MAYO CLINIC LABORATORIES

Test Definition: GLBF

Glucose, Body Fluid

Overview

Useful For
Aiding in the diagnosis of infection using body fluid specimens

Method Name
Enzymatic Photometric Assay

NY State Available
Yes

Specimen

Specimen Type
Body Fluid

Ordering Guidance
For spinal fluid specimens, order GLSF / Glucose, Spinal Fluid. Testing will be changed to GLSF if this test is ordered on that specimen type.

Necessary Information
1. Date and time of collection are required.
2. Specimen source is required.

Specimen Required
Specimen Type: Body fluid
Preferred Source:
-Peritoneal fluid (peritoneal, abdominal, ascites, paracentesis)
-Pleural fluid (pleural, chest, thoracentesis)
-Drain fluid (drainage, JP drain)
-Peritoneal dialysate (dialysis fluid)
-Pericardial
-Amniotic fluid+
-Synovial fluid
- Pancreatic cyst
Acceptable Source: Write in source name with source location (if appropriate)
Collection Container/Tube: Sterile container
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions:
1. Centrifuge to remove any cellular material and transfer into a plastic vial.

2. Indicate the specimen source and source location on label.

Forms

If not ordering electronically, complete, print, and send a Oncology Test Request (T729) with the specimen.

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross Lipemia	Reject
Gross Icterus	Reject
Anticoagulant or additive Breast milk Nasal secretions Gastric secretions Bronchoalveolar lavage (BAL) or bronchial washings Colostomy/ostomy Feces Saliva Sputum Cerebrospinal fluid Urine Vitreous fluid	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Body Fluid	Refrigerated (preferred)	7 days	
	Ambient	24 hours	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Blood glucose is measured to assess the glycemic state of a patient. Body fluid glucose concentrations that are lower than expected indicate increased cellularity and, therefore, glycolysis within the body fluid space. This serves as an indicator of infection or possibly malignancy. Body fluid glucose concentrations are expected to be lower than that found in serum or plasma. Ideally, they are measured in the fasting state, whereby glucose is able to equilibrate into the space the body fluid is contained within.

Pleural fluid:
Low pleural fluid glucose concentrations (<40-60 mg/dL) indicate a complicated parapneumonic or malignant effusion.(1) However, low glucose is not specific for infection or malignancy and may be attributed to hemothorax, tuberculosis, or rheumatoid or lupus pleuritis, among other diseases. pH is the preferred test for making this determination when available.

Pericardial fluid:
Pericardial fluid glucose levels have been investigated on a limited basis. In presumed normal specimens collected during surgery, pericardial fluid-to-serum ratio for glucose was 1.0 (95% CI, 0.8-1.2).(2)

Peritoneal fluid:
Ascitic fluid glucose should be interpreted in conjunction with serum glucose measurement. In a cohort of noninfected patients with alcohol-related cirrhosis, the mean (SD) ascitic fluid-to-serum glucose ratio was 1.04 (0.25).(3) Ascitic fluid glucose may be helpful in differentiating spontaneous bacterial peritonitis from secondary peritonitis caused by bowel perforation.(4) Secondary peritonitis is likely if 2 of the 3 following criteria are met:
1. Total protein is greater than 1 g/dL
2. Lactate dehydrogenase is greater than 225 IU/L (or greater than the upper limit of normal for serum)
3. Glucose is less than 50 mg/dL(4)

Amniotic fluid:
Amniotic fluid is produced by the amnion and placenta, representing a plasma ultrafiltrate. Amniocentesis may be performed to assess fetal distress. Intraamniotic infection or chorioamnionitis is an acute inflammation of the fetal membranes commonly caused by bacterial infection prompting an inflammatory response leading to labor and term or preterm birth.(5) Chorioamnionitis may be symptomatic (clinical) or asymptomatic (histological), occurring most often during prolonged labor or as a consequence of membrane rupture as bacteria have greater opportunity to ascend the lower genital tract to colonize the uterus. Prompt diagnosis and treatment for clinical chorioamnionitis is critical to avoid maternal and fetal morbidity and mortality. Culture and gram stain are often used in the assessment of infection, however, gram stain lacks sensitivity and culture results are not returned in a timely enough manner to make clinical decisions. Low glucose concentrations have been associated with positive culture results and consequently poor outcomes.(6)

Synovial fluid:
Synovial fluid is present in joint cavities and serves a number of important roles in maintaining joint health and mobility. Symptoms of joint problems include pain, swelling, stiffness, or decreased range of motion.

Routine analysis of synovial fluid includes Gram stain, culture, crystal analysis, and cell count with white blood cells differential. In normal synovial fluid, glucose concentrations are similar to those observed in fasting serum. Low synovial fluid glucose has been associated with septic arthritis or inflammation.(7)

Pancreatice Cyst:
Pancreatic cyst fluid glucose may be useful for differentiating mucinous from non-mucinous cystic lesions.

Reference Values

An interpretive report will be provided.

