

# GLYCOMARK ASSAY

## Physiology and Clinical Implication

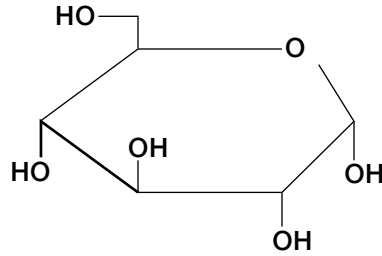
Adapted from: Buse, et. al., *Diabetes Technology and Therapeutics*, 2003, 5 (3): 355-363.

### Primary Mechanism

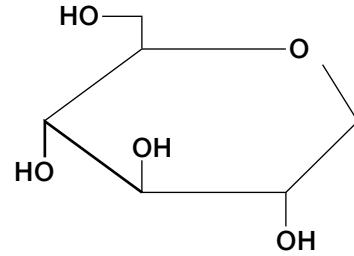
GlycoMark measures 1,5-anhydroglucitol (1,5-AG), a monosaccharide derived from ingestion of foodstuffs. In the absence of diabetes, 1,5-AG serum levels remain constant. However, when glucose levels are elevated and glucosuria occurs, 1,5-AG levels fall and are *inversely* proportional to the degree of hyperglycemia.

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**GlycoMark** measures 1,5-anhydroglucitol (1,5-AG), a monosaccharide in serum or plasma. 1,5-AG is very similar in chemical structure to glucose.



D-Glucose



1,5-AG  
1,5-Anhydro-D-glucitol  
1-Deoxyglucose

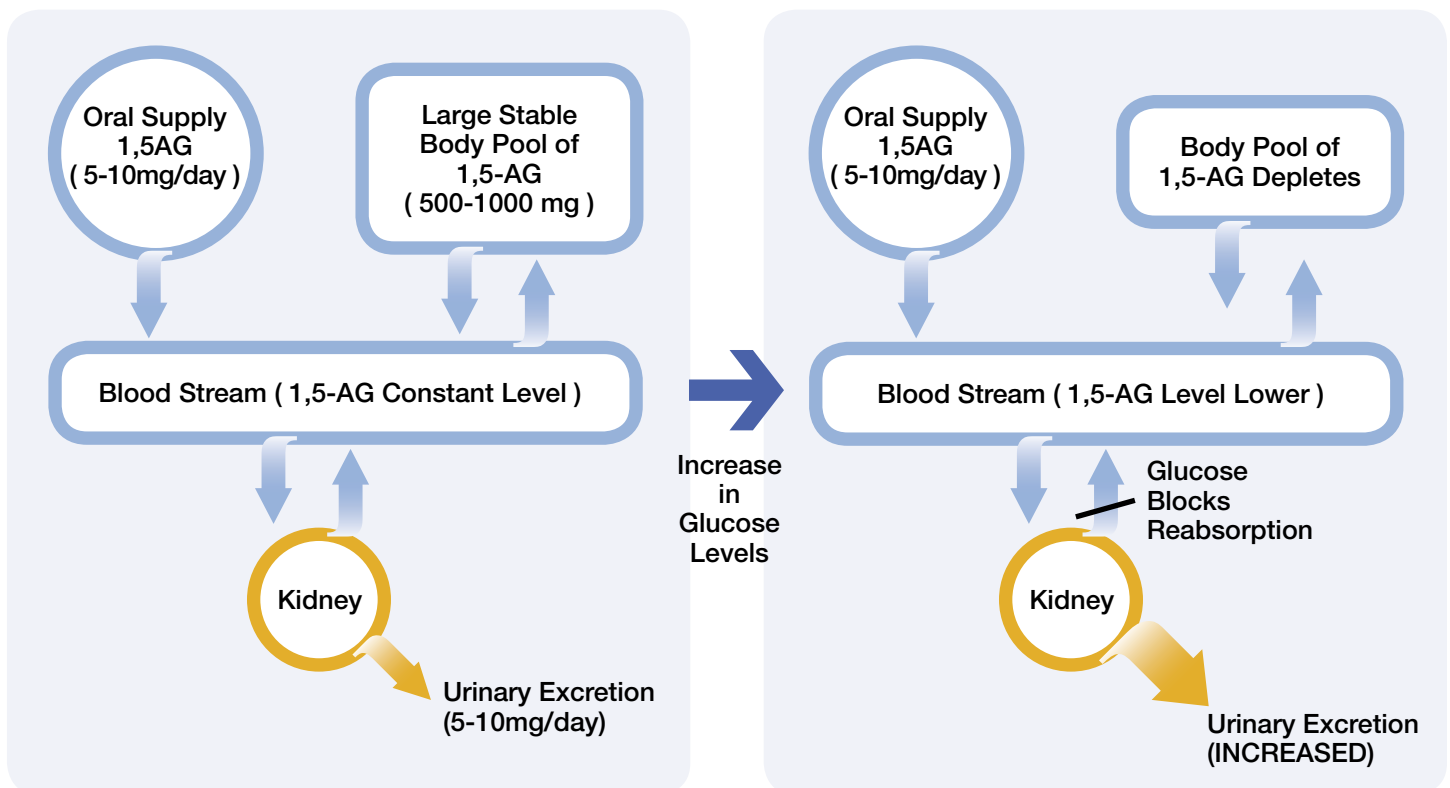
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### Normoglycemia

