**Liver Function tests**

Liver is a large organ (1.6 kg wt.). 70% of blood supply by portal vein & only 30 % by hepatic artery. Its shares with the kidney in the excretory or detoxifying and product of metabolism.

**Function of livers:**

1. Circulatory function: Transfers blood (postal systemic circulations & blood storage (regulation of blood volume) .
2. Excretory function: bile , conjugated bilirubin, cholesterol , bile salt , heavy metals & dye (bromsulphathalin).
3. Metabolic function: CHO. Protein, lipid, minerals & vitamins.
4. Protective function & detoxification: kupffer cells activity in removing foreign bodies from the blood (phagocytosis), conjugation, methylation, oxidation, reduction & conversion of ammonia into urea.
5. Haematolytic function: blood formation in embryo, plasma protein synthesis (except immunoglobulins) & most of coagulation factors (VII, IX, X, prothrombine , fibrinogen) which need Vit. K for production.
6. Storage function: Glycogen, lipid, Vit A, D, B12 .

**Bilirubin metabolism :**





**Jaundice (icterns):**

When the bil. In the blood exceeds 1.2 mg/dl(19 Mmol/L) hyperbilirubinaemia exists, so lead to accumulation of bil. in the blood & diffuse into the tissues which then become yellow & the condition called jaundice or icterus.

This may be:

1. Pre-hepatic jaundice (Haemolytic Jaundice):

An increase rate of bil. production that exceeds normal excretory capacity like neonatal physiological jaundice, acute & chronic haemolytic anaemia.

1. Hepatic jaundice (Hepatocellular juandice):

The normal load of bil. cann't be conjugated &/or exercted by damaged liver cells due conjugated failure, biliary transport failure, hepatocellular necrosis or intrahepatic obstruction.

1. Post –Hepatic jaundice (obstructive jaundice):

Reduced biliary flow that conjugated bil. cann't flow into the intestine due to stone, neoplasm, or spasm of biliary canaliculi.



**Neonatal physiological jaundice:**

Transient condition. Most common cause of unconjugated hyper-bilirubinaemia. In first few days of life. It results from an accelerated haemolysis & an immature hepatic system (for uptake, conjugation(reduced activity of UDP glucoronyl transferase), & secretion of bil.). The concentration of unconj. bil. exeeds that which can be tightly bound to albumin, this can lead to production of unbound free unconj. bil. (lipid soluble) & can enter & damage brain cells (neonatal kernicturus) .

**Inherited hyperbilirubinaemia:**

1. Unconjugated hyperbilirubinaemia:
2. Gilbert's disease: common, at any age. Plasma bil. May exceed 3 or 6 mg/dl due to defect in hepatic clearance of bil. Due to either a defect in the uptake of bil. by liver cells or reduced activity of UDP gluronyl transferase enzyme.
3. The Grigler-Najjar syndrom:deficiency of UDP glucuronyl transferase enzyme either partial (type I) or complet (type II). Unconj. bil. may exceed the binding capacity of plasma albumin kernicturus .
4. Conjugated hyperbilirubinaemia: in both conditions there is a defect in hepatic excretion of conj. bil. Bile.
5. Dubin – johnson syndrom: bil. appaers in urine. Hepatomegaly & the live is pigmented .
6. Roto syndrom: bil. appears in urine. Hepatomegaly but the liver is not pigmented.

 Unconj. Bil.

 Gilbert's disease

UDP Glucuronyl Transferase

Conjugated bil.

 Grigler- Najjar

 Syndrom(I&II)

 Dub.- Jon.

& Rotor syndroms bile

**Pathological process in liver disease:**

They may be present singly or in combination.

1. Liver –cell damage:
2. Viral hepatitis (A,B,C,…….., Delta) .
3. Infectiors mononucolsus.
4. Toxin or drugs such as paracetamol (acetaminophen), carbon tetrachorid or alcohol.
5. Hypoxia & / or congesion such as occur in congestive cardiac failure & shock .
6. Cellular destruction of known or unkown cause.
7. Chronic hepatitis .
8. Secondary to prolonged biliary obstruction.
9. Tumour deposit .
10. Cholestasis: (impraired secretion of bile)
11. Intrahepatic : a- viral hepatitis b- some druge like chloropromazine (Largectil) c- cholengitis d- biliary atresia e- liver cirhosis f- infiltration of liver (hodgkin's disease, malignancy) g- intrahepatic atresia.
12. Extrahepatic: a- gall stone b- carcinoma of head of pancrease c- fibrosis of bile duct d-external pressure by tumour or glands e- extrahepatic biliary atresia.
13. Reduced –functioning tissue mass:

The synthetic and metabolic functions of liver are impaired like in chronic liver damage.

**The importance of liver function tests:**

1. To assess the severity of liver damage.
2. To defferentiate different types of jaundice.
3. To find out the presence of latent liver disease.