

## Overview

### Useful For

Measuring tauro- and glycol-conjugated and unconjugated bile acid constituents in serum

Monitoring patients receiving bile acid therapy, such as cholic acid, deoxycholic acid, or ursodeoxycholic acid

Aiding in the evaluation of liver function; evaluation of liver function changes before the formation of more advanced clinical signs of illness such as icterus

Determining hepatic dysfunction as a result of chemical and environmental injury

Indicating hepatic histological improvement in chronic hepatitis C patients responding to interferon treatment

Indicating intrahepatic cholestasis of pregnancy

### Highlights

Bile acids are elevated in individuals with liver dysfunction.

This bile acid test can be used in the diagnosis of intrahepatic cholestasis of pregnancy.

Fractionated bile acids, including tauro- and glycol-conjugates of cholic acid, chenodeoxycholic acid, deoxycholic acid, and ursodeoxycholic acid are individually summed and reported.

### Testing Algorithm

[See Ordering Guide: Bile Acid-Associated Tests](#) in Special Instructions.

### Special Instructions

- [Ordering Guide: Bile Acid-Associated Tests](#)

### Method Name

Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Advisory Information

This bile acid test is useful in diagnosing intrahepatic cholestasis of pregnancy.

Do not use this assay for the diagnosis of peroxisomal biogenesis disorders (see BAIPD / Bile Acids for Peroxisomal Disorders, Serum) or inborn errors of bile acid metabolism.

### Specimen Required

**Patient Preparation: Patient must be fasting for 12-14 hours.**

**Collection Container/Tube:**

**Preferred:** Red top

**Acceptable:** Serum gel

**Submission Container/Tube:** Plastic vial

**Specimen Volume:** 0.5 mL

**Forms**

If not ordering electronically, complete, print, and send a [Gastroenterology and Hepatology Client Test Request \(T728\)](#) with the specimen.

**Specimen Minimum Volume**

0.3 mL

**Reject Due To**

Gross hemolysis	OK
Gross lipemia	OK

**Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	90 days	
	Ambient	90 days	
	Frozen	90 days	

**Clinical and Interpretive**
**Clinical Information**

Bile acids are formed in the liver from cholesterol, conjugated primarily to glycine and taurine, stored and concentrated in the gallbladder, and secreted into the intestine after the ingestion of a meal. In the intestinal lumen, the bile acids serve to emulsify ingested fats and thereby promote digestion. During the absorptive phase of digestion, approximately 90% of the bile acids are reabsorbed.

The efficiency of the hepatic clearance of bile acids from portal blood maintains serum concentrations at low levels in normal persons. An elevated fasting level, due to impaired hepatic clearance, is a sensitive indicator of liver disease. Following meals, serum bile acid levels have been shown to increase only slightly in normal persons, but markedly in patients with various liver diseases, including cirrhosis, hepatitis, cholestasis, portal-vein thrombosis, Budd-Chiari syndrome, cholangitis, Wilson disease, and hemochromatosis. No increase in bile acids will be noted in patients with intestinal malabsorption. Metabolic hepatic disorders involving organic anions (eg, Gilbert disease, Crigler-Najjar syndrome, and Dubin-Johnson syndrome) do not cause abnormal serum bile acid concentrations.

**Reference Values**

Analyte	Normal (nmol/mL)
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Total Cholic Acid	< or =5.00
Total Chenodeoxycholic Acid	< or =6.00
Total Deoxycholic Acid	< or =6.00
Total Ursodeoxycholic Acid	< or =2.00
Total Bile Acids	< or =19.00

## Interpretation

Total bile acids are metabolized in the liver and can serve as a marker for normal liver function. Increases in serum bile acids are seen in patients with acute hepatitis, chronic hepatitis, liver sclerosis, liver cancer, and intrahepatic cholestasis of pregnancy.

## Cautions

This test does not measure sulfated bile acids.

## Clinical Reference

1. Tribe RM, Dann AT, Kenyon AP, et al: Longitudinal profiles of 15 serum bile acids in patients with intrahepatic cholestasis of pregnancy. *Am J Gastroenterol* 2010 Mar;105(3):585-595
2. Marschall HU: Management of intrahepatic cholestasis of pregnancy. *Expert Rev Gastroenterol Hepatol* 2015 Oct;9(10):1273-1279
3. Ducroq DH, Morton MS, Shadi N, et al: Analysis of serum bile acids by isotope dilution-mass spectrometry to assess the performance of routine total bile acid methods. *Ann Clin Biochem* 2010 Nov;47(Pt 6):535-540

## Performance

### Method Description

Bile acid concentrations in serum are measured by liquid chromatography-tandem mass spectrometry stable isotope dilution analysis. Serum is mixed with isotopically labeled internal standards of selected bile acids and then subjected to protein precipitation. Sample preparation is semi-automated using a liquid handler. Reverse-phase liquid chromatography is performed using mobile phases to separate free bile acids, their respective tauro- and glyco-conjugates and 2 bile acid precursors.(Unpublished Mayo method)

### PDF Report

No

### Day(s) and Time(s) Test Performed

Monday, Wednesday, Thursday, Friday; 8 a.m.

### Analytic Time

2 days (not reported on Saturday or Sunday)

### Maximum Laboratory Time

7 days

### Specimen Retention Time

1 month

**Performing Laboratory Location**

Rochester

**Fees and 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 Regional Manager. For assistance, contact [Customer Service](#).

**Test Classification**

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**

82542

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
BAFS	Bile Acids, Fractionated and Tot, S	43130-4

Result ID	Test Result Name	Result LOINC Value
35796	Total Cholic acid	30518-5
35797	Total Chenodeoxycholic acid	30519-3
35798	Total Deoxycholic acid	30520-1
35799	Total Ursodeoxycholic acid	55159-8
35800	Total bile acids	14628-2