Test Definition: GALCR

Galactocerebrosidase Reflex, Leukocytes

Overview

Useful For

Diagnosis of Krabbe disease as a confirmatory reflex of the six-enzyme panel

Follow-up testing for evaluation of an abnormal newborn screening result for Krabbe disease

This test **is not recommended** for carrier detection because of the wide range of enzymatic activities observed in carriers and noncarriers.

Method Name

Only orderable as a reflex. For more information see LSD6W / Lysosomal Disorders, Six-Enzyme Panel, Leukocytes.

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

NY State Available

Yes

Specimen

Specimen Type

Whole Blood ACD

Specimen Required

Only orderable as a reflex. For more information see LSD6W / Lysosomal Disorders, Six-Enzyme Panel, Leukocytes.

Container/Tube:
Preferred: Yellow top (ACD solution B)
Acceptable: Yellow top (ACD solution A) or lavender top (EDTA)
Specimen Volume: 6 mL
Collection Instructions: Send whole blood specimen in original tube. **Do not aliquot**.

Specimen Minimum Volume

4 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole Blood ACD	Refrigerated (preferred)	6 days	
	Ambient	6 days	

Clinical & Interpretive

Clinical Information

Krabbe disease (globoid cell leukodystrophy) is an autosomal recessive disorder caused by a deficiency of the enzyme, galactocerebrosidase (GALC). GALC facilitates the lysosomal degradation of psychosine (galactosylsphingosine) and 3 other substrates (galactosylceramide, lactosylceramide, and lactosylsphingosine) causing severe demyelination throughout the brain. Krabbe disease is caused by variants in the *GALC* gene, and it has an estimated frequency of 1 in 100,000 births. Although rare, a few infants with an infantile Krabbe disease-like phenotype due to deficiency of saposin A have been found. Saposin-A is a sphingolipid activator protein that assists galactocerebrosidase in its action on galactosylceramide.

Severely affected infants typically present between ages 3 to 6 months with increasing irritability and sensitivity to stimuli. Rapid neurodegeneration including white matter disease follows, with death usually occurring by age 2. Some individuals have later onset forms of the disease that are characterized by ataxia, vision loss, weakness, and psychomotor regression presenting anywhere from age 6 months to the seventh decade of life. The clinical course of Krabbe disease can be variable, even within the same family.

Newborn screening for Krabbe disease has been implemented in some states. The early (presymptomatic) identification and subsequent testing of infants at risk for Krabbe disease may be helpful in reducing the morbidity and mortality associated with this disease. While treatment is mostly supportive, hematopoietic stem cell transplantation has shown some success if performed early, prior to onset of neurologic damage.

Reduced or absent galactocerebrosidase in leukocytes can indicate a diagnosis of Krabbe disease; however, a number of alterations in the *GALC* gene have been identified that result in reduced galactocerebrosidase activity in vitro but do not cause disease. The biomarker, psychosine (PSY / Psychosine, Blood Spot, PSYR / Psychosine, Whole Blood, or PSYCF / Psychosine, Spinal Fluid), has been shown to be elevated in patients with active Krabbe disease. Molecular sequencing of the *GALC* gene (GALC / Krabbe Disease, *GALC* Gene Sequencing with Deletion/Duplication, Varies) is necessary for differentiating alternations from disease-causing variants in affected patients and for carrier detection in family members.

Reference Values

Only orderable as a reflex. For more information see LSD6W / Lysosomal Disorders, Six-Enzyme Panel, Leukocytes.

> or =0.300 nmol/hr/mg protein

Interpretation

When abnormal results are detected, a detailed interpretation is given, including an overview of the results and of their significance, a correlation to available clinical information, elements of differential diagnosis, recommendations for additional biochemical testing, and in vitro, confirmatory studies (enzyme assay, molecular analysis), name and phone

number of key contacts who may provide these studies, and a phone number to reach one of the laboratory directors in case the referring physician has additional questions.

Cautions

Pseudodeficiency of galactocerebrosidase causes reduced enzymatic activity but does not cause disease.

Enzyme levels may be normal in individuals who have undergone hematopoietic stem cell transplant.

Clinical Reference

1. Elliott S, Buroker N, Cournoyer JJ, et al. Pilot study of newborn screening for six lysosomal storage diseases using Tandem Mass Spectrometry. Mol Genet Metab. 2016;118(4):304-309
2. Matern D, Gavrilov D, Oglesbee D, Raymond K, Rinaldo P, Tortorelli S. Newborn screening for lysosomal storage disorders. Semin Perinatol. 2015;39(3):206-216
3. Orsini JJ, Escolar ML, Wasserstein MP, et al. Krabbe disease. In: Adam MP, Feldman J, Mirzaa GM, et al, eds. GeneReviews [Internet]. University of Washington, Seattle; 1993-2025. Updated October 11, 2018. Accessed July 22, 2025. Available at www.ncbi.nlm.nih.gov/books/NBK1238/
4. Liao HC, Spacil Z, Ghomashchi F, et al. Lymphocyte galactocerebrosidase activity by LC-MS/MS for post-newborn screening evaluation of Krabbe disease. Clin Chem. 2017;63(8):1363-1369
5. Lin N, Huang J, Violante S, et al. Liquid chromatography-tandem mass spectrometry assay of leukocyte acid alpha-glucosidase for post-newborn screening evaluation of Pompe disease. Clin Chem. 2017;63(4):842-851

Performance

Method Description

The specimens are incubated with a mix of substrate and internal standard for galactocerebrosidase and alpha galactosidase (GLA). The reaction is then stopped using acetonitrile, centrifuged, and a portion of the supernatant is prepared for analysis by liquid chromatography-tandem mass spectrometry. GLA is included to verify sample integrity.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Preanalytical processing: Monday through Saturday
Testing performed: Monday, Wednesday

Report Available

4 to 10 days

Specimen Retention Time

White blood cell homogenate: 1 month

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

CPT Code Information

82542