True
- b. False

Question 40

The first major branch of the renal artery is:

Answer:

- a. Cortical radiate
- b. Interlobular
- c. Arcate
- d. Segmental

Question 41

Vigorous exercise could release high amounts of _ into the urine.

Answer:

- a. Ascorbic acid
- b. Albumin
- c. Glucose
- d. Uric acid

Question 42

The triangular regions of the kidneys that are striped in appearance and separated by the renal columns are the:

Answer:

- a. Renal cortex
- b. Renal pyramids
- c. Calyces
- d. Renal medulla
- e. Renal pelvis

Question 43

This happens if the proximal convoluted tubule is removed from the nephron:

Answer:

- a. Urine is not formed
- b. Urine is more concentrated
- c. Quality and quantity of urine is unaffected
- d. Urine is more diluted

Question 44

Which of the following is true about Bowman's Capsule?

Answer:

- a. Inner layer called Parietal layer
- b. It's a single-walled cup
- c. Outer layer is formed of simple squamous epithelium
- d. It surrounds the Filtration Slits of podocyte

Question 45

The most serious hypokalemia would occur in which condition?

Answer:

- a. Fourfold increase in aldosterone secretion plus high sodium intake
- b. Decrease in potassium intake from 150 to 60 mEq/day
- c. Increase in sodium intake from 100 to 200 mEq/day
- d. Fourfold increase in aldosterone secretion plus low sodium intake
- e. Addison's disease

Question 46

Which cells secrete renin, which regulates blood pressure?

Answer:

- a. Polar cushion cells
- b. Glomerulus
- c. Juxta-glomerular cells

d. Macula densa

Question 47

Which of the following is usually not found in the urine?

Answer:

- a. Uric acid
- b. Urea
- c. Magnesium
- d. Glucose

Question 48

Proximal Convoluted Tubule arises from the:

Answer:

- a. Glomerulus
- b. Vascular pole
- c. Urinary pole
- d. Mesangium

Question 49

Which of the following is one component of the muscle layer in the lower 1/3 of the ureter?

Answer:

- a. Outer longitudinal
- b. Outer circular
- c. Transitional epithelium

Question 50

The targets of angiotensin II are blood vessels and:

Answer:

- a. Kidney nephron

- b. Nerves
- c. Adrenal cortex
- d. Adrenal medulla

Question 51

Alpha-blockers are commonly used in the treatment of:

Answer:

- a. Bladder cancer
- b. Cancer prostate
- c. BPH
- d. None of the above

Question 52

It occupies the space between glomerular capillaries:

Answer:

- a. Glomerulus
- b. Vascular pole
- c. Mesangium
- d. Urinary pole

Question 53

Which of the following statements describes the histology of the ureters?

Answer:

- a. They are made up of several layers of endothelium
- b. They are trilayered (mucosa, muscularis, and adventitia)
- c. they are actually an extension of the visceral peritoneum
- d. they are made up of entirely of muscle tissue because they need to contract in order to transport urine efficiently

Question 54

A patient's urine is collected for 2 hours, and the total volume is 600 milliliters during this time. Her urine osmolarity is 150 mOsm/L, and her plasma osmolarity is 300 mOsm/L.

What is her "free water clearance"?

Answer:

- a) +2.5 ml/min
- b) -5.0 ml/min
- c) 0.0 ml/min
- d) -2.5 ml/min
- e) +5.0 ml/min

Question 55

What is the average glomerular filtration rate?

Answer:

- a) 180 L per day
- b) 1,500 ml per day
- c) 10 L per day
- d) 1 ml per minute

Question 56

The enlarged, cup-shaped closed end of the renal tubule that completely surrounds the glomerulus is called the:

Answer:

- a) Collecting duct
- b) Loop of Henle
- c) Distal convoluted tubule
- d) Bowman's capsule
- e) Proximal convoluted tubule

Question 57

An adrenal tumor that causes excess aldosterone secretion would tend to _____ plasma K⁺ concentration, _____ plasma pH, _____ renin secretion, and _____ blood pressure.

Answer:

- a) Decrease, increase, decrease, increase
- b) Increase, decrease, decrease, increase
- c) Decrease, increase, increase, increase
- d) Decrease, decrease, decrease, increase
- e) Decrease, decrease, decrease, decrease
- f) Increase, increase, decrease, increase

Question 58

Which cells secrete renin, which regulates blood pressure?

Answer:

- a) Glomerulus
- b) Juxta-glomerular cells
- c) Macula densa
- d) Polar cushion cells

Question 59

Which of the following tends to decrease potassium secretion by the cortical collecting tubule?

