

# LIVER FUNCTION TESTS

By

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## INDICATIONS OF LIVER FUNCTION :

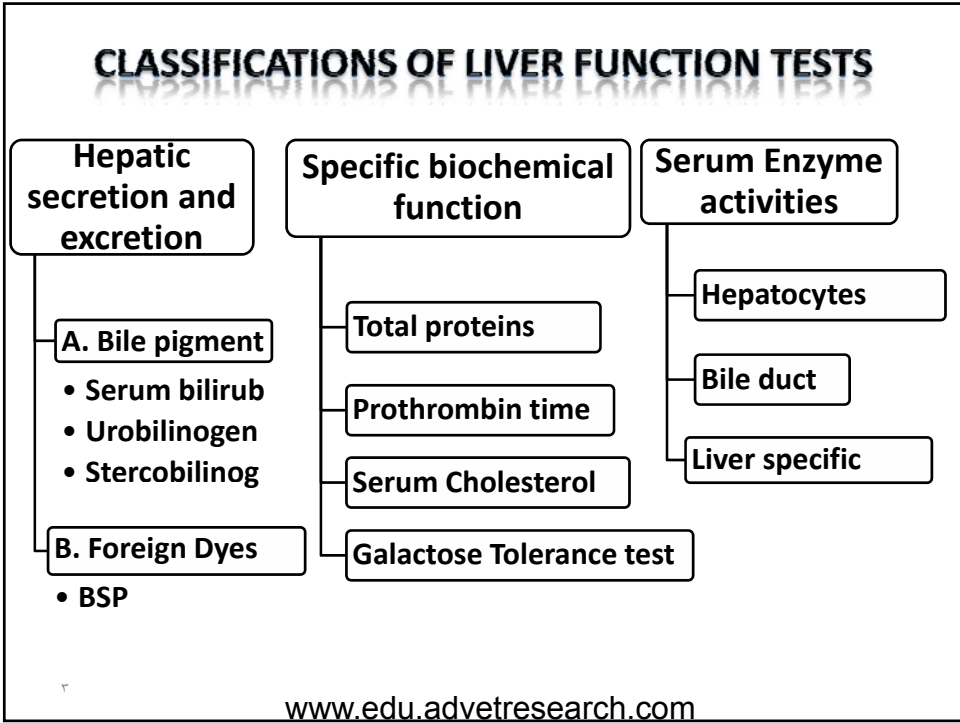
Detection of hepatic dysfunction.

Differentiation for types of Jaundice.

Evaluation for the prognosis of hepatic disease.

Evaluation of therapy.

