# Kidney function test

*Q: What is the most superior kidney function test?*
Serum Creatinine.

*Q: 77 year-old male patient came to the clinic with sudden lower back pain, a serum creatinine analysis was done and the serum creatinine level was 0.55mg/dL, calculate the glomerular filtration rate knowing that the patient's body weight is 63kg.*

GFR = (K * (140-age) * body weight) / serum creatinine μmol/L
To convert mg/dL to μmol/L we need to multiply by 88.4
Serum creatinine = 0.55 * 88.4 = 48.62μmol/L
GFR = (1.23 * 63 * 63)/48.62μmol/L
GFR=100.408 mL/min

*Q: Creatinine Clearance test is only recommended in?*

Early renal disease. Assessment of kidney donors.
Detection of renal toxicity of nephrotoxic drugs.

*Q: Specify the normal values of the following electrolytes.*
*Potassium:* 3.5-5.5mEq/L
*Sodium:* 135mEq/L
*Calcium:* 8.6-10 mg/dL

**1) The nephron is composed of** :
A. Glomerulus
B. Renal tubules
C. Collecting duct
D. Both A & B

2) **Creatinine secreted by renal tubules equals what percentage of urinary creatinine** :
A. 5%
B. 10%
C. 15%
D. 20%

3) **Urea formation is increased with** :
A. Diet without meat
B. High carbohydrate diet
C. Cushing syndrome
D. Protein anabolism

4) **To measure glomerular filtration you need a substance that is** :
A. Endogenous
B. Exogenous
C. Has a limited filtration
D. Reabsorbed by renal tubules

5) **Serum creatinine is used for** :
A. Confirm the diagnosis of renal disease.
B. Give an idea about the severity of the disease.
C. Follow up the treatment.
D. All of the above

6) **Creatinine clearance is used for** :
A. Minor renal impairment.
B. Renal failure.
C. glomerulonephritis.
D. Cystitis

1/D 2/B 3/C 4/A 5/D 6/A

# Chemical examination of urine

*Q: Give an example of a pre-renal proteinuria.*
Multiple Myeloma.

*Q: How can it be diagnosed?*
Serum electrophoresis and Immunoelectrophoresis.

*Q: One of the most important diagnostic features of multiple myeloma in the serum is?*
Elevated levels of light-chain monoclonal antibodies called Bence-Jones protein.

Q: What are the conditions which cause presence of bilirubin in the urine?
Hepatocellular damage & bile duct obstruction (either due to stones or tumors)

Q: What are the conditions which cause presence of high urobilinogen in the urine? Hemolytic anemia & hepatocellular damage.

**1) The presence of intact RBC in urine is termed as:**
A. hematouria
B. hemoglobinuria
C. Choluria

**2) One of the clinical presentations of hepatocellular damage is:**
A. Urobilinogen
B. hemoglobinuria
C. glucosuria

**3) A child was presented with Increased pressure on the renal vein in the vertical position and proteinuria . What is the diagnosis ?**
A. Multiple myeloma
B. Microalbuminuria
C. Orthostatic (Postural) Proteinuria

**4) Which of the following is a normal major urine component :**
A. Na
B. protein
C. glucose

**5) In which case of proteinuria proteins have low molecular weight:**
A. pre-renal
B. Post-renal
C. Tubular
D. Glomerular

**6) In chronic nephritis:**
A. high glomerular permeability.
B. Filtration of high molecular weight.
C. Low tubular reabsorption.
D. Low glomerular permeability.

1/A 2/A 3/C 4/A 5/C 6/C

# Kidney stones

Q: What are the types of kidney stones?
Calcium salts 80%, Uric acid 8%, Mg ammonium $PO_4$ 10% & cystine

Q: What do the calcium salt stones mostly contain? Ca-Oxalate

Q: In primary hyperoxaluria what is the urinary oxalate excretion? More than 400μmol/24 hours

Q: What is the dietary method of treatment for calcium salt stone?
Oxalate-restricted diet, increased fluid intake if there is glomerular failure & acidification of urine through diet changes.