1,5-AG is contained in foods (like glucose) and in a normal situation oral intake and urinary excretion of 1,5-AG are balanced, which maintains a constant 1,5-AG level in blood.

### Hyperglycemia

High levels of glucose block reabsorption of 1,5-AG in the proximal tubule (due to chemical similarity of glucose and 1,5-AG). *This results in increased urinary excretion of 1,5-AG and decreased 1,5-AG levels in serum.*



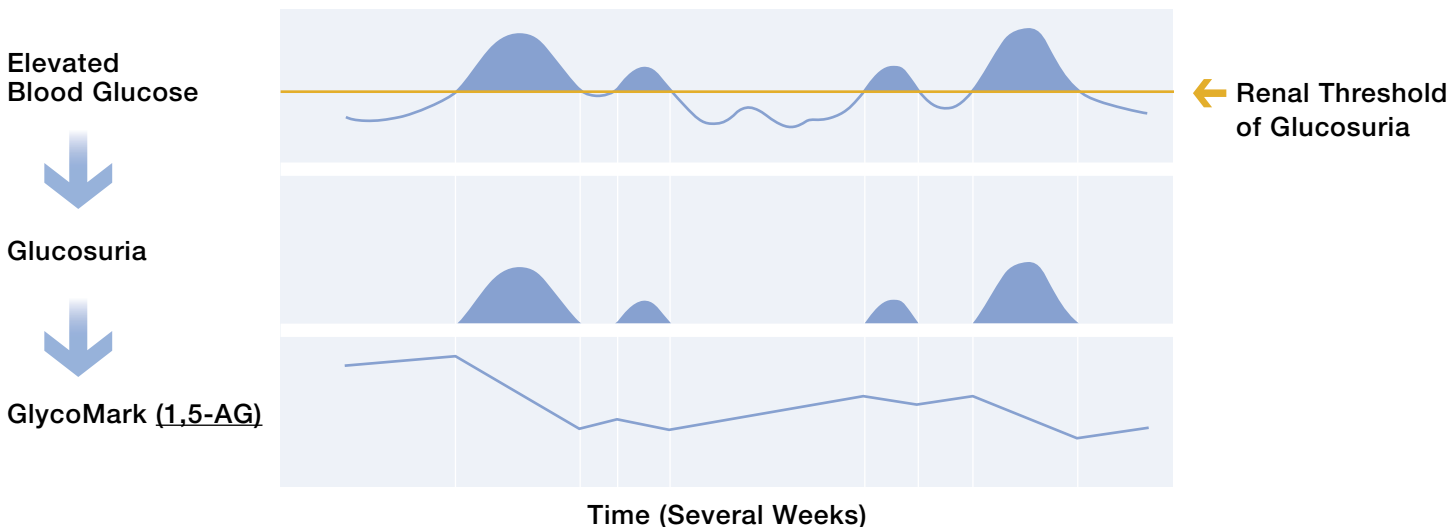
# 3

## Short-Term Glucose Control

1,5-AG blood levels decrease rapidly as a direct result of increased urinary glucose (blood glucose levels above the renal threshold of ~ 180 mg/dL). In the absence of urinary glucose (decreased blood glucose levels), 1,5-AG blood levels increase at a steady rate.

**Due to the direct relationship with glucosuria, 1,5-AG blood levels respond rapidly to changing blood glucose levels – reflecting glucose levels over 1-2 weeks.**

SCHEMATIC REPRESENTATION OF ELEVATED BLOOD GLUCOSE FOLLOWED BY GLUCOSURIA RESULTING IN DECLINE OF BLOOD 1,5-AG LEVEL



# 4

## Postprandial Hyperglycemia

In moderately controlled patients (A1C < 8%), 1,5-AG reflects postmeal glucose levels that rise above the renal threshold.

**1,5-AG levels reflect postmeal glucose levels over 1-2 weeks – providing an “average” of postmeal glucose levels for this time period in one single value.**

REPRESENTATIVE BLOOD GLUCOSE LEVELS IN ONE DAY IN DIABETES PATIENTS

