

### **The use of glycated albumin in the management of diabetes mellitus.**

Glycated albumin (GA) is considered useful for assessing the degree of protein glycation directly dependent on glucose exposure. The conventional biomarkers employed for screening and monitoring diabetes mellitus (DM) include fasting glucose, postprandial glucose and glycated hemoglobin (HbA1c). Although they provide useful information, in some clinical conditions they are inadequate. GA is an interesting biomarker for diabetes mellitus: 1) as it is an intermediate-term marker of the glycemic status, it gives more information than the short-term (glycemia) and long-term (HbA1c) biomarkers currently employed in clinical practice; 2) in specific clinical conditions (altered erythrocyte lifespan, pregnancy and end-stage renal disease) it should be preferred to HbA1c; 3) it is probably also useful for diabetes mellitus screening and risk stratification of diabetes-related complications. HbA1c may be affected by any condition affecting erythrocyte lifespan (hemolytic anemia, hemorrhage, folate and vitamin B12 deficiency anemia, aplastic anemia, nephropathy) and hemoglobin metabolism (variant hemoglobin, thalassemia). Unlike HbA1c, GA is not influenced by their lifespan and is also independent of iron deficiency. In pregnancy HbA1c suffers some limits as an indicator of glycemic control since it rises from the second to the third trimester probably due to iron deficiency. Unlike HbA1c, GA is not affected by iron deficiency and, as an intermediate-term glycemic marker (albumin turnover is shorter than erythrocyte lifespan - 20 vs. 120 days), it enables pregnant women with DM to maintain a stricter glycemic control, important to lower the risk of fetal and maternal complications. GA is also a useful biomarker for monitoring diabetes mellitus in newborns due to the high levels of fetal hemoglobin. Patients with diabetes and end-stage renal diseases under dialysis also cannot be efficiently managed with HbA1c, because of the reduced persistence of red blood cells due to mechanical disruption, lower hemoglobin and erythropoietin concentration. GA may be a better indicator of their glycemic status. GA may be a useful diagnostic tool for diabetes screening in the general population and in individuals with a pre-diabetic condition. GA also rises sooner than HbA1c when glycemic status worsens, probably due to albumin biochemistry and its half-life. This means that GA is more useful as an indicator of glycemic status in all those conditions requiring short-term control of changes in glycemia, such as after the start or modifications of diabetes treatments. GA may be also directly implicated in the development of different complications related to diabetes, playing a role as a pathogenic molecule. However, in some

specific disorders GA levels are either lower or higher than the mean plasma glucose concentration, mainly because of changes in the albumin metabolism.

In conclusion, the introduction of this biomarker in clinical practice could help clinicians in the diagnosis and monitoring of diabetes mellitus and in planning measures to prevent long-term diabetes complications.