Q: Numerate the types of kidney stones and the main differences in structure and treatment.

1) Calcium Salt stones: White, hard & radio opaque. Form in alkaline urine.
Treatment: primary cause treatment, increase fluid intake, oxalate restricted diet & acidification of urine.

2) Uric Acid stones: Yellowish, small, friable & radio lucent. Visualized by ultrasound. Form in acidic urine
Treatment: treatment of cause of hyperuricemia, purine-restricted diet, increased fluid intake and alkalization of urine.

3) Struvite kidney stones (Mg ammonium $PO_4$): Form in alkaline urine. Makes up the majority (75%) of staghorn stones. Due to chronic urinary tract infections.
Treatment: Treatment of infection, percutaneous nephrolithotomy (in some cases only), increased fluid intake & urine acidification.

4) Cystine stones: Faint radio-opaque (shows very slightly), Form in acidic urine.
Treatment: Penicillamine (solubilizes cystine), increased fluid intake & alkalization of urine.

Q: Give some examples for stone-forming inhibitors. Citrate, Pyrophosphate & glycoprotein

**1) Most common type of stone is :**
A. Calcium
B. Mg ammonium PO4
C. Uric acid
D. cysteine

**2) Patient with Hyperoxaluria Was found to have stones. What is the most probable constituent of these stones ?**
A. Calcium phosphate
B. Uric acid
C. Cysteine
D. Calcium Oxalate

**3) Calcium stones are treated by**
A. Alkalization of urine
B. Acidification of urine
C. Penicillamine
D. None

**4) Uric acid stones are visualized by**
A. X-ray
B. IV-Pyelogram
C. ultrasound
D. B and C

**5) Infections are associated with what type of stone**
A. Calcium
B. Mg ammonium PO4
C. Uric acid
D. cysteine

**6) Patient with stone reported to be Staghorn shaped. Most probable type is ?**
A. Calcium phosphate
B. Uric acid
C. Mg ammonium PO4
D. Calcium Oxalate

1/A 2/D 3/B 4/D 5/B 6/C

# Inborn errors of Amino acids

1. **When phenyllactate, phenylacetate, and phenylpyruvate got excreted in urine, they will cause :**

A. maple syrup odor.
B. black color.
C. mousy odor.
D. non of above.

2. **Which one of the following is a neurotransmitter?**

A. Tyrosine
B. Tryptophan
C. Phenylalanine
D. Serotonine

3. **Which one of the following is a symptom of PKU?**

A. Physical disability .
B. Seizures .
C. Black pigmentation.
D. Heart disease.

4. **In hypopigmentation, which statement of the following is not true:**

A. It can occur due to the absence of BH4.
B. It occurs due to a deficiency of tyrosinase.
C. The tyrosine is defect.
D. Usually associated with some CNS symptoms.

5. **Homocysteinuria is due to defect in.**

A. Cystathionine b-synthase.
B. Tyrosine.
C. BH4.

6. **Vitamin ..... Is a cofactor :**

A. B12.
B. B6.
C. B1.
D. D3.

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7. **Alkaptouria is characterized by:**

A. Black pigmentation of cartilage.
B. black color.
C. Skeletal abnormalities .
D. Mental retardation.

8. **All of the following can cause Atypical PKU, except:**

A. Dihydropteridine reductase deficiency .
B. Dihydropteridine synthase deficiency
C. Carbinolamine dehydratase deficiency
D. Phenylalanine hydroxylase deficiency

9. **Albinism is caused by a Deficiency of :**

A. Phenylalanine hydroxylase.
B. tyrosinase
C. Cystathionine beta-synthase
D. Dihydropteridine reductase

10. **Hyperhomocysteinemia**

A. spina bifida
B. atherosclerosis
C. Heart diseases
D. All of the above.

11. **In Maple Syrup urine disease, Branched amino acids and their corresponding alpha-keto acids accumulate in the blood**

A. T
B. F

1/C 2/D 3/B 4/B 5/A 6/C 7/A 8/D 9/B 10/D 11/A

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Good Luck ..