

HEMOGLOBIN SOLUTIONS

Abbreviation	HbA0, HbA1c
Accession Numbers	P69905 (Alpha subunit), P68871 (Beta subunit)
Source	Erythrocytes
Applications	Control Manufacture, Biosensors, Clinical Chemistry, ELISA Assay, Lateral Flow, Life Science. Critical reagent for quality control and calibrator material

Protein Function	Hemoglobin is the primary active protein component of red blood cells carrying oxygen to the tissues. Composed of two different subunits incorporating heme molecules Hemoglobin exists in a range of different isoforms. HbA1c is one of the glycosylated isoforms formed in the presence of glucose, the free amino groups at the N-terminus of the β -chain of hemoglobin A0 will naturally form HbA1c via an Amadori rearrangement and subsequent reaction. Low levels of HbA1c are normally found in normal red blood cells and the level correlates with the available glucose levels in the circulation over a longer time period (usually over a 3-month time span). HbA1c can be separated from non-glycosylated Hemoglobin by techniques such as ion exchange chromatography.		
Tissue Occurrence & Abundance	Hemoglobin levels in blood are normally around 12-16g/dL. HbA1c levels are normally around 30–33 mmol/mol in healthy young people. Levels however can increase with age and lifestyle. Higher levels, as a proportion of total Hemoglobin, are seen in people with poor glucose control.		
Function in Disease	HbA1c reagents are designed for a wide range of applications as critical raw materials to build calibrators or controls for different formats of Immunoassay. HbA1c is a glycosylated form of Hemoglobin ^{2,4} . It is formed by plasma glucose non-enzymatically binding to hemoglobin. In diabetes, higher amounts of glycosylated hemoglobin, indicating poorer control of blood glucose levels, have been associated with cardiovascular disease, nephropathy, neuropathy, and retinopathy ⁵ . HbA1c measurement is used in diabetes management as it identifies the average plasma glucose concentration over prolonged periods of time. With over 5 percent of the population suffering with diabetes, HbA1c is a crucial marker in modern medical diagnostics for monitoring and diagnosis of Diabetes.		
Product use (application notes)	Hemoglobin solutions are supplied as two different frozen preparations of concentrated (120-160mg/ml by Drabkins method ¹) purified Hemoglobin in a stabilizing buffer. The Hemoglobin solutions contain low (PS186-0) and high levels (PS186-9) of HbA1c. The solutions can be mixed to provide HbA1c target levels between the two absolute levels. Recent standardization of HbA1c by the IFCC ³ has meant that previous levels defined by the Diabetes Control complications trial (DCCT) quoted as percentages have been superseded by the more precise and traceable SI units mmol/mol.		
	PS186-0	120-160mg/ml Hb	<3% HbA1c (DCCT) <9.4mmol/mol (IFCC)
	PS 186-9	120-160mg/ml Hb	>25% HbA1c(DCCT) >249.8mmol/mol (IFCC)

Order your evaluation sample today www.bbisolutions.com

References	
	1. David L. Drabkin and J. Harold Austin (1935) Sulfhemoglobin hemoglobin and blood cells; nitric oxide preparations from washed spectrophotometric studies. J. Biol. Chem., 112: 51-65.
	2. Kenneth M. Spicer, Robert C. Allen, David Hallett, and Maria G. Buse (1979) Synthesis of Hemoglobin A, and Related minor Hemoglobins by Erythrocytes. J. Clin. Invest., 64: 40-48.
	3. Cas Weykamp et al. (2008) The IFCC Reference Measurement System for HbA1c: A 6-Year Progress Report. Clin Chem. 54:2 240-248
	4. M.C. De Rosa et al. (1998) Glycated human hemoglobin HbA1c: functional characteristics and molecular modeling studies. Biophysical Chemistry, 72: 323-335.
	5. Lind M, Pivodic A, Svensson A-M, Ólafsdóttir A, Wedel H, Ludvigsson J, (2019) HbA1c level as a risk factor for retinopathy and nephropathy in children and adults with type 1 diabetes: Swedish population based cohort study. BMJ 2019; 366: l4894.

WHY CHOOSE BBI'S ANTIGENS?

- + Our production facilities allow us to offer large batch sizes ranging from ml to litre quantities.
- + With a network of global labs and hospitals, we can access many diverse testing platforms, providing you with the exact analysis results you need.
- + With over 25 years' experience sourcing human biologicals at our HTA approved site; you can be confident in a secure supply.

Stability & Formulation	Supplied liquid frozen in a proprietary buffer formulation that has been designed to maintain the product shelf-life of 2 years at -15°C storage.
Testing for HbA1c concentration	The Siemens DCA Vantage method has been used to determine the HbA1c concentration which uses an immunoassay and a spectrophotometric method to determine the Hb concentration. As this method cannot be used to determine levels outside the range 2.5-14% HbA1c dilution with a low high concentration followed by back calculation is used to determine the HbA1c concentration.
Dispensations	PS186-0 - 10ml / 100ml/ 1000ml PS186-9 - 1ml / 10ml/ 100ml

ORDERING DETAILS - USE THE FOLLOWING CODES WHEN ORDERING

Product	Code	Description
Low HbA1c solution (<3%)	PS186-0	120-160mg/ml pure hemoglobin supplied liquid frozen sourced from lysed red blood cells
High HbA1c solution (>25%)	PS186-9	120-160mg/ml pure hemoglobin supplied liquid frozen sourced from lysed red blood cells