Answer:

- a) Acute alkalosis
- b) A diuretic that decreases proximal tubule sodium reabsorption
- c) A diuretic that inhibits the action of aldosterone (e.g., spironolactone)
- d) High sodium intake
- e) Increased plasma potassium concentration

Question 60

Which of these could appear in the urine from dieting or the utilization of excess lipids?

Answer:

- a) Urea
- b) Ketone
- c) Uric acid
- d) Glycine

Question 61

Place the following in the correct sequence from the formation of a drop of urine to its elimination from the body:

1. Major calyx
2. Minor calyx
3. Nephron
4. Urethra
5. Ureter
6. Collecting duct

Answer:

- a) 3,1,2,6,5,4
- b) 3,6,2,1,5,4
- c) 2,1,3,6,5,4
- d) 6,3,2,1,5,4

Question 62

Which of the following would you expect to find in a patient who has chronic diabetic ketoacidosis?

Answer:

- a) Decreased renal HCO_3^- excretion, increased NH_4^+ excretion, increased plasma anion gap
- b) Increased renal HCO_3^- production, increased NH_4^+ excretion, decreased plasma anion gap
- c) Decreased urine pH, decreased renal HCO_3^- excretion, increased arterial Pco_2

- d) Increased respiration rate, decreased arterial P_{CO_2} , decreased plasma anion gap
- e) Increased NH_4^+ excretion, increased plasma anion gap, increased urine pH

Question 63

The main hormone that acts on the kidneys to regulate sodium ion concentration of the extracellular fluid (ECF) is:

Answer:

- a) ADH
- b) Aldosterone
- c) Secretin
- d) Epinephrine
- e) Renin

Question 64

The most common urinary malignancy of childhood is:

Answer:

- a) Neuroblastoma
- b) Rhabdomyosarcoma
- c) Renal cell carcinoma
- d) None of the above

Question 65

The formation of uric acid from purines is catalyzed by:

Answer:

- a) Uricase
- b) Allantoinase
- c) Xanthine oxidase
- d) Adenylate deaminase
- e) Urease

Question 66

Which changes would you expect to find after administering a vasodilator drug that caused a 50% decrease in afferent arteriolar resistance and no change in arterial pressure?

Answer:

- a) Increased renal blood flow, increased GFR, and increased peritubular capillary hydrostatic pressure
- b) Increased renal blood flow, increased GFR, and no change in peritubular capillary hydrostatic pressure
- c) Decreased renal blood flow, decreased GFR, and decreased peritubular capillary hydrostatic pressure
- d) Decreased renal blood flow, decreased GFR, and increased peritubular capillary hydrostatic pressure
- e) Increased renal blood flow, increased GFR, and decreased peritubular capillary hydrostatic pressure

Question 67

Which of the following is TRUE regarding the prostate?

- (a) The blood supply to the prostate is from the pudendal artery
- (b) The majority of cancers originate from the central zone
- (c) The glandular elements drain into the urethra at the verumontanum
- (d) The prostate gland develops from the distal nephric ducts
- (e) Fibromuscular stroma makes up 70% of the prostate

Question 68

The "committed" step in purine biosynthesis is:

- (a) Ring closure of formamidolmidazole-carboxamide ribotide to form IMP
- (b) The synthesis of phosphoribosylamine
- (c) The formation of azaserine, which interferes with glutamine reactions
- (d) Ring closure of allantoin to reform uric acid

- (e) The synthesis of phosphoribosylpyrophosphate

Question 69

Two THFA-requiring steps of purine biosynthesis are:

- (a) Formation of aminoimidazole carboxylic acid ribonucleotide and inosinic acid from formylglycinamide ribonucleotide
- (b) Formation of formamidoimidazole carboxamide ribonucleotide
- (c) Formation of phosphoribosylamine and glycinamide ribonucleotide
- (d) Formation of formylglycinamide ribonucleotide and aminoimidazole carboxamide ribonucleotide
- (e) Formation of inosinic acid and adenylosuccinic acid

Question 70

What is the net renal tubular reabsorption rate of potassium in the patient described in Question 5?

- (a) 0.200 mmol/min
- (b) 0.090 mmol/min
- (c) 0.020 mmol/min
- (d) 0.040 mmol/min
- (e) 0.110 mmol/min
- (f) Potassium is not reabsorbed in this example

Question 71

Which change tends to increase urinary calcium (Ca^{++}) excretion?

