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## Medical Encyclopedia: Bilirubin

URL of this page: <http://www.nlm.nih.gov/medlineplus/ency/article/003479.htm>

### Alternative names

Total bilirubin; Unconjugated bilirubin; Indirect bilirubin; Conjugated bilirubin; Direct bilirubin

### Definition

Bilirubin is a breakdown product of hemoglobin. Total and direct bilirubin are usually measured to screen for or to monitor liver or gall bladder dysfunction.

### How the test is performed

Blood is drawn from a vein (venipuncture) or capillary. The laboratory centrifuges the blood to separate the serum from the cells and the bilirubin test is done on the serum.

### How to prepare for the test

Fast for at least 4 hours before the test. Your health care provider may instruct you to discontinue drugs that affect the test.

Drugs that can increase bilirubin measurements include allopurinol, anabolic steroids, some antibiotics, antimalarials, azathioprine, chlorpropamide, cholinergics, codeine, diuretics, epinephrine, meperidine, methotrexate, methyl dopa, MAO inhibitors, morphine, nicotinic acid, oral contraceptives, phenothiazines, quinidine, rifampin, salicylates, steroids, sulfonamides, and theophylline.

Drugs that can decrease bilirubin measurements include barbiturates, caffeine, penicillin, and high-dose salicylates.

### Why the test is performed

This test is useful in determining if a patient has liver disease or a blocked bile duct.

Bilirubin metabolism begins with the breakdown of red blood cells. Red blood cells contain hemoglobin, which is broken down to heme and globin. Heme is converted to bilirubin, which is then carried by albumin in the blood to the liver.

In the liver, most of the bilirubin is chemically attached to a glucuronide before it is excreted in the bile. This "conjugated" bilirubin is called direct bilirubin; unconjugated bilirubin is called indirect bilirubin. Total serum bilirubin equals direct bilirubin plus indirect bilirubin.

Conjugated bilirubin is excreted into the bile by the liver and stored in the gall bladder or transferred directly to the small intestines. Bilirubin is further broken down by bacteria in the intestines to urobilins, which contribute to the color of the feces. A small percentage of these compounds are reabsorbed and eventually appear in the urine,

where they are referred to as urobilinogen.

### Normal Values

- Direct bilirubin: 0 to 0.3 mg/dl
- Total bilirubin: 0.3 to 1.9 mg/dl

Note: mg/dl = milligrams per deciliter

Normal values may vary slightly from laboratory to laboratory.

### What abnormal results mean

Jaundice is the discoloration of skin and sclera of the eye, which occurs when bilirubin accumulates in the blood at a level greater than approximately 2.5 mg/dl. Jaundice occurs because red blood cells are being broken down too fast for the liver to process, because of disease in the liver, or because of bile duct blockage.

If the bile ducts are obstructed, direct bilirubin will build up, escape from the liver, and end up in the blood. If the levels are high enough, some of it will appear in the urine. Only direct bilirubin appears in the urine. Increased direct bilirubin usually means that the biliary (liver secretion) ducts are obstructed.

Increased indirect or total bilirubin may indicate:

- Erythroblastosis fetalis
- Gilbert's disease
- Hemolytic anemia
- Hemolytic disease of the newborn
- Physiological jaundice (normal in newborns)
- Sickle cell anemia
- Transfusion reaction
- Pernicious anemia
- Resolution of a large hematoma

Increased direct bilirubin may indicate:

- Bile duct obstruction
- Cirrhosis
- Crigler-Najjar syndrome (very rare)
- Dubin-Johnson syndrome (very rare)
- Hepatitis

Additional conditions under which the test may be performed:

- Biliary stricture
- Cholangiocarcinoma
- Cholangitis
- Choledocholithiasis
- Hemolytic anemia due to G6PD deficiency
- Hepatic Encephalopathy
- Idiopathic aplastic anemia
- Idiopathic autoimmune hemolytic anemia
- Immune hemolytic anemia

- Secondary aplastic anemia
- Drug-induced immune hemolytic anemia
- Thrombotic thrombocytopenic purpura
- Wilson's disease

### Special considerations

Interfering factors:

- Hemolysis of blood will falsely increase bilirubin levels
- Lipids in the blood will falsely decrease bilirubin levels
- Bilirubin is light-sensitive; it decomposes in light

### Update Date: 2/14/2005

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Review provided by VeriMed Healthcare Network.



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