

Glycosylated Hemoglobin

Glycohemoglobin is formed from Hemoglobin A by non-enzymatic addition of carbohydrate to N-terminal amino groups of hemoglobin polypeptide subunits. The conversion takes place within the erythrocytes at a rate that is proportional to the erythrocytic concentration of glucose. Several forms of glycohemoglobin are formed; HbA_{1a}, HbA_{1b}, and HbA_{1c}. As a sum, these are reported as “fast” or total glycohemoglobins. Of these, one species, HbA_{1c}, has been considered to more closely parallel the previous history of glucosemia.

HbA_{1c} mirrors the average plasma glucose over the life span of the red cells in blood, generally 60-90 days. When erythrocyte lifespan is shortened, as in patients with hemolytic anemia, HbA_{1c} results will be lower than expected. The magnitude of the effect will depend upon the severity of the anemia. Conditions such as polycythemia or splenectomy which cause increased red cell lifespan may be associated with increased HbA_{1c} results. In addition, patients with hemoglobinopathies may have inaccurate HbA_{1c} results.

HbA_{1c} has more recently been promoted for use as a means to detect those at increased risk for diabetes and diagnosis of diabetes mellitus. The 2010 Guidelines from the American Diabetes Association (ADA)* indicated that HbA_{1c} in the range of 5.7 – 6.4%, over two separate occasions, is an indicator of increased risk for diabetes. Further, an HbA_{1c} value \geq 6.5%, on two separate occasions, is diagnostic for diabetes mellitus.

*Diabetes Care 2010;33:S62 – S69.