Kidney MCQs

1 At the junction of the renal papilla and the minor calyx, which two epithelial types are positioned facing each other, in th.is particular order?

A. Simple squamous and Simple cuboidal
B. Simple squamous and transitional
C. Transitional and Simple columnar
D. Simple columnar and Transitional
E. Simple columnar and simple cuboidal

2. The renal biopsies of patients with chronic kidney disease demonstrated atrophy of the cortical collecting duct. Which type of cells will exhibit abnormality?

A. Cuboid epithelial cells with microvilli
B. Cuboid epithelial cells with “empty“ cytoplasm
C. Cuboid epithelial cells with no microvilli
D. Columnar epithelial cells with microvilli
E. Squamous epithelial cells

3. In patients with proteinuria, which specific type of cells do you anticipate to find injured or lost through histological examination in the filtration membrane?

A. Columnar epithelial cells
B. Cuboid epithelial cells
C. Principal cells
D. Podocytes
E. Modified, Smooth muscle cells

4. Among the following cell types, which one is responsible for stimulating erythropoiesis in the red bone marrow?

A. Juxtaglomerular cells of afferent arteriole
B. Cuboid epithelial cells with microvilli of proximal convoluted tubule
C. Endothelium of the peritubular capillaries in renal cortex
D. Principal cells of collecting ducts
E. Macula densa cells in distal tubule

5. What is the tissue of origin for renal cell carcinoma (RCC) that develops in the epithelial cells of the proximal tubules?

A. Simple cuboid epithelium with microvilli
B. Simple cuboid epithelium with “empty“ cytoplasm
C. Simple cuboid epithelial cells with no microvilli
D. Simple squamous epithelium
E. Simple columnar epithelium

6. A patient with uncontrolled hypertension, the renin-angiotensin system (RAS) is being investigated. What components of the renin-angiotensin system should be scrutinized?

A. Fenestrated endothelium and Juxtaglomerular cells (granular cells)
B. Macula Densa and Juxtaglomerular cells
C. Macula Densa and Fenestrated endothelium
D. Podocytes and Juxtaglomerular cells (granular cells)
E. Juxtaglomerular cells and Podocytes

7. Which parts of the nephrons are present in the renal cortical labyrinth?

A. Proximal Convoluted tubule; Pars recta of proximal tubule; Pars recta of distal tubule
B. Proximal Convoluted tubule; Distal Convoluted tubule; Renal corpuscle
C. Renal corpuscle; Proximal Convoluted tubule; Pars recta of proximal tubule;
D. Pars recta of distal tubule; Distal Convoluted tubule; Renal corpuscle
E. Thin Loop of Henle; Thick Loop of Henle; Proximal Convoluted tubule

8. Which type of cells are impaired in patients with metabolic acidosis, leading to acid-base disturbances?

A. Principal cells
B. Cuboidal epithelial cells
C. Intercalated cells
D. Smooth muscle cells
E. Podocytes

9. A patient with diabetic nephropathy developed aberrant proliferation of mesangial cells that occurred between the tufts of glomerular capillary and produced excess production of matrix proteins. Which part of the nephron is impacted?

A. Papillary duct of Bellini

B. Thin loop of Henle

C. Renal Corpuscle

D. Macula Densa

E. Proximal tubule

10. Which one of the following structures contain the principal cells?

A. Collecting duct system

B. Loop of Henle

C. Bowman's capsule

D. Proximal tubule

E. Distal tubule

11. Which one of the following structures is present at the area cribrosa?

A. Medullary collecting duct

B. Major calyx

C. Papillary collecting duct of Bellini

D. Cortical collecting duct

E. Thick ascending loop of Henle

12. Tom is suffering from chronic kidney disease related anemia and he is treated with recombinant form of erythropoietin. Which one of the following kidney cells is impaired and cannot produce enough erythropoietin?

A. Juxtaglomerular cells of afferent arteriole

B. Endothelium of the peritubular capillaries in renal cortex

C. Simple cuboid epithelial cells with microvilli of proximal convoluted tubule

D. Macula densa cells in distal convoluted tubule

E. Principal cells of papillary duct of bellini

13. Which pair of epithelia performs exchange between thin loop of Henle and vasa recta?

A. Transitional; Simple squamous

B. Simple squamous; Simple squamous

C. Simple cuboid, with microvilli; Simple columnar

D. Simple cuboid; Transitional
E. Simple columnar; Endothelium

14. Which one of the following epithelia performs water reabsorption by ADH?

A. Fenestrated simple squamous
B. Simple squamous
C. Simple cuboid with microvilli
D. Podocytes
E. Simple columnar with short microvilli

15. During an episode of low blood pressure, the insufficient blood flow may cause acute renal tubular necrosis. Which of the following arteries monitors and maintains the normal blood pressure in the renal corpuscle?

