MAYO CLINIC LABORATORIES

Test Definition: BILI3

Bilirubin, Serum

Overview

Useful For

Assessing liver function

Evaluating a wide range of diseases affecting the production, uptake, storage, metabolism, or excretion of bilirubin

Monitoring the efficacy of neonatal phototherapy

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
BILIT	Bilirubin Total, S	Yes	Yes
BILID	Bilirubin, Direct	Yes	Yes

Method Name

BILIT: Colorimetric
BILID: Photometric

NY State Available

Yes

Specimen

Specimen Type

Serum

Shipping Instructions

Ship specimen in amber vial to protect from light.

Necessary Information

Patient's age and sex are required.

Specimen Required

Supplies: Amber Frosted Tube, 5 mL (T915)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Amber vial
Specimen Volume: 1 mL
Collection Instructions:

1. Serum gel tubes should be centrifuged within 2 hours of collection.
2. Red-top tubes should be centrifuged, and the serum aliquoted into an amber vial within 2 hours of collection.

Forms

If not ordering electronically, complete, print, and send a Kidney Transplant Test Request with the specimen.

Specimen Minimum Volume

0.25 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	24 hours	LIGHT PROTECTED
	Ambient	6 hours	LIGHT PROTECTED
	Frozen	30 days	LIGHT PROTECTED

Clinical & Interpretive

Clinical Information

Bilirubin is one of the most frequently used tests to assess liver function. Approximately 85% of the total bilirubin produced is derived from the heme moiety of hemoglobin, while the remaining 15% is produced from red blood cell precursors destroyed in the bone marrow and from the catabolism of other heme-containing proteins. After production in peripheral tissues, bilirubin is rapidly taken up by hepatocytes where it is conjugated with glucuronic acid to produce bilirubin mono- and diglucuronide, which are then excreted in the bile.

A number of inherited and acquired diseases affect 1 or more of the steps involved in the production, uptake, storage, metabolism, and excretion of bilirubin. Bilirubinemia is frequently a direct result of these disturbances.

The most commonly occurring form of unconjugated hyperbilirubinemia is that seen in newborns and referred to as physiological jaundice.

The increased production of bilirubin, that accompanies the premature breakdown of erythrocytes and ineffective erythropoiesis, results in hyperbilirubinemia in the absence of any liver abnormality.

The rare genetic disorders, Crigler-Najjar syndromes type I and type II, are caused by a low or absent activity of bilirubin uridine 5'-diphospho--glucuronosyltransferase. In type I, the enzyme activity is totally absent, the excretion rate of bilirubin is greatly reduced, and the serum concentration of unconjugated bilirubin is greatly increased. Patients with this disease may die in infancy owing to the development of kernicterus.

In hepatobiliary diseases of various causes, bilirubin uptake, storage, and excretion are impaired to varying degrees. Thus, both conjugated and unconjugated bilirubin are retained and a wide range of abnormal serum concentrations of each form of bilirubin may be observed. Both conjugated and unconjugated bilirubins are increased in hepatitis, space-occupying lesions of the liver, and obstructive lesions such as carcinoma of the head of the pancreas, common bile duct, or ampulla of Vater.

Reference Values

Direct Bilirubin
> or =12 months: 0.0-0.3 mg/dL
Reference values have not been established for patients who are younger than 12 months of age.

Total Bilirubin
0-6 days: Refer to www.bilitool.org for information on age-specific (postnatal hour of life) serum bilirubin values.
7-14 days: 0.0-14.9 mg/dL
15 days to 17 years: 0.0-1.0 mg/dL
> or =18 years 0.0-1.2 mg/dL

Interpretation

The level of bilirubinemia that results in kernicterus in a given infant is unknown. In preterm infants, the risk of a handicap increases by 30% for each 2.9 mg/dL increase of maximal total bilirubin concentration. While central nervous system damage is rare when total serum bilirubin (TSB) is less than 20 mg/dL, premature infants may be affected at lower levels. The decision to institute therapy is based on a number of factors, including TSB, age, clinical history, physical examination, and coexisting conditions. Phototherapy is typically discontinued when TSB level reaches 14 to 15 mg/dL.

Physiologic jaundice should resolve in 5 to 10 days in full-term infants and by 14 days in preterm infants.

When any portion of the biliary tree becomes blocked, bilirubin levels will increase.

Cautions

Specimens should be protected from light and analyzed as soon as possible.

Grossly hemolyzed specimens should be rejected because hemoglobin inhibits the diazo reaction and falsely decreased results may be seen.

Compounds that compete for binding sites on serum albumin contribute to lower serum bilirubin levels (eg, penicillin, sulfisoxazole, acetylsalicylic acid).

Clinical Reference

1. Rifai N, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023
2. Scharschmidt BF, Blanckaert N, Farina FA, Kabra PM, Stafford BE, Weisiger RA. Measurement of serum bilirubin and its mono- and diconjugates: Applications to patients with hepatobiliary disease. Gut. 1982;23(8):643-649
3. Practice parameter: management of hyperbilirubinemia in the healthy term newborn. American Academy of Pediatrics. Provisional Committee for Quality Improvement and Subcommittee on Hyperbilirubinemia [published correction appears in Pediatrics 1995 Mar;95(3):458-61]. *Pediatrics*. 1994;94(4 Pt 1):558-565.

Performance

Method Description

Total Bilirubin:
Total bilirubin, in the presence of a suitable solubilizing agent, is coupled with 3,5-dichlorophenyl diazonium in a strongly acidic medium. The color intensity of the red azo dye formed is directly proportional to the total bilirubin and can be determined photometrically.(Package insert: Bilirubin Total Gen. 3. Roche Diagnostics; 01/2024)

Direct Bilirubin:
Conjugated bilirubin and delta bilirubin (direct bilirubin) react directly with 3,5-dichlorophenyl diazonium salt in acid buffer to form the red-colored azobilirubin. The color intensity of the red azo dye formed is directly proportional to the direct (conjugated) bilirubin concentration and is measured photometrically at 570 nm.(Package insert: Bilirubin Direct Gen.2 [Doumas standardization]. Roche Diagnostics; 12/2023)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 days

Specimen Retention Time

See Individual Unit Codes

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

Test Definition: BILI3

Bilirubin, Serum

CPT Code Information

82247-Bilirubin, total

82248-Bilirubin, direct

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BILI3	Bilirubin, S	34543-9

Result ID	Test Result Name	Result LOINC® Value
BILID	Bilirubin, Direct	1968-7
BILIT	Bilirubin Total, S	1975-2