MAYO CLINIC LABORATORIES

Test Definition: AMISO

Amylase, Isoenzymes, Serum

Overview

Useful For

Ruling out salivary amylase as the cause of elevated serum amylase

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
AMYSE	Amylase, Total, S	Yes, (Order AMS)	Yes
AMYPA	Amylase, Pancreatic, S	No	Yes
AMYSA	Amylase, Salivary, S	No	Yes

Testing Algorithm

Total and pancreatic amylase are measured in the submitted serum specimen. Salivary amylase is calculated as the difference between the two measured results (salivary amylase = total amylase-pancreatic amylase).

Method Name

AMYSE, AMYPA: Colorimetric Rate Reaction

AMYSA: Calculation

NY State Available

Yes

Specimen

Specimen Type

Serum

Necessary Information

Age and sex of patient are required.

Specimen Required

Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Submission Container/Tube: Plastic 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 a plastic vial within 2 hours of collection.

Forms

If not ordering electronically, complete, print, and send Gastroenterology and Hepatology Test Request (T728) with the specimen.

Specimen Minimum Volume

See Specimen Required

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	30 days	
	Ambient	7 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

The amylase enzymes are a group of hydrolases that degrade complex carbohydrates (starches) into simple sugars. The pancreas and salivary glands have amylase concentrations that are orders of magnitude greater than any other tissue. These two amylase isoenzymes, pancreatic and salivary, are present in serum.

Pancreatic and salivary amylase isoenzymes can be measured in serum at physiologic concentrations (within the age-specific reference interval), and elevated concentrations indicate hyperamylasemia. Hyperamylasemia can result from either increased rate of release of amylase into blood or decreased metabolic clearance of the enzyme (ie, macroamylase).

Routine amylase laboratory tests measure total amylase activity in serum and do not differentiate between amylase isoenzymes. Differentiation of amylase isoenzymes is useful in cases where amylase elevations are not thought to be from a pancreatic source.

Pancreatic amylase may be elevated due to pancreatitis as well as other conditions in which pancreatic amylase is released (eg, cannulation of the pancreatic duct) or absorbed (eg, loss of bowel integrity) into the blood. Serum pancreatic amylase should always be interpreted in a context of total amylase to determine the relative contribution of salivary and pancreatic isoenzymes.

Hyperamylasemia due to salivary amylase may occur when salivary gland disease is present. Salivary amylasemia may also be observed in conditions where there is no clinical evidence of salivary gland diseases, such as chronic alcoholism, postoperative states, lactic acidosis, anorexia nervosa or bulimia, and malignant neoplasms that secrete amylase.

Reference Values

AMYLASE, TOTAL
0-30 days: < or =6 U/L
31-182 days: 1-17 U/L
183-365 days: 6-44 U/L
1-3 years: 8-79 U/L
4-17 years: 21-110 U/L
> or =18 years: 28-100 U/L

AMYLASE, PANCREATIC
0-<24 months: < or =20 U/L
2-<18 years: 9-35 U/L
> or =18 years: 13-53 U/L

AMYLASE, SALIVARY
0-<18 years: Not established
> or =18 years: < or =86 U/L

Interpretation

Increased concentrations of total amylase activity in conjunction with increased concentration of specific amylase isoenzymes may aid in differentiating the source of amylase (pancreatic versus salivary).

Cautions

Amylase results may be elevated in patients with macroamylase. Macroamylase refers to a high-molecular weight form of amylase that is present in a patient's serum. Different causes of macroamylase have been suggested, the most common being amylase complexed with an immunoglobulin. The large size of the macroamylase complex prevents its excretion in the urine. By utilizing serum lipase and urinary amylase, the presence or absence of macroamylase may be determined.

Total amylase measurement should be used for diagnosis and management of pancreatitis and evaluation of pancreatic function. Amylase isoenzyme determination is not necessary for these situations.

Clinical Reference

1. Panteghini M. Laboratory evaluation of pancreatic diseases. Biochimica Clinica. 2010;34(1):19-25
2. Rifai N, Horvath AR, Wittwer CT. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics. 8th ed. Elsevier; 2018
3. Pieper-Bigelow C, Strocchi A, Levitt MD. Where does serum amylase come from and where does it go? Gastroenterol Clin North Am. 1990;19(4):793-810
4. Azzopardi E, Lloyd C, Teixeira SR, Conlan RS, Whitaker IS. Clinical applications of amylase: Novel perspectives. Surgery. 2016;160(1):26-37

Performance

Method Description

Total amylase:
The liquid Roche amylase method is an enzymatic colorimetric test using 4,6-ethylidene-(G7) p-nitrophenyl-(G1)-alpha-D-maltoheptaoside (ethylidene-G7PNP), cleaved under the catalytic action of alpha-amylases. The G2PNP, G3PNP, and G4PNP fragments formed are completely hydrolyzed to p-nitrophenol and glucose by alpha-glucosidase. The color intensity of the p-nitrophenol formed is directly proportional to the alpha-amylase activity. It is determined by measuring the increase in absorbance.(Package insert: AMYL2 reagent. Roche Diagnostics; 12/2018)

Pancreatic amylase:
After immunoinhibition with antibodies against human salivary alpha-amylase, the amount of pancreatic alpha-amylase in a sample is selectively determined by an enzymatic colorimetric method using the substrate ethylidene-G7PNP.(Package insert: Alpha-Amylase EPS Pancreatic. Roche Diagnostics; 05/2019)

PDF Report
No

Day(s) Performed
Monday through Sunday

Report Available
1 to 3 days

Specimen Retention Time
7 days

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
82150 x 2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value

AMISO	Amylase, Isoenzymes, S	24333-7

Result ID	Test Result Name	Result LOINC® Value
AMYPA	Amylase, Pancreatic, S	1805-1
AMYSA	Amylase, Salivary, S	1809-3
AMYSE	Amylase, Total, S	1798-8