The GLYCOMARK® Test
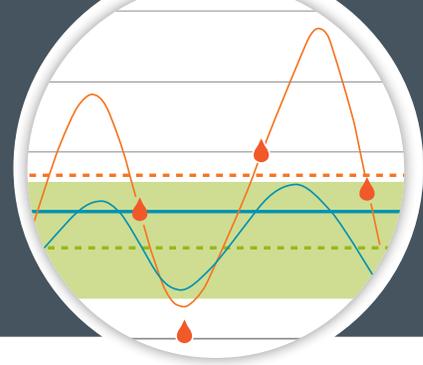
CPT Code 84378
Sample Type EDTA Plasma or Serum

Order Code C155
Tube Type Lavender Top or Tiger Top

A clinically-proven indicator of post-prandial glycemic control in diabetic patients[1-3]

Description

The GlycoMark® test is a surrogate marker to detect frequent and high glycemic excursions in diabetic patients[1-3] and measures blood levels of 1,5-anhydroglucitol (1,5-AG), a glucose-like sugar found in food.

When blood glucose levels are well controlled, most circulating 1,5-AG is reabsorbed in the kidneys instead of being excreted in the urine[1]. In healthy individuals, circulating levels of 1,5-AG are high, with median values exceeding 20 µg/mL[2].

However, when blood glucose levels are high, 1,5-AG reabsorption is blocked and a majority is excreted in the urine. Blood glucose spikes of greater than 180 mg/dL result in 1,5-AG loss in the urine. Individuals with type 2 diabetes have low circulating levels of 1,5-AG[2,4]. Unlike HbA1c testing, which measures an individual's average glucose over a 2-3 month period[5], the GLYCOMARK® test reveals more recent deteriorations in glucose control.

Clinical Use

The GLYCOMARK® test may be performed monthly on individuals with moderately controlled diabetes and HbA1c of 6.0–8.0% to detect glucose excursions. The GLYCOMARK® test may also be used on diabetic individuals with high HbA1c (>8.0%) to monitor effectiveness of therapy changes.

Clinical Significance

- The GLYCOMARK® test helps identify patients with more frequent and extreme hyperglycemic excursions over the previous 2 week time period, despite similar HbA1c levels, and indicates the need for more frequent self-blood glucose monitoring or continuous glucose monitoring.

- Approximately 40% of individuals with diabetes who are "controlled" for glucose and HbA1c testing have significant post-prandial glucose variability[5]. In fact, the average blood glucose in an individual with an HbA1c of 7.0% can range from 123 to 185 mg/dL[6].

- Low levels of 1,5-AG are associated with the presence of diabetes complications. For example, low circulating levels of 1,5-AG are associated with elevated levels of urinary albumin and N-acetylglucosaminidase, both markers of renal damage[7].

Sample Type

The GLYCOMARK® Test may be performed on a serum or EDTA plasma sample.

Testing Frequency

The GLYCOMARK® test may be performed monthly on diabetic patients to monitor therapy between HbA1c tests.

Commercial Insurance or Medicare Coverage

Coverage guidelines, also known as NCD (National Coverage Determination) or LCD (Local Coverage Determination) for reimbursement have been established and **Medicare (CGS) will not reimburse for the GLYCOMARK® test**. Limited information has been posted by the majority of the larger Carriers (Aetna, United HealthCare, Cigna, Blues). Medical necessity and specificity of diagnosis should be provided when ordering this test.

Understanding Medical Necessity

The following ICD-10 codes for the GLYCOMARK® test are listed as a convenience for the ordering physician. The ordering physician should report the diagnosis code that best describes the reason for performing the test.

Diagnosis	Diagnosis Code
Type 2 Diabetes Mellitus with Hyperglycemia	E11.65
Type 2 Diabetes Mellitus without Complications	E11.9
Other Specified Diabetes Mellitus without Complications	E13.9
Pure Hypercholesterolemia, Unspecified	E78.00
Familial Hypercholesterolemia	E78.01
Mixed Hyperlipidemia	E78.2
Other Hyperlipidemia	E78.4
Hyperlipidemia, Unspecified	E78.5
Metabolic Syndrome	E88.81
Essential (primary) Hypertension	I10
Atherosclerotic Heart Disease of Native Coronary Artery without Angina Pectoris	I25.10
Impaired Fasting Glucose	R73.01
Impaired Glucose Tolerance Test (oral)	R73.02

ClevelandHeartLab®

Know your risk.

OPTIMAL RANGE
for Diabetic Patients
GLYCOMARK®
(µg/mL)

>10

REFERENCE RANGE
for Non-Diabetic Patients
GLYCOMARK®
(µg/mL)

WOMEN 6.8 - 29.3	MEN 10.7 - 32.0

Treatment Considerations

These treatment considerations are for educational purposes only. Specific treatment plans should be provided and reviewed by the treating practitioner.

Important: *1,5-AG blood levels are falsely lowered by the diabetes drug INVOKANA® which prevents reabsorption of 1,5-AG in the kidneys. INVOKANA is part of a new class of diabetes medications known as sodium-glucose co-transporter 2 (SGLT2) inhibitors, which block reabsorption of glucose in the kidneys, and other SGLT2 inhibitors may have the same effect. 1,5-AG levels may also be lowered in advanced (stage 4 or 5) kidney disease, cirrhosis of the liver and pregnancy.*

Moderately Controlled Patients
(A1c ≤8.0%)

1,5-AG ≥10 µg/mL
Peak glucose <180 mg/dL

1,5-AG <10 µg/mL
Peak glucose >180 mg/dL

30-Day Visit + GLYCOMARK® Test
if still <10 µg/mL

Consider Targeting Fasting Glucose

- Diet and Exercise
- Biguanide
- Sulfonylurea
- Thiazolidinedione
- Long-acting GLP-1
- Basal insulin

Focused SBGM/CGM

Consider Targeting Postprandial Glucose

- Diet counseling
- Prandial GLP-1 agonist
- DPP IV inhibitor
- Glinide
- Bile acid sequestrant
- Amylin mimetic
- Prandial insulin

Consider Adjusting or Adding Prandial Medication
until 1,5-AG and HbA1c are within target

References

1. Dungan KM et al. 1, 5-anhydroglucitol and postpriandal hyperglycemia as measured by continuous glucose monitoring system in moderately controlled patients with diabetes. *Diabetes Care*. 2006; 29: 1214-1219.

2. Wang Y et al. A study on the association of serum 1,5-anhydroglucitol levels and the hyperglycaemic excursions as measured by continuous glucose monitoring system among people with type 2 diabetes in China. *Diabetes Metab Res Rev*. 2012; 28: 357-362.

3. Stettler C et al. Association of 1,5-Anhydroglucitol and 2-h postprandial blood glucose in type 2 diabetic patients. *Diabetes Care*. 2008; 31: 1534-1535.

4. McGill JB et al. Circulating 1,5-anyhdrogluciton levels in adult patients with diabetes reflect longitudinal changes of glycemia. *Diabetes Care*. 2004; 27: 1859-1865.

5. Bonora E et al. Prevalence and correlates of post-prandial hyperglycemia in a large sample of patients with type 2 diabetes. *Diabetologia*. 2006; 49: 846-854.

6. Nathan DM et al. Translating the A1c assay into estimated average glucose values. *Diabetes Care*. 2008; 31: 1473-1478.

7. Yamanouchi T et al. Relationship between serum 1,5-anhydroglucitol and urinary excretion of N-acetlyglucosaminidase and albumin determined at onset of NIDDM with 3-year follow-up. *Diabetes Care*. 1998; 21: 619-624.