A. Endothelium of vasa recta
B. Intraglomerular mesangial cells
C. Modified, cuboid epithelial cells in distal tubule
D. Modified, smooth muscle cells of tunica media in afferent arteriole
E. Extraglomerular mesangial cells

16. During an autoimmune process, the number of fenestrae in the endothelium of the glomerular capillaries may decrease. Which one of the following physiological processes will be affected?

A. Excretion
B. Filtration
C. Absorption
D. Secretion
E. Counter current multiplier

17. Infection and toxic drugs may damage the nephrons. Which one of the following physiological processes will be affected, if the loop of Henle of the juxtamedullary nephrons degenerate?

A. Excretion
B. Filtration
C. Absorption
D. Secretion
E. Counter current multiplier

18. During low sodium levels the macula densa signals to the juxtaglomerular cells. What two types of cells are involved in the signaling?

A. Simple cuboidal epithelium to smooth muscle
B. Tall simple cuboidal epithelium to modified smooth muscle
C. Modified simple squamous epithelium to modified smooth muscle
D. Tall simple columnar epithelium to modified simple cuboidal epithelium
E. Modified smooth muscle to Tall simple columnar epithelium

19. Which one of the following cells are also called Lacis cells and may function signaling between Macula Densa and Juxtaglomerular (granular) cells?

A. Fenestrated simple squamous
B. Intraglomerular mesangial cells
C. Extraglomerular mesangial cells
D. Podocytes
E. Principal cells

20. Which one of the following cells keeps the filtration membrane clean by phagocytosis?

A. Fenestrated simple squamous
B. Intraglomerular mesangial cells
C. Extraglomerular mesangial cells
D. Podocytes
E. Principal cells

21. Which one of the following cells activate Vitamin D?

A. Juxtaglomerular (granular) cells
B. Epithelial cells of proximal convoluted tubule
C. Endothelium of peritubular capillaries
D. Principal cells
E. Epithelial cells of distal convoluted tubule

22. A 50-year-old man was evaluated at the clinic because of edema of lower extremities accompanied by increased foam in the urine. Kidney biopsy revealed proliferation of the parietal cells of the Bowman's capsule (glomerular crescents). In their normal state, what type of epithelium do the parietal cells display?

A. Transitional
B. Simple squamous
C. Simple cuboid
D. Endothelial
E. Simple columnar

23. Where are the intercalated cells located?

A. Proximal tubule
B. Cortical collecting duct
C. Distal tubule
D. Medullary collecting duct
E. Papillary collecting duct of Bellini

24. Which of the epithelial junctions provide impermeability of urine in transitional epithelium?

A. Desmosomes
B. Hemi-desmosomes
C. Tight junctions
D. Adherens junctions
E. Connexons

25. A 6-year-old male child with diabetes exhibited protein in his urine (proteinuria). A renal biopsy was performed, and electron microscopy revealed an abnormal, thickened filtration basement membrane. Which two types of cells co-produce and share this basement membrane in a healthy individual?

A. Endothelium and podocytes
B. Intra-glomerular mesangial cells and podocytes
C. Fenestrated endothelium and intra-glomerular mesangial cells
D. Endothelium and intra-glomerular mesangial cells
E. Fenestrated endothelium and podocytes

26. Where does do the blood flow next from the peritubular capillaries?

A. Vasa recta
B. Arcuate artery
C. Renal vein
D. Interlobular artery
E. Interlobular vein

27. In an uncontrolled diabetic patient glucose will appear in the urine. Which of the following epithelium fails to reabsorb high levels of glucose?

A. Simple cuboidal
B. Simple squamous
C. Simple columnar
D. Pseudostratified columnar
E. Simple cuboidal with microvilli

28. Where is the macula densa located?

A. Distal tubule, urinary pole
B. Proximal tubule, urinary pole
C. Distal tubule, vascular pole
D. Afferent arteriole
E. Efferent arteriole

29. A tumor grew in the ureter, resulting in urine backflow, which led to hydronephrosis of the renal pelvis and calyces. Where does the urine accumulate next after backflow from the minor calyx?