- (a) Increased plasma parathyroid hormone concentration
- (b) Decreased blood pressure
- (c) Metabolic alkalosis
- (d) Extracellular fluid volume expansion
- (e) Increased plasma phosphate concentration

Question 72

Phosphodiesterase 5 inhibitors cause:

- (a) Increased disintegration of free oxygen radicals

- (b) Increase cGMP levels
- (c) Increased NO levels in penile endothelium
- (d) Decreases cAMP levels
- (e) Increased (nitric oxide) NO breakdown

Question 73

Immunosuppressed patients are at a lower risk for UTIs compared to healthy individuals.

- (a) False
- (b) True

Question 74

Renal calculi are usually comprised of the following except which one?

- (a) Calcium oxalate
- (b) Uric acid
- (c) Magnesium phosphate
- (d) Cholesterol

Question 75

The chemically buffered combination of strong acids that dissociate completely in water with weak bases such as hydroxides leads to a:

- (a) Weak base and salt
- (b) Weak acid and a salt
- (c) Strong base and a salt
- (d) Weak acid and a strong base
- (e) Weak base and water

Question 76

The key enzyme of de novo synthesis of purine nucleotides is:

- (a) IMP dehydrogenase
- (b) PRPP glutamyl amido transferase
- (c) PRPP synthase
- (d) PRPP dehydrogenase

Question 77

Which of the following is one component of the muscle layer in the lower 1/3 of the ureter?

- (a) Transitional epithelium
- (b) Outer longitudinal
- (c) Transitional epithelium
- (d) Outer circular

Question 78

At which renal tubular sites would the concentration of creatinine be expected to be highest in a normally hydrated person?

- (a) Distal tubule
- (b) Collecting duct
- (c) End of the loop of Henle
- (d) The concentration would be the same in all renal tubular segments because creatinine is neither secreted nor reabsorbed
- (e) Glomerular filtrate
- (f) End of the proximal tubule

Question 79

The fatty tissue surrounding the kidneys is important because:

- (a) It ensures adequate energy of the adrenal glands to operate efficiently
- (b) It is necessary as a barrier between the adrenal glands and kidneys
- (c) It stabilizes the position of the kidneys by holding them in their normal position
- (d) It produces vitamin D

Question 80

The most valuable investigation in suspected urethral injury is:

- (a) Ascending cystography
- (b) Computed tomography (CT)
- (c) Ascending urethrography
- (d) Cystoscopy

Question 81

Kidney infections can lead to systemic symptoms and even sepsis.

- (a) False
- (b) True

Question 82

In adults under age 50, UTI prevalence in males is low.

- (a) True
- (b) False

Question 83

Testicular biopsy is least helpful in:

- (a) None of the above
- (b) Evaluation of bilateral absent vas with normal FSH
- (c) Evaluation of non-obstructive azoospermia
- (d) Inability to retrieve motile sperm from epididymis

Question 84

Which of the following would cause the greatest decrease in GFR in a person with otherwise normal kidneys?

- (a) Decrease in afferent arteriolar resistance 50%
- (b) Decrease in renal arterial pressure from 100 to 80 mm Hg in a normal kidney
- (c) Decrease in efferent arteriolar resistance 50%
- (d) 5 mm Hg decrease in Bowman's capsule pressure
- (e) Increase in proximal tubular sodium reabsorption 50%
- (f) Increase in glomerular capillary filtration coefficient 50%
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Question 85

• A 55-year-old male patient with hypertension has had his blood pressure reasonably well controlled by administration of a thiazide diuretic. At his last visit (6 months ago), his blood pressure was 130/75 mm Hg and his serum creatinine was 1 mg/100 ml. He has

been exercising regularly for the past 2 years but recently has reported knee pain and began taking large amounts of a nonsteroidal anti-inflammatory drug. When he arrives at your office, his blood pressure is 155/85 mm Hg and his serum creatinine is 2.5 mg/100 ml. What best explains his increased serum creatinine level?

- Answer:

- a. Increased muscle mass due to the exercise
- b. Increased afferent arteriolar resistance that reduced GFR
- c. Increased glomerular capillary filtration coefficient that reduced GFR
- d. Increased efferent arteriolar resistance that reduced GFR
- e. Increased angiotensin II formation that decreased GFR

-

- Question 86

- Which one of the following is NOT true of incontinence?

- Answer:

- a. It is normal in older children who sleep soundly
- b. It is never considered normal
- c. It is normal in children 2 years old or younger
- d. It can result from pressure on the bladder
- e. It occurs when we are unable to voluntarily control the external sphincter

-

- Question 87

- Inosine monophosphate (IMP) is the biological precursor of?

- Answer:

- a. Uridylic acid and cytidylic acid
- b. Purines and pyrimidines
- c. Adenylate and guanylate
- d. Uracil and thymine
- e. Orotate and uridylic acid

-

- Question 88

- Which of the following is one component of the muscle layer in the upper 2/3 of the ureter?