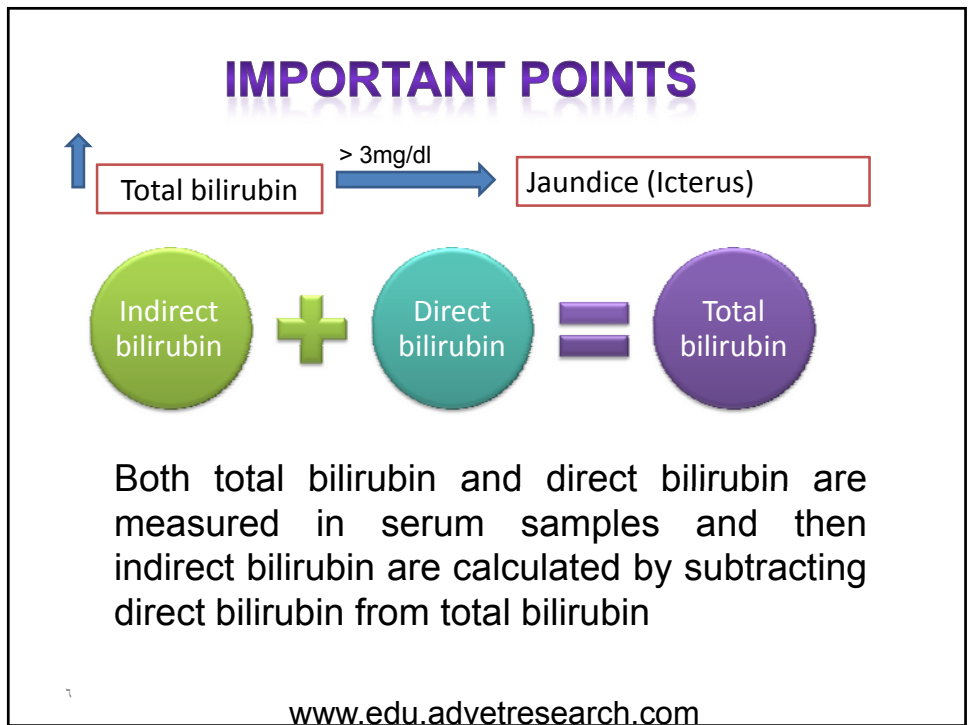
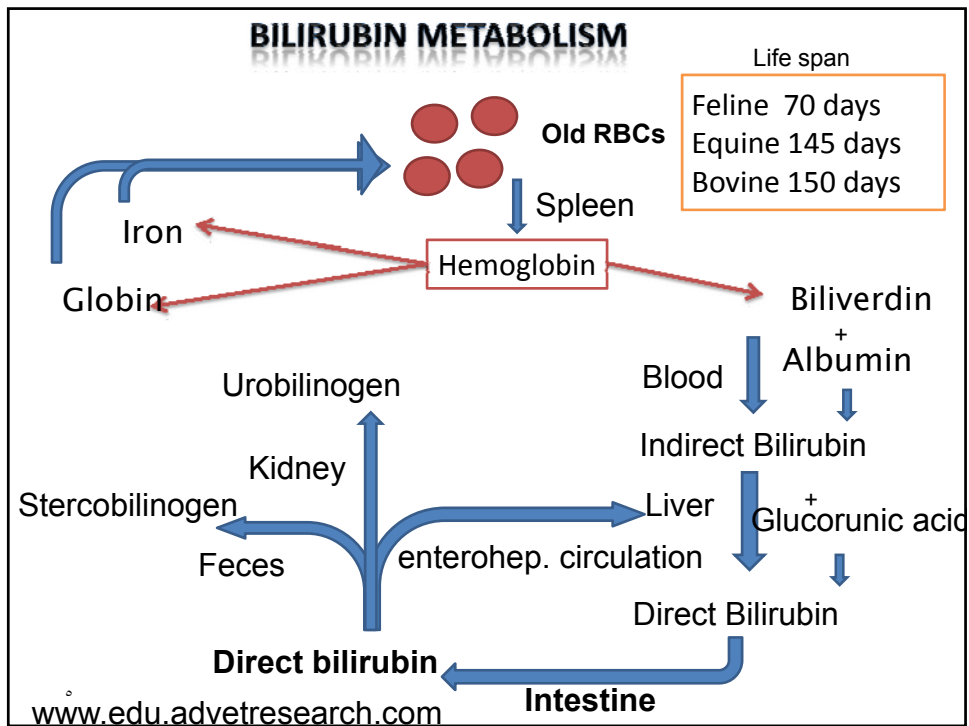
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# I. HEPATIC SECRETION AND EXCRETION

## A. BILE PIGMENT

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## Jaundice

**Jaundice or icterus** is defined as the yellowish pigmentation of skin and mucous membranes especially conjunctiva and sclera, as a consequence of increased blood bilirubin level.

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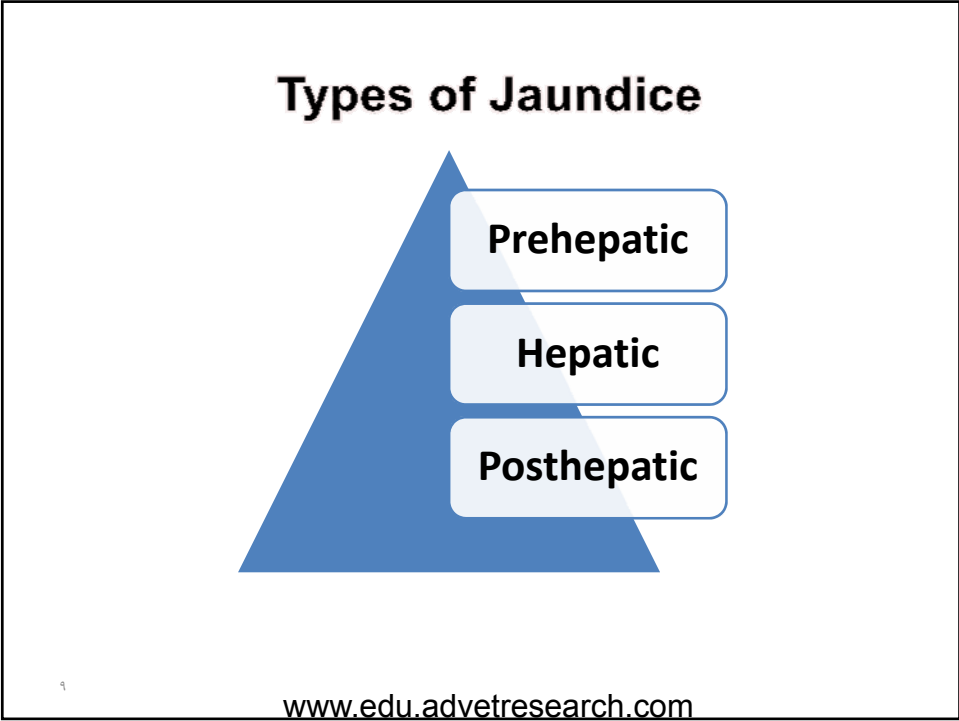
## Jaundice

There are two forms of bilirubin in the blood circulation, which are direct or conjugated and indirect or unconjugated bilirubin. The increase of any one of them result in increased the total bilirubin level, which cause the yellowish color of skin.

Normally total bilirubin level in adult animals is below 1 mg/dl.

Jaundice occurs when the total bilirubin level become above 3 mg/dl.

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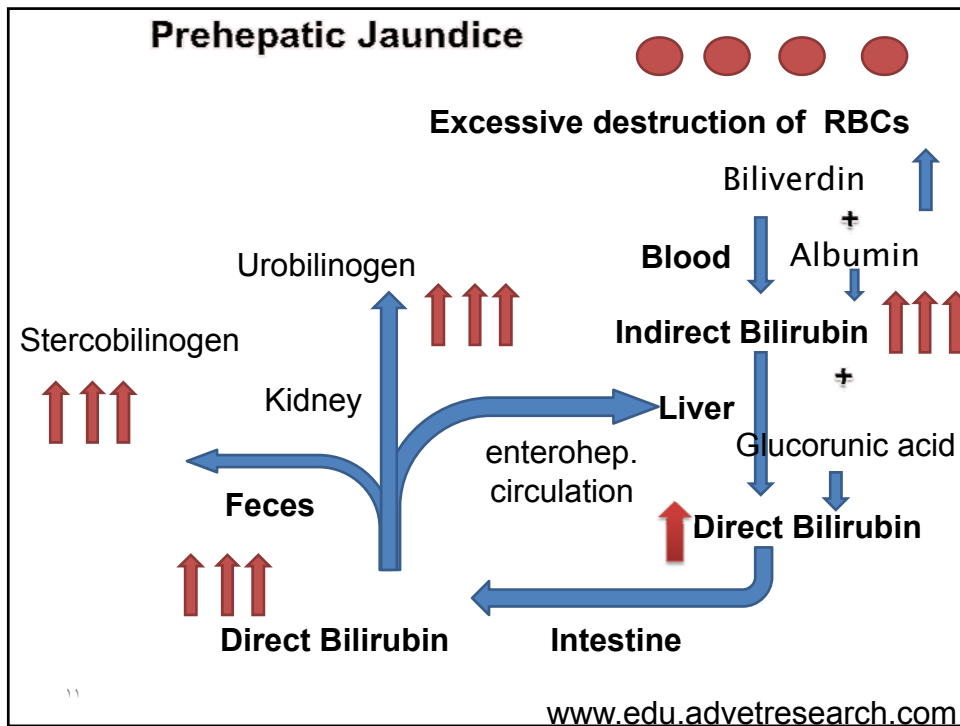


### Prehepatic Jaundice

### HEMOLYTIC JAUNDICE

10

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**Prehepatic jaundice**

**Indirect bilirubin is the dominant bilirubin in the blood**

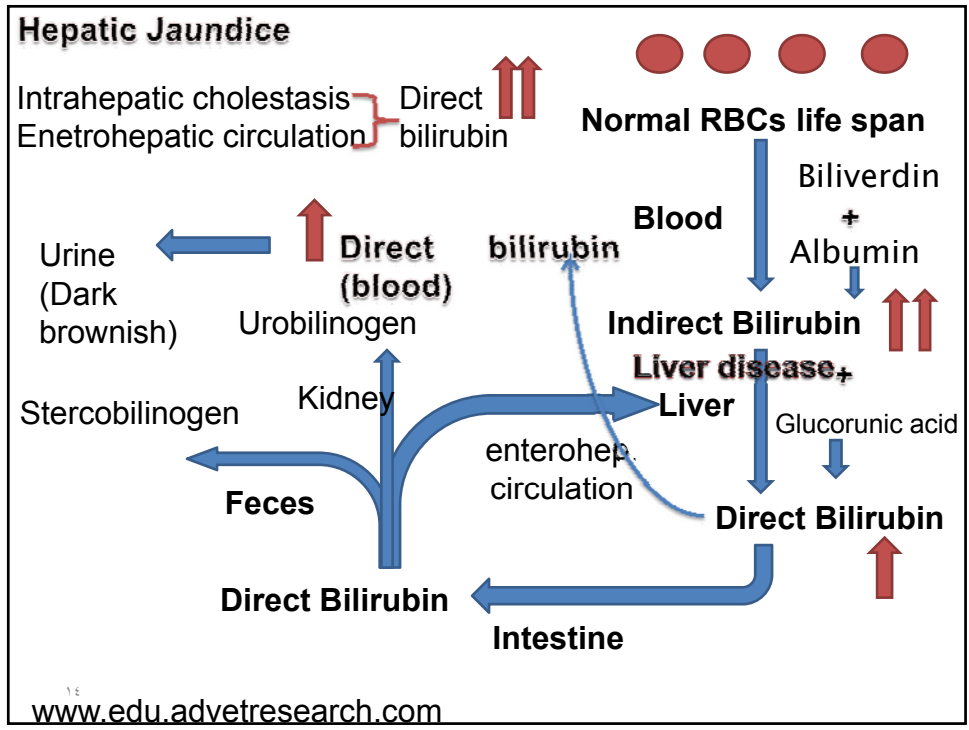
**Urobilinogen increased in urine**

**The color of feces is dark orange due to excess stercobilinogen**

**As a rule indirect bilirubin is not secreted in urine because it is bound to albumin .**

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# Hepatic Jaundice



## **HEPATIC JAUNDICE**

Both direct and indirect bilirubin increased in blood

Increase in total bilirubin mainly due to increase in both direct and indirect bilirubin

Direct bilirubin excreted in urine and results in change the color of urine to Dark brownish.

Normal urobilinogen level

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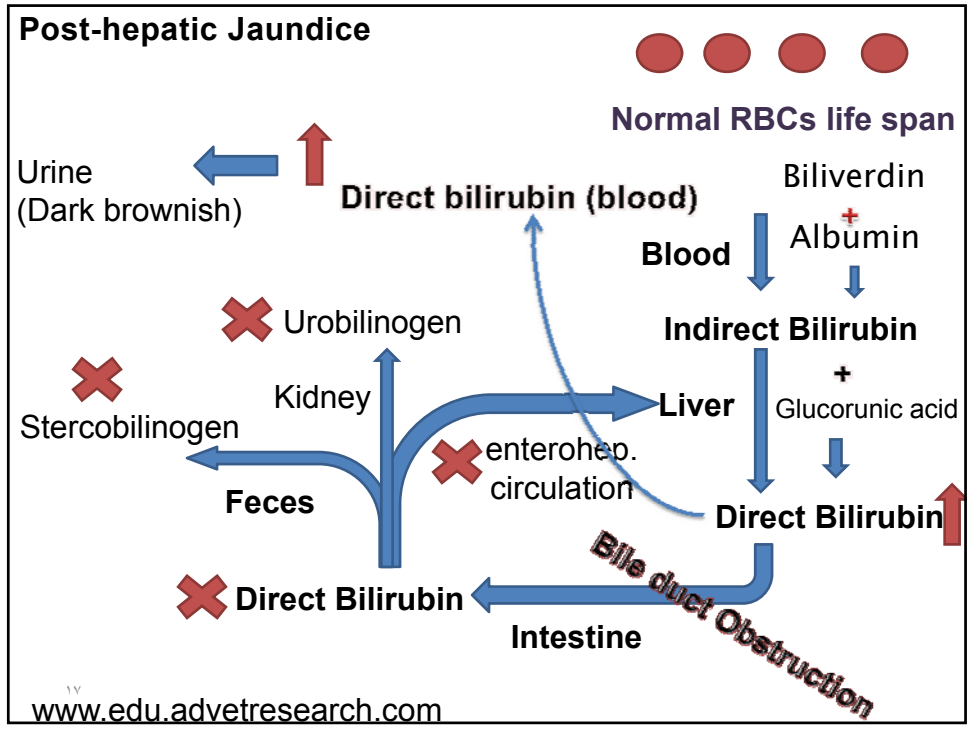
## **Post-hepatic Jaundice**

### **OBSTRUCTIVE JAUNDICE**

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## POST-HEPATIC JAUNDICE

Direct bilirubin is the main bilirubin in the circulation

Direct bilirubin excreted in urine and give the urine Dark brownish in color.

Urobilinogen is absent in urine

## **CONCLUSION**

**Direct bilirubin is excreted in urine in hepatic and obstructive jaundice.**

**Urobilinogen is absent from urine in obstructive jaundice**

**Both direct and indirect bilirubin increased in hepatic jaundice**

**Indirect bilirubin is the dominant in blood in cases of prehepatic jaundice**

**Direct bilirubin is the dominant in blood in cases of obstructive jaundice.**

19

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## **B. Foreign Dyes**

Dyes used are Sulphobromophthalein (Bromsulphothalin-BSP), rose Bengal & indocyanine green.

Dye is injected i/v and a sample of blood is withdrawn at 30 min. post injection.

The amount of dye retention in the blood serves as a measure of the degree of hepatic disease and blood.

20

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## **II-TESTS BASED ON SPECIFIC BIOCHEMICAL FUNCTION**

**A- Plasma protein level**

**B- Prothrombin time**

**C- Galactose tolerance test.**

**D- Blood cholesterol level**

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## **II-TESTS BASED ON SPECIFIC BIOCHEMICAL FUNCTION**

**A- Plasma protein level**

- Alterations are not specific for liver function.
- Hyperproteinemia with hypoalbuminemia and hyperglobulinemia indicate acute inflammation.
- Hypoproteinemia with hypoalbuminemia indicate severe liver disease ..... Edema

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## **II-TESTS BASED ON SPECIFIC BIOCHEMICAL FUNCTION**

### **B- Prothrombin time**

**The liver converts vitamin K to prothrombin.**

**Prolonged prothrombin time occurs in:**

- Obstructive jaundice where absence of bile from the intestine prevents absorption of vit. K.
- Severe hepatic disease that interfere with the synthesis of prothrombin in the hepatocytes.

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## **II-TESTS BASED ON SPECIFIC BIOCHEMICAL FUNCTION**

### **C- Galactose tolerance test.**

- Inject definite amount of galactose i/v.
- Estimate concentration of blood galactose at various intervals post injection.
- Slowly decreased galactose level in blood means liver disease.

### **D- Serum cholesterol level**

- Serum cholesterol is decreased in severe hepatic dysfunction.

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### **III-TESTS BASED ON SERUM ENZYME ACTIVITY**

#### **1. Enzymes released from the hepatocytes**

**Aspartate aminotransferase (AST)**

**Alanine aminotransferase (ALT)**

**Glutamic dehydrogenase (GD)**

**Sorbitol dehydrogenase (SD)**

**Lactate dehydrogenase (LDH)**

**Gama glutamyl transferase (GGT).**

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### **III-TESTS BASED ON SERUM ENZYME ACTIVITY**

#### **2. Enzymes released from the bile duct**

**Alkaline phosphatase (ALP)**

**Gama glutamyl transferase (GGT)**

#### **3. Liver specific enzymes**

**Gama glutamyl transferase (GGT)**

**Glutamic dehydrogenase (GD)**

**Sorbitol dehydrogenase (SD)**

**Alanine aminotransferase (ALT)....Human, dog and cat**

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