A. Papillary collecting duct of Bellini
B. Loop of Henle
C. Bowman's space
D. Cortical collecting duct
E. Distal tubule

30. During diabetic nephropathy glomerular basement membrane thickening and albuminuria may develop. Where does the albumin appear first in the urine?

A. Collecting ducts
B. Distal tubule
C. Bowman's space
D. Proximal tubule
E. Loop of Henle

31. Thin Basement Membrane Disease is a rare inherited kidney disorder affecting the glomerular filtration membrane causing hematuria and proteinuria. Which of the following collagen genes mutated?

A. Type I
B. Type II
C. Type III
D. Type IV
E. Type V

32. Which one of the following structures represents the junction between microscopic part and macroscopic part of urine flow?

A. Cortical Collecting tubule
B. Major calyx
C. Area cribrosa
D. Medullary Collecting duct
E. Thick ascending loop of Henle

33. Which two epithelia is engaged in the exchange between thin loop of Henle and vasa recta when sodium is secreted from blood?

A. Transitional; Simple squamous
B. Simple squamous; Simple squamous
C. Simple cuboid, with microvilli; Simple columnar
D. Simple cuboid; Transitional
E. Simple columnar; Endothelium

34. Which one of the following cell types modified to secrete renin?

A. Endothelium of afferent arteriole
B. Cuboid epithelial cells in proximal tubule
C. Cuboid epithelial cells in distal tubule
D. Smooth muscle cells of afferent arteriole
E. Podocytes

35. A 56-year-old male patient was hospitalized due to the presence of blood in the urine (gross hematuria) and pain in the side of the body (flank pain). An abdominal ultrasound scan revealed the presence of a 4 cm tumor located at the lower portion of the left kidney. Following surgical removal of the kidney, the histological examination confirmed a diagnosis of Bellini duct carcinoma. Which type of epithelium underwent malignant transformation?

A. Simple cuboidal
B. Simple squamous
C. Simple cuboidal with microvilli
D. Podocytes
E. Simple columnar with short microvilli

36. Which tubules/ducts are present in the medullary ray of renal cortex?

A. Thin Loop of Henle; Thick Loop of Henle; Proximal Convoluted tubule
B. Distal Convoluted tubule; Papillary collecting duct of Bellini; Thin Loop of Henle
C. Pars recta of proximal tubule; Pars recta of distal tubule; Medullary collecting duct
D. Pars recta of proximal tubule; Pars recta of distal tubule; Cortical collecting duct
E. Proximal Convoluted tubule; Pars recta of proximal tubule; Pars recta of distal tubule

37. Which one of the following structures of the kidney is affected by the aldosterone?

A. Collecting duct system
B. Thin loop of Henle
C. Bowman's capsule
D. Proximal tubule
E. Thick descending loop of Henle

38. What type of epithelial cells are named principal cells in the renal cortex?

A. Squamous
B. Light cuboidal
C. Dark cuboidal
D. Columnar with short microvilli
E. Cuboidal with microvilli

39. Amy had a urinary catheterization. The catheter was inserted into her urinary bladder, and she suffered urinary tract infection afterwards. Which one of the epithelia is inflamed in her bladder?

A. Stratified squamous and no keratin
B. Stratified squamous and thin keratin
C. Stratified squamous and thick keratin
D. Transitional
E. Stratified Columnar

40. An 18 year old female presented to the clinic with high blood pressure. The blood plasma renin and aldosterone was high. The diagnosis was, reninoma, a tumor of renin-secreting cells. Which type of cell is responsible for this condition?

A. Simple squamous epithelium of the peritubular capillaries
B. Simple cuboid epithelial cells with microvilli of proximal convoluted tubule
C. Tall simple cuboid epithelial cells in distal convoluted tubule
D. Columnar epithelial cells with microvilli of papillary collecting duct of Bellini
E. Modified smooth muscle cells of tunica media of afferent arteriole

41. Which one of the following locations in the kidney have only thick loop of Henle?

A. Outer strip of outer medulla
B. Inner strip of outer medulla
C. Inner medulla
D. Papilla of inner medulla
E. Renal cortex

42. Which of the following two epithelia are crossed by molecules during secretion from peritubular capillary to distal convoluted tubule in the correct order?