- Answer:

- a. Outer circular
- b. Transitional epithelium
- c. Transitional epithelium
- d. Outer longitudinal

-

- Question 89

- What is the space between the renal pyramids called?

- Answer:

- a. Medulla
- b. Renal columns
- c. Medullary ray
- d. Nephron
- e. Lobe

-

- Question 90

- A 59-year-old man with COVID-19 one week ago, history of hypertension and liver cirrhosis presents to his primary care physician with lower extremity edema. Physical examination reveals pitting edema from the ankles to the knees bilaterally. X-ray shows bilateral pneumonia, O₂ saturation 90%. The patient has begun on furosemide and standard management protocol for COVID-19. It is important for the physician to be aware of which of the following drug–drug interactions?

- Answer:

- a. Ototoxic when combined with thiazide diuretics
- b. Hyperkalemia with corticosteroids
- c. Potentiates nephrotoxicity, hypomagnesemia of amphotericin B, and ototoxicity of

amikacin

d. Improves orthostatic hypotension

-

- Question 91

- In the choice of anti-hypertensive medications, which of the following drugs is least likely to cause erectile dysfunction?

- Answer:

- a. Ganglion blockers

b. Diuretics

c. ACE inhibitors

d. Beta-adrenergic blockers

-

- Question 92

- A 55-year-old male patient with hypertension has had his blood pressure reasonably well controlled by administration of a thiazide diuretic. At his last visit (6 months ago), his blood pressure was 130/75 mm Hg and his serum creatinine was 1 mg/100 ml. He has been exercising regularly for the past 2 years but recently has reported knee pain and began taking large amounts of a nonsteroidal anti-inflammatory drug. When he arrives at your office, his blood pressure is 155/85 mm Hg and his serum creatinine is 2.5 mg/100 ml. What best explains his increased serum creatinine level?

- Answer:

- a. Increased efferent arteriolar resistance that reduced GFR

b. Increased glomerular capillary filtration coefficient that reduced GFR

c. Increased angiotensin II formation that decreased GFR

d. Increased muscle mass due to the exercise

e. Increased afferent arteriolar resistance that reduced GFR

-

- Question 93

- Phosphoribosyl-1-pyrophosphate (PRPP) is an intermediate in the synthesis of?

- Answer:

- a. Pyrimidine nucleotides

- b. All of the above

- c. Purines

- d. Purine nucleotides

- e. NAD^+

-

- Question 94

- Pyelonephritis is an infection of the?

- Answer:

- a. Bladder

- b. Prostate

- c. Urethra

- d. Ureters

- e. Kidneys

-

- Question 95

- Catheterization increases the risk of urinary tract infections.

- Answer:

- a. True

- b. False

-

- Question 96

- Which of the following laboratory findings is consistent with an intrinsic cause of acute kidney injury?

- Answer:

- a. BUN/Cr ratio of 20

- b. Fractional excretion of sodium (FENa) of 1%

- c. Urine Na of 50 mEq/L

d. Urine osmolality of 380 mOsm/L

-

- Question 97

- In a person with normal kidneys and normal lungs who has chronic metabolic acidosis, you would expect to find all of the following, compared with normal, except?

- Answer:

- a. Increased plasma HCO_3^- concentration

b. Decreased urine pH

c. Decreased plasma Pco_2

d. Decreased urine HCO_3^- excretion

e. Increased renal excretion of NH_4Cl

-

- Question 98

- A 22-year-old woman runs a 10-kilometer race on a hot day and becomes dehydrated.

Assuming that her ADH levels are very high and that her kidneys are functioning normally, in which part of the renal tubule is the most water reabsorbed?

- Answer:

- a. Cortical collecting tubule

b. Proximal tubule

c. Loop of Henle

d. Distal tubule

e. Medullary collecting duct

-

- Question 99

- When the dietary intake of K^+ increases, body K^+ balance is maintained by an increase in K^+ excretion primarily by which of the following?

- Answer:

- a. Decreased reabsorption of K^+ by the thick ascending limb of the loop of Henle

b. Increased K^+ secretion by the late distal and collecting tubules

- c. Decreased reabsorption of K^+ by the proximal tubule
- d. Shift of K^+ into the intracellular compartment
- e. Decreased glomerular filtration of K^+

-

- Question 100
- In the ascending limb of the loop of Henle?
- Answer:
 - a. The thin segment is freely permeable to water
 - b. The thick segment is permeable to water
 - c. The thin segment is not permeable to sodium and chloride
 - d. The thick segment moves ions out into interstitial spaces for reabsorption

Renal system

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