Interpretation

Body fluid glucose concentrations may be decreased due to increased cellular metabolism and should be interpreted in the context of blood glucose concentrations and in conjunction with other laboratory and clinical findings.(8, 9)

Pleural, peritoneal, and pericardial fluid and serum glucose concentrations are similar in the absence of infection.(3)

Transudative pleural fluid glucose concentrations are similar to serum glucose concentrations, while exudates have glucose concentrations less than serum glucose. Glucose levels below 60 mg/dL are typically associated with low fluid pH.(1,10)

Amniotic fluid glucose levels below 16 mg/dL is suggestive of infection.(6)

Synovial fluid glucose concentrations are similar to fasting blood glucose concentrations or approximately 50% of the nonfasting serum glucose concentration under normal conditions. Values below this can be seen with infection.(7)

Pancreatic cyst fluid glucose less than50 mg/dL is associated with mucinous cystic lesions.(13-15)

Cautions

Body fluid glucose results are not diagnostic and should be interpreted in conjunction with other laboratory and clinical findings.

Specimens that have cells present, either due to trauma during collection (ie, blood present) or due to infection (ie, bacteria), that are not centrifuged and separated from cells as soon after collection as possible, may have falsely decreased glucose concentrations owing to the continued metabolic action of cells in vitro.

In very rare cases of gammopathy, in particular type IgM (Waldenstrom macroglobulinemia), may cause unreliable results.

Clinical Reference

1. Light RW. Clinical practice. Pleural effusion. N Engl J Med. 2002;346(25):1971-1977
2. Ben-Horin S, Shinfeld A, Kachel E, Chetrit A, Livneh A. The composition of normal pericardial fluid and its implications for diagnosing pericardial effusions. Am J Med. 2005;118(6):636-640
3. Wilson JA, Suguitan EA, Cassidy WA, Parker RH, Chan CH. Characteristics of ascitic fluid in the alcoholic cirrhotic. Dig Dis Sci. 1979;24(8):645-648
4. Runyon BA, Hoefs JC. Ascitic fluid analysis in the differentiation of spontaneous bacterial peritonitis from gastrointestinal tract perforation into ascitic fluid. Hepatology. 1984;4(3):447-450
5. Gonzalez-Bosquet E, Cerqueira MJ, Dominguez C, Gasser I, Bermejo B, Cabero Ll. Amniotic fluid glucose and cytokines values in the early diagnosis of amniotic infection in patients with preterm labor and intact membranes. J Matern Fetal Med. 1999;8(4):155-158

6. Margaretten ME, Kohlwes J, Moore D, Bent S. Does this adult patient have septic arthritis? JAMA. 2007;297(13):1478-1488
7. Knight JA, Kjeldsberg CR: Cerebrospinal, synovial, and serous body fluids. In: McPherson RA, Pincus MR, eds. Henry's Clinical Diagnosis and Management by Laboratory Methods. Elsevier, 2007;448
8. Brunzel NA: Pleural, pericardial, and peritoneal fluid analysis. In: Fundamentals of Urine and Body Fluid Analysis. WB Saunders Company. 1994;406
9. Sahn SA: Getting the most from pleural fluid analysis. Respirology. 2012;17(2):270-277
10. Meyers DG, Meyers RE, Prendergast TW. The usefulness of diagnostic tests on pericardial fluid. Chest. 1997;111(5):1213-1221
11. Kacerovsky M, Holeckova M, Stepan M, et al. Amniotic fluid glucose level in PPROM pregnancies: a glance at the old friend. J Matern Fetal Neonatal Med. 2022;35(12):2247–2259
12. Cotton, SW, Block DR. A review of current practices and future trends in body fluid testing. J Appl Lab Med. 2023;8(5):962-983. doi:10.1093/jalm/jfad014
13. Gyimesi G, Keczer B, Rein P, et al. Diagnostic performance of intracystic carcinoembryonic antigen (CEA) versus glucose in differentiation of mucinous and non-mucinous pancreatic cysts. Pathol Oncol Res. 2024;30:1611881. Published 2024 Oct 10. doi:10.3389/pore.2024.1611881
14. Sinha SR, Mondal S, Akhtar MJ, Singh RK, Prakash P. Evaluating Carcinoembryonic Antigen and Glucose Levels in Pancreatic Cyst Fluid for Mucinous Versus Non-mucinous Differentiation. Cureus. 2024;16(6):e62686. Published 2024 Jun 19. doi:10.7759/cureus.62686
15. Ribeiro T, Lopes S, Moutinho-Ribeiro P, Macedo G, Vilas-Boas F. Performance of Intracystic Glucose Measurement for the Characterization of Pancreatic Cystic Lesions. J Gastrointestin Liver Dis. 2024;33(1):74-78. Published 2024 Mar 30. doi:10.15403/jgld-5330

Performance

Method Description

Glucose, in the presence of hexokinase, is converted to glucose-6-phosphate (G6P). Glucose-6-phosphate dehydrogenase (G6PDH) oxidizes G6P in the presence of nicotinamide adenine dinucleotide phosphate (NADP) to gluconate-6-phosphate and NADPH. The rate of NADPH formation is directly proportional to glucose concentration and is measured photometrically.(Package insert: Glucose reagent. Roche Diagnostics; v16.0, 02/2020)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 3 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 modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

82945

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
GLBF	Glucose, BF	2344-0

Result ID	Test Result Name	Result LOINC® Value
GL_BF	Glucose, BF	2344-0
FLD12	Fluid Type, Glucose	14725-6