MAYO CLINIC LABORATORIES

Test Definition: BILID

Bilirubin, Direct, Serum

Overview

Useful For
Evaluation of jaundice and liver functions

Method Name
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: 0.5 mL
Collection Instructions:
1. Within 2 hours of collection, centrifuge the specimen.
2. For serum gel tubes, aliquot serum into an amber vial within 6 hours. Protect from light.
3. For red top tubes, aliquot serum into an amber vial immediately. Protect from light.
4. Refrigerate or freeze serum.

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

Approximately 85% of the total bilirubin produced is derived from the heme moiety of hemoglobin while the remaining 15% is produced from the RBC 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 mono- and diglucuronide, which are excreted in the bile. Direct bilirubin is a measurement of conjugated bilirubin.

Jaundice can occur as a result of problems at any step in the metabolic pathway. Disorders may be classified as those due to increased bilirubin production (eg, hemolysis and ineffective erythropoiesis), decreased bilirubin excretion (eg, obstruction and hepatitis), and abnormal bilirubin metabolism (eg, hereditary and neonatal jaundice).

Inherited disorders in which direct bilirubinemia occurs include Dubin-Johnson syndrome and Rotor syndrome. Jaundice of the newborn where direct bilirubin is elevated includes idiopathic neonatal hepatitis and biliary atresia. The most commonly occurring form of jaundice of the newborn, physiological jaundice, results in unconjugated (indirect) hyperbilirubinemia. Elevated unconjugated bilirubin in the neonatal period may result in brain damage (kernicterus). Treatment options are phototherapy and, if severe, exchange transfusion.

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. In hepatobiliary diseases of various causes, bilirubin uptake, storage, and excretion are impaired to varying degrees. Thus, both conjugated and unconjugated bilirubin is retained and a wide range of abnormal serum concentrations of each form of bilirubin may be observed. Both conjugated and unconjugated bilirubin are increased in hepatocellular diseases such as hepatitis and 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

> or =12 months: 0.0-0.3 mg/dL
Reference values have not been established for patients <12 months.

Interpretation

Direct bilirubin levels must be assessed in conjunction with total and indirect levels and the clinical setting.

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 which may cause falsely low results.

Under the influence of intense blue light *in vivo* (eg, during phototherapy), circulating bilirubin is partly transformed into a water-soluble isomer called photobilirubin, a potential substrate for bilirubin tests. This photobilirubin fraction is rapidly eliminated *in vivo* but is detected by the assay and may lead to falsely elevated bilirubin results.

It is important to remember that in addition to the mono- and diglucuronide fraction, the direct bilirubin assay will also measure the delta bilirubin fraction. Delta bilirubin is a conjugated bilirubin that is covalently bound to albumin. Therefore, the clearance of delta bilirubin from the serum is similar to the clearance of albumin which has a half-life of approximately 21 days.

Clinical Reference

1. Rifai N, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023
2. Roche/Hitachi Modular Analytics Reference Guide, Vol 7

Performance

Method Description

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

1 week

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.

CPT Code Information

82248

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BILID	Bilirubin, Direct	1968-7

Result ID	Test Result Name	Result LOINC® Value
BILID	Bilirubin, Direct	1968-7