A. Simple cuboidal with microvilli and simple squamous

B. Simple cuboidal and simple squamous
C. Simple squamous and simple cuboidal
D. Simple columnar and simple squamous
E. Simple squamous and simple squamous

43. Shedding of epithelial cells is a powerful defense mechanism to reduce the number of bacteria in the body. Which of the following infected epithelium is shedding in the penile urethra?

A. Stratified squamous and no keratin
B. Stratified squamous and thin keratin
C. Stratified squamous and thick keratin
D. Transitional
E. Pseudo-stratified columnar

44 Which one of the following blood vessels is called the 1st capillary bed of the kidney?

A. Vasa recta in medulla
B. Peritubular in cortex
C. Peritubular in medulla
D. Glomerular in cortex
E. Glomerular in medulla

45 Chromophobe renal cell carcinoma may arise from cells of the nephron. Cytokeratin 7 is used as a marker for differentiation from other types of renal cancer. Which type of epithelium will be labelled by this marker in the distal tubule?

A. Podocytes
B. Simple squamous
C. Simple cuboid with microvilli
D. Simple cuboid, no microvilli
E. Simple columnar with short microvilli

46 Which type of epithelium is producing and secreting the fluid in the prostatic gland?

A. Transitional

B. Simple squamous
C. Simple cuboidal
D. Pseudo-stratified columnar
E. Simple columnar

47 What is the correct order of the layers of the filtration membrane in the physiological order of filtration?

A. Podocytes; Fused Basement membrane; Fenestrated endothelium
B. Fused Basement membrane; Fenestrated endothelium; Podocytes
C. Fenestrated endothelium; Podocytes; Fused Basement membrane
D. Podocytes; Fenestrated endothelium; Fused Basement membrane
E. Fenestrated endothelium; Fused Basement membrane; Podocytes

48 Proteinuria is very common in uncontrolled diabetic patient. This may be related to damaged podocytes. Where are these cells located in the nephron?

A. Proximal tubule
B. Distal tubule
C. Thin Loop of Henle
D. Visceral layer of glomerular capsule
E. Parietal layer of glomerular capsule

49 Where is the simple squamous epithelium in the nephron?

A. Proximal tubule and Distal tubule
B. Distal tubule and Thin Loop of Henle
C. Thin Loop of Henle and Parietal layer of glomerular capsule
D. Collecting ducts and Visceral layer of glomerular capsule
E. Collecting ducts and Proximal tubule

50 When does the transitional epithelium first and last appear in the MALE lower urinary system, in order?

A. Minor calyx and Prostatic urethra
B. Ureter and Minor Calyx
C. Major calyx and Membranous urethra

D. Renal pelvis and urinary bladder

E. Minor calyx and Penile urethra

51 Which of the following is the correct order of the layers in urinary vesicle starting from the lumen?

A. Lamina propria, Transitional Epithelium, Inner circular smooth muscle, Outer longitudinal smooth muscle

B. Lamina propria, Transitional Epithelium, Inner longitudinal smooth muscle, Outer circular smooth muscle

C. Transitional Epithelium, Lamina propria, Inner circular smooth muscle, Outer longitudinal smooth muscle, Outermost circular smooth muscle

D. Transitional Epithelium, Lamina propria, Inner circular smooth muscle, Outer longitudinal smooth muscle, Outermost longitudinal smooth muscle

E. Transitional Epithelium, Lamina propria, Inner longitudinal smooth muscle, Outer circular smooth muscle, Outermost longitudinal smooth muscle

52 Kidney stone is passing through the proximal part of the ureter. Which of the following smooth muscle layers are causing severe colic pain, starting from lumen?

A. Inner circular and outer longitudinal
B. Inner longitudinal and outer circular
C. Inner longitudinal and outer circular and outermost longitudinal
D. Inner longitudinal and outer longitudinal and outermost circular
E. Inner circular and outer longitudinal and outermost longitudinal

53 In the outer zone of the medulla the pars recta of the proximal tubule abruptly narrows to the thin descending loop of Henle. Select how the epithelium is changed?

A. From simple cuboid to simple squamous
B. From simple squamous to simple squamous
C. From simple cuboid with microvilli to simple squamous
D. From simple cuboid with microvilli to simple columnar
E. From simple columnar to simple cuboidal

54 Which two structures in the kidney have similar histological features when viewed under a microscope?

A. Medullary collecting duct and thin loop of Henle

B. Papillary collecting duct of Bellini and Peri-tubular capillary
C. Cortical collecting duct and Glomerular capillary
D. Thick ascending loop of Henle and Peri-tubular capillary
E. Glomerular capillary and thin loop of Henle

55 A six-year-old male child exhibited symptoms of blood and protein in his urine (hematuria and proteinuria). A renal biopsy was performed, and electron microscopy revealed a thickened filtration basement membrane. Which two types of cells co-produce the basement membrane?

