MAYO CLINIC LABORATORIES

Test Definition: LIVPR

Liver Profile, Serum

Overview

Useful For
Screening for liver damage, especially if someone has a condition or is taking a drug that may affect the liver

Method Name
ALB, ALP, ALT, AST, BILID: Photometric
BILIT, TP: Colorimetric, Biuret

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: 0.6 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
0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated	7 days	

Clinical & Interpretive

Clinical Information

The hepatic function panel may be used to help diagnose liver disease if a person has signs and symptoms that indicate possible liver dysfunction. If a person has a known condition or liver disease, testing may be performed at intervals to monitor the health of the liver and to evaluate the effectiveness of any treatments. Abnormal tests on a liver panel may prompt a repeat analysis of one or more tests, or of the whole panel, to see if the elevations or decreases persist and may indicate the need for additional testing to determine the cause of the liver dysfunction.

Reference Values

TOTAL BILIRUBIN
0-6 days: Refer to http://bilitool.org/ for information on age-specific (postnatal hour of life) serum bilirubin values.
7-14 days: 0.0-14.9
15 days to 17 years: 0.0 -1.0
>18 years: 0.0-1.2

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.

ASPARTATE AMINOTRANSFERASE
Males
0-11 months: Not established
1-13 years: 8-60 U/L
> or =14 years: 8-48 U/L

Females
0-11 months: Not established
1-13 years: 8-50 U/L
> or =14 years: 8-43 U/L

ALANINE AMINOTRANSFERAASE
Males
> or =1 year: 7-55 U/L
Reference values have not been established for patients who are younger than 12 months of age.

Females
> or =1 year: 7-45 U/L
Reference values have not been established for patients who are younger than 12 months of age.

ALKALINE PHOSPHATASE
Males
4 years: 149-369 U/L
5 years: 179-416 U/L
6 years: 179-417 U/L
7 years: 172-405 U/L
8 years: 169-401 U/L
9 years: 175-411 U/L
10 years: 191-435 U/L
11 years: 185-507 U/L
12 years: 185-562 U/L
13 years: 182-587 U/L
14 years: 166-571 U/L
15 years: 138-511 U/L
16 years: 102-417 U/L
17 years: 69-311 U/L
18 years: 52-222 U/L
> or =19 years: 45-115 U/L

Females
4 years: 169-372 U/L
5 years: 162-355 U/L
6 years: 169-370 U/L
7 years: 183-402 U/L
8 years: 199-440 U/L
9 years: 212-468 U/L
10 years: 215-476 U/L
11 years: 178-526 U/L
12 years: 133-485 U/L
13 years: 120-449 U/L
14 years: 153-362 U/L
15 years: 75-274 U/L
16 years: 61-264 U/L
17-23 years: 52-144 U/L
24-45 years: 37-98 U/L
46-50 years: 39-100 U/L
51-55 years: 41-108 U/L
56-60 years: 46-118 U/L
61-65 years: 50-130 U/L
> or =66 years: 55-142 U/L

Reference values have not been established for patients who are younger than 4 years of age.

ALBUMIN
> or =12 months: 3.5-5.0 g/dL
Reference values have not been established for patients who are younger than 12 months of age.

TOTAL PROTEIN
> or =1 year: 6.3-7.9 g/dL
Reference values have not been established for patients who are younger than 12 months of age.

Interpretation

Hepatic function panel results are not diagnostic of a specific condition; they indicate that there may be a problem with the liver. In a person who does not have symptoms or identifiable risk factors, abnormal liver test results may indicate a temporary liver injury or reflect something that is happening elsewhere in the body, such as in the skeletal muscles, pancreas, or heart. It may also indicate early liver disease and the need for further testing and periodic monitoring.

Results of liver panels are usually evaluated together. Several sets of results from tests performed over a few days or weeks are often assessed together to determine if a pattern is present. Each person will have a unique set of test results that will typically change over time. A healthcare practitioner evaluates the combination of liver test results to gain clues about the underlying condition. Often, additional testing is necessary to determine what is causing the liver damage or disease.

Cautions

No significant cautionary statements

Clinical Reference

Kampfrath T. Liver Panel Test. Testing.com; Updated September 28, 2022. Accessed September 19, 2023. Available at https://www.testing.com/tests/liver-panel/

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)

Aspartate Aminotransferase:

Aspartate aminotransferase (AST) catalyzes the transfer of an amino group between L-aspartate and 2-oxoglutarate to form oxaloacetate and L-glutamate. The oxaloacetate then reacts with reduced nicotinamide adenine dinucleotide (NADH), in the presence of malate dehydrogenase to form L-malate and NAD[+]. Pyridoxal phosphate serves as a coenzyme in the amino transfer reaction. It ensures full enzyme activation. The rate of NADH oxidation is directly proportional to the catalytic AST activity. It is determined by measuring the decrease in absorbance.(Package insert: Aspartate Aminotransferase reagent. Roche Diagnostics; 01/2024)

Alanine Aminotransferase:
Alanine aminotransferase (ALT) catalyzes the transfer of an amino group between L-alanine and 2-oxoglutarate to form pyruvate and L-glutamate. The pyruvate then reacts with NADH in the presence of lactate dehydrogenase to form L-lactate and NAD[+]. Pyridoxal phosphate serves as a coenzyme in the amino transfer reaction. It ensures full enzyme activation. The rate of NADH oxidation is directly proportional to the catalytic ALT activity. It is determined by measuring the decrease in absorbance.(Package insert: ALT reagent. Roche Diagnostics; 04/2024)

Alkaline Phosphatase:
In the presence of magnesium and zinc ions, p-nitrophenyl phosphate is cleaved by phosphatases into phosphate and p-nitrophenol. The p-nitrophenol released is directly proportional to the catalytic alkaline phosphatase activity. It is determined by measuring the increase in absorbance.(Package insert: Alkaline Phosphatase reagent. Roche Diagnostics; 09/2022)

Albumin:
At a pH value of 4.1, albumin displays a sufficiently cationic character to be able to bind with bromcresol green (BCG), an anionic dye, to form a blue-green complex. The color intensity of the blue-green color is directly proportional to the albumin concentration in the sample and is measured photometrically.(Package insert: Albumin reagent. Roche Diagnostics; 06/2024)

Total Protein:
Divalent copper reacts in alkaline solution with protein peptide bonds to form the characteristic purple-colored biuret complex. Sodium potassium tartrate prevents the precipitation of copper hydroxide and potassium iodide prevents auto-reduction of copper. The color intensity is directly proportional to the protein concentration, which can be determined photometrically.(Package insert: Total Protein Gen.2 reagent. Roche Diagnostics; 09/2023)

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

82247
82248
84450
84460
84075
82040
84155
80076 (if appropriate if all analytes performed)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
LIVPR	Hepatic Function Panel, S	24325-3

Result ID	Test Result Name	Result LOINC® Value
ALB	Albumin, S	1751-7
ALP	Alkaline Phosphatase, S	6768-6
ALT	Alanine Aminotransferase (ALT), S	1743-4
AST	Aspartate Aminotransferase (AST), S	30239-8
BILID	Bilirubin, Direct	1968-7
BILIT	Bilirubin Total, S	1975-2
TP	Protein, Total, S	2885-2