



Top Tips

The Importance of Hemoglobin Variant Detection in HbA1c Testing

Hemoglobin variant detection is important in HbA1c testing because variants can influence A1c results, and detecting their presence helps ensure accurate and reliable HbA1c reporting. Commonly occurring hemoglobin variants are HbS, HbC, HbE, HbD, and elevated fetal hemoglobin (HbF).

These variants can interfere with HbA1c results, depending on the type of method used, which can lead to an HbA1c value that is falsely high, falsely low, or not reportable. Detecting and flagging variants helps the lab with the additional information they need to ensure the reporting of an accurate A1c result. This also helps them with the full context required to select an alternative testing approach when appropriate.

Hemoglobin variants are relatively common in many populations, and individuals are often unaware that they carry a trait. Without variant detection or flagging capability built into the testing method, these interferences may go unnoticed.

Not all A1c testing methodologies enable variant detection. Some A1c testing methodologies only provide an A1c number, without any indication of potential variant hemoglobin presence.

The HPLC methodology for A1c testing is a high-resolution separation method that detects commonly occurring variant hemoglobins, thus providing the laboratory with valuable insights into the patient's hemoglobin profile.

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Top Advantages of Hemoglobin Variant Detection in HbA1c Analysis via HPLC Methodology

1

Protects the accuracy of the results

Some hemoglobin variants can affect the performance of certain A1c assay methods, which may influence results by making them appear higher, lower, or occasionally not reportable. When a variant goes undetected, there is a greater chance that the reported A1c may not fully reflect the individual's true glycemic status.

2

Prevents suboptimal clinical decisions

HbA1c is used to diagnose diabetes and guide therapy adjustments. An inaccurate result can lead to overtreatment (risking hypoglycemia) or undertreatment (increasing risk of long-term complications).

3

Improves confidence in diabetes monitoring

Diabetes management relies heavily on trending A1c values over time. Ensuring that each result shows little to no interference from variants and preserves the integrity of long-term trend analysis.

4

Reduces diagnostic delays and repeat testing

If a variant interferes with an assay and goes undetected, inconsistent or unexpected results may require redraws, repeat testing, or method comparisons. Detecting variants upfront improves workflow efficiency and reduces unnecessary follow-up testing.

5

Supports laboratory quality and compliance

Clinical laboratories are responsible for ensuring reported results are accurate and clinically reliable. Detecting hemoglobin variants helps labs meet quality standards, avoid reporting misleading data, and maintain confidence with clinicians and regulatory bodies.

6

Strengthens clinician - laboratory collaboration

When labs can detect and communicate potential variant interference, it builds trust with providers and supports more informed clinical decision-making.

7

Helps detect altered red blood cell lifespan

Some hemoglobinopathies and related conditions shorten or prolong red blood cell survival. Because HbA1c reflects glycation over the life of the red cell, altered lifespan can produce misleading results. Variant awareness prompts the laboratory to review A1c values more cautiously.

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8

Distinguishes analytical interference from true glycemc change

When an A1c result shifts unexpectedly, variant detection helps the laboratory to determine whether the change reflects real glycemc deterioration or simply assay interference. This prevents unnecessary medication adjustments.

9

Enhances population health equity

Hemoglobin variants are more prevalent in certain ethnic and geographic populations. Having variant detection capability helps ensure accurate A1c reporting across diverse patient groups, reducing the risk of systematic bias and supporting equitable diabetes diagnosis and monitoring.



Tosoh's GR01 HPLC A1c Analyzer is a fully automated analyzer that harnesses Tosoh's proprietary non-porous ion exchange HPLC column technology to deliver precise, reproducible A1c results in just 50 seconds - while also detecting the most common hemoglobin variants.

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