A. Endothelium and Podocytes
B. Intra-glomerular Mesangial cells and Podocytes
C. Fenestrated endothelium and Intra-glomerular Mesangial cells
D. Endothelium and Intra-glomerular Mesangial cells
E. Fenestrated endothelium and Podocytes

56 During a rat experiment, a single nephron was blocked with wax by micropuncture at a Bowman's space at the urinary pore. Which tubule would not be able to receive the filtrate?

A. Afferent arteriole
B. Distal convoluted tubule
C. Efferent arteriole
D. Proximal convoluted tubule
E. Cortical collecting duct

57 Which structures are located at the vascular pole of the renal corpuscle?

A. Proximal tubule
B. Glomerular capillary bed
C. Afferent and efferent arterioles
D. Macula Densa
E. Cortical collecting duct

58 Which of the following stromal cells is responsible for scaffolding the nephrons by Type III collagen?

A. Intra-glomerular Mesangial
B. Extra-glomerular Mesangial cells (Lacis cells)
C. Interstitial cells
D. Endothelium
E. Pericyte

59 When the urinary bladder is empty, how does the epithelium appear under the microscope?

A. Six to eight cells thick and flat epithelial cells at the surface
B. Six to eight cells thick and dome-shaped epithelial cells at the surface
C. Three layers of epithelial cells and flat epithelial cells at the surface
D. Three layers of epithelial cells and dome-shaped epithelial cells at the surface
E. Two to three cells thick and cuboidal epithelial cells at the surface

60. When the urinary bladder is empty, how does the epithelium appear under the microscope?

A. Stratified columnar-like epithelium
B. Stratified squamous-like, non-keratinized epithelium
C. Stratified cuboidal-like epithelium
D. Pseudo-stratified columnar-like epithelium
E. Stratified squamous-like, keratinized epithelium

61 During paracentesis of the urinary bladder, the needle passes through several layers, including the linea alba. What type of connective tissue is found in the linea alba?

A. Dense regular
B. Areolar
C. Loose irregular
D. Dense irregular
E. Reticular

62 In a mouse experiment with transitional cell carcinoma, the spread (metastasis) of the disease was observed under the microscope. Select the correct order of the layers of the urinary bladder, starting from the lumen, in the direction the tumor invades the wall.

A. Lamina propria, transitional epithelium, smooth muscle, adventitia
B. Smooth muscle, adventitia, lamina propria, transitional epithelium
C. Lamina propria, smooth muscle, adventitia, transitional epithelium
D. Transitional epithelium, smooth muscle, adventitia, Lamina propria
E. Transitional epithelium, lamina propria, smooth muscle, adventitia

63 Urine can be removed from the urinary bladder by a procedure called paracentesis. Select the correct order of the layers of the urinary bladder as the needle penetrates.

A. Lamina propria, transitional epithelium, smooth muscle, adventitia
B. Smooth muscle, adventitia, lamina propria, transitional epithelium
C. Adventitia, smooth muscle, lamina propria, transitional epithelium
D. Transitional epithelium, smooth muscle, adventitia, Lamina propria
E. Transitional epithelium, lamina propria, smooth muscle, adventitia

64 A 45-year-old male patient presented with complaints of persistent lower abdominal pain and frequent urination. During cystoscopy, inflammation of the trigone was discovered. What is the histology of the trigone when the urinary bladder is empty and when it is full, in order?

A. Transitional epithelium with rugae; Transitional epithelium without rugae
B. Transitional epithelium without rugae; Transitional epithelium with rugae
C. Transitional epithelium with rugae; Transitional epithelium with rugae
D. Transitional epithelium without rugae; Transitional epithelium without rugae
E. Stratified squamous epithelium without rugae; Transitional epithelium without rugae

65 Patients with chronic kidney disease (CKD) and kidney failure can be treated by using the peritoneum as a natural filter to remove waste products from the blood (peritoneal dialysis). One side effect is that the peritoneal tissue is gradually replaced by fibrous connective tissue. What type of cells are damaged during this procedure?

A. Fibroblast
B. Mesothelial cells
C. Principle cells
D. Podocytes
E. Intercalated cells