

Glycosylated Hemoglobin Testing

Hemoglobin A1c (HbA1c)

The glycosylated hemoglobin test (HbA1c) is a simple lab test that shows the average amount of sugar that has been in your blood over the last three months. This test is used to give you and your doctor the most accurate picture of your overall diabetes control. Here's how it works.

Red blood cells are produced in the bone marrow and circulated in the blood stream for approximately 120 days.¹ During this time the red blood cells (RBC) are responsible for carrying oxygen to the tissues and organs of your body. The specific cell part that carries the oxygen is called hemoglobin. During circulation, glucose that is not used for energy is left in the blood where it attaches itself to the hemoglobin through a process called glycosylation. Once glycosylated, a hemoglobin molecule stays that way throughout the lifecycle of its RBC. The percent of glycosylation is proportional to time and concentration of glucose. In other words, older RBC's will have a greater percent of glycosylated hemoglobin (GHb). Also, poorly controlled diabetics (those who have experienced periods of high concentrations of blood glucose) will have a greater percent of GHb. Elevated levels of GHb are strongly associated with complications of diabetes.

Research has proven that good control of diabetes is the best way to prevent or delay complication of the disease that include heart disease, blindness, nerve damage, and kidney damage. While daily blood glucose monitoring tells you how your blood sugar is doing right then (allowing you to make necessary changes in medicine, food, and exercise), the HbA1c test gives you a picture of your long term diabetes management success. The HbA1c test measures the proportion of the hemoglobin molecule in your red blood cells that has glucose attached to them (thus are "glycosylated").² Glycosylated hemoglobin can be separated by electrophoresis into three fractions called HbA1a, HbA1b, and HbA1c. Normally only HbA1c is quantitated.

Diabetes mellitus patients should have an HbA1c test every three to six months, depending on their treatment program and level of control. HbA1c levels under 6% are normal for people without the disease.³ The American Diabetes Association recommends that HbA1c levels be below 7% for diabetics.² Studies have shown that diabetics that can maintain levels in the 7% range have a much better chance of delaying complications than those in the 9% range.² (In August 2001, The American College of Endocrinology and The American Association of Clinical Endocrinologist released clinical practice guidelines proposing that the target HbA1c be dropped to 6.5% or lower.)⁴

Since the HbA1c test indicates the average blood sugar level, and is not affected by short term changes, it isn't necessary for patients to be fasting before collection of the blood sample. A properly collected purple top tube is the required specimen for testing. Allow 48 hour turn-around time for result reporting. HHLA's trended report (3 previous results) should prove helpful in the monitoring of long term diabetes management.

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1) "What is HbA1c?" Diabetes Technologies, Inc. pg.1-2, <http://www.healthology.com/dti/WhatisA1c.htm> copyright 1998

2) "HbA1c-The 7-Percent Solution" Diabetic Gourmet Magazine, pg1-2, <http://diabeticgourmet.com/articles/155.shtml> copyright 2000

3) "Glycosylated Hemoglobin Testing", Diabetes & Hormone Center of the Pacific, pg1-2, <http://www.endocrinologist.com/Hemoglobin.htm>, copyright 1996

4) "World Leaders In Endocrinology Call For New Diabetes Guidelines" American Association of Clinical Endocrinologists, pg 1-4, <http://www.aace.com/pub/press/releases/index.php?r=20010821>, copyright 2002

