MAYO CLINIC LABORATORIES

Test Definition: MALP

Malabsorption Evaluation Panel, Feces

Overview

Useful For

Evaluation of patients with suspected malabsorption, as suggested by chronic diarrhea, unexplained weight loss, or nutritional deficiencies

Differentiation between causes of malabsorption, specifically inflammatory conditions, pancreatic insufficiency, and osmotic diarrhea

Detection of protein-losing enteropathy that may be associated with an underlying malabsorption

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
A1AF	Alpha-1-Antitrypsin, Random, F	Yes	Yes
CALPR	Calprotectin, F	Yes	Yes
ELASF	Pancreatic Elastase, F	Yes	Yes
UREDF	Reducing Substance, F	Yes	Yes

Method Name

A1AF: Nephelometry
CALPR, ELASF: Enzyme-Linked Immunosorbent Assay (ELISA)
UREDF: Benedict's Copper Reduction Reaction

NY State Available

Yes

Specimen

Specimen Type

Fecal

Specimen Required

Supplies: Malabsorption Panel (T920)
Container/Tube: Malabsorption kit or 2 small stool containers
Specimen Volume: 18 g split equally between 2 containers
Collection Instructions:
1. Collect a fresh, random fecal specimen, no preservatives.
2. Split specimen equally between 2 small containers.
3. Label one small container with the A1AF and UREDF sample collection labels. Label the other small container with the

CALPR, ELASF sample collection label.

4. Freeze immediately

Additional Information:

1. Specimen must be split prior to transport.
2. Testing cannot be added to a previously collected specimen.
3. Specimen cannot be collected from a diaper.

Forms

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

Specimen Minimum Volume

5 g

Reject Due To

Urine and feces mixed Specimens collected from diapers Feces collected in any preservative or fixative	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Fecal	Frozen	7 days	

Clinical & Interpretive

Clinical Information

Malabsorption is defined as impaired gastrointestinal (GI) absorption of nutrients, including fats, proteins, carbohydrates, vitamins, and minerals. The classic presentation of malabsorption is chronic diarrhea; however, many patients may not display this symptomatology. Instead, they may present with mild GI symptoms and weight loss or with systemic manifestations associated with a specific nutrient deficiency.

Malabsorption can result from different pathologic mechanisms; identification of the specific cause is important for proper treatment. Evaluation for the cause of malabsorption requires a variety of blood and stool tests. Stool testing as a more direct marker of GI function is particularly useful for certain diseases. Fecal calprotectin concentrations are a reflection of the number of neutrophils in the GI tract, with an elevated result consistent with an inflammatory condition such as inflammatory bowel disease. Elastase is an enzyme produced by the pancreas and decreased concentrations in

the stool are indicative of pancreatic insufficiency and malabsorption due to a deficiency in digestive enzymes.

The reducing substances test is useful in cases of chronic diarrhea; increased concentrations are consistent with osmotic diarrhea caused by disaccharidase deficiency or intestinal monosaccharide malabsorption. In comparison, measurement of alpha-1-antitrypsin in stool is not diagnostic for a specific malabsorption etiology but is useful for determining the extension of protein loss through the GI tract.

Reference Values

ALPHA-1-ANTITRYPSIN, RANDOM:
< or =54 mg/dL

CALPROTECTIN:
<50.0 mcg/g (Normal)
50.0-120 mcg/g (Borderline)
>120 mcg/g (Abnormal)
Reference values apply to all ages.

PANCREATIC ELASTASE:
<100 mcg/g (Severe pancreatic insufficiency)
100-200 mcg/g (Moderate pancreatic insufficiency)
>200 mcg/g (Normal)
Reference values apply to all ages.

REDUCING SUBSTANCE:
Negative or trace

Interpretation

Calprotectin concentrations above 120 mcg/g are suggestive of an active inflammatory process within the gastrointestinal system; additional diagnostic testing to determine the etiology of the inflammation is suggested.

Calprotectin concentrations between 50.0 and 120 mcg/g are borderline and may represent a mild inflammatory process; for patients with clinical symptoms suggestive of an inflammatory process, retesting in 4 to 6 weeks may be indicated.

Pancreatic elastase concentrations below 100 mcg/g are consistent with exocrine pancreatic insufficiency; pancreatic elastase concentrations from 100 to 200 mcg/g are suggestive for moderate exocrine pancreatic insufficiency.

Reducing substance concentrations above 0.50 g/dL are consistent with grade 2 to 4 osmotic diarrhea; reducing substance concentrations from 0.25 to 0.50 g/dL are consistent with grade 1 osmotic diarrhea.

Alpha-1-antitrypsin concentrations above 100 mg/dL are consistent with protein-losing enteropathy

Cautions

Malabsorption can result from a variety of pathological conditions; for most individuals with malabsorption, appropriate evaluation includes blood and fecal testing in addition to clinical evaluation.

Due to the heterogeneous composition of fecal material, variability in results may be observed when patients are monitored over time.

Clinical Reference

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2. Murray FR, Morell B, Biedermann L, Schreiner P. Protein-losing enteropathy as precursor of inflammatory bowel disease: a review of the literature. BMJ Case Rep. 2021;14(1):e238802
3. Gisbert JP, McNicholl AG. Questions and answers on the role of faecal calprotectin as a biological marker in inflammatory bowel disease. Dig Liver Dis. 2009;41(1):56-66
4. Sherwood RA, Walsham NE, Bjarnason I. Gastric, pancreatic, and intestinal function. In: Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1398-1420
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6. Chowdhury SD, Kurien RT, Ramachandran A, et al. Pancreatic exocrine insufficiency: Comparing fecal elastase 1 with 72-h stool for fecal fat estimation. Indian J Gastroenterol. 2016;35(6):441-444
7. Siddiqui HA, Salwen MJ, Shaikh MF, Bowne WB. Laboratory diagnosis of gastrointestinal and pancreatic disorders. In: McPherson RA, Pincus MR, eds. Henry's Clinical Diagnosis and Management by Laboratory Methods. 23rd ed. Elsevier; 2017:306-323
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9. Krom FA, Frank CG. Clinitesting neonatal stools. Neonatal Netw. 1989;8(2):37-40
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Performance

Method Description

Alpha-1-Antitrypsin:
Immunonephelometry quantitates the alpha-1-antitrypsin (AAT) contained in a fecal sample. In the absence of a timed fecal collection, an AAT fecal concentration will be reported.(Instruction manual: Siemens Nephelometer II Operations. Siemens, Inc; Version 2.4, 07/2019)

Calprotectin:
The QUANTA Lite Calprotectin Extended Range assay is an enzyme-linked immunosorbent assay (ELISA). Briefly, polyclonal capture antibodies specific for human calprotectin are immobilized on a 96-well plate. Calibrators, controls, and diluted patient samples are added to the wells of the plate. If present, calprotectin will bind to the capture antibodies on the plate. After a wash step, a solution containing an enzyme-labelled antibody is added. After another wash step, a substrate solution is added, which will change color in the presence of the enzyme. The absorbance of the color produced is proportional to the amount of calprotectin in the patient sample. Lastly, the control and patient results are calculated based on a curve generated from the kit calibrators.(Packet insert: QUANTA Lite Calprotectin Extended Range ELISA kit. INOVA Diagnostics; 04/2020)

Pancreatic Elastase:
The Immundiagnostik Pancreatic Elastase assay is an ELISA. Calibrators, controls, and diluted patient samples are added to a 96-well plate pre-coated with monoclonal antibodies to pancreatic elastase. If present, pancreatic elastase will bind to the antibodies on the surface of the microtiter wells. After a wash step, a peroxidase-labeled conjugate (mouse anti-pancreatic elastase) is added. After another washing step, substrate tetramethylbenzidine is added, which reacts with the peroxidase. An acidic stop solution is added, causing the color to change from blue to yellow. The intensity of the yellow color is directly proportional to the concentration of pancreatic elastase. A dose response curve of absorbance unit (optical density at 450 nm) vs. concentration is generated using the values obtained from the standards. Pancreatic elastase present in the patient samples is determined directly from this curve.(Package insert: IDK Pancreatic Elastase ELISA kit. Immundiagnostik AG; 02/23/2023)

Reducing Substances:
Copper sulfate in the tablet reacts with reducing substances converting cupric sulfate to cuprous oxide.(Package insert: AimTab Reducing Substances Tablets. Germaine Laboratories, Inc; 12/2015)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
4 to 6 days

Specimen Retention Time
See individual test IDs

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

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
See Individual Test IDs

CPT Code Information
0430U

LOINC® Information

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Test Definition: MALP

Malabsorption Evaluation Panel, Feces

Test ID	Test Order Name	Order LOINC® Value
MALP	Malabsorption Evaluation Panel, F	101803-5

Result ID	Test Result Name	Result LOINC® Value
6215	Reducing Substance, F	11060-1
AAT_F	Alpha-1-Antitrypsin, Random, F	9407-8
CALPR	Calprotectin, F	38445-3
ELASF	Pancreatic Elastase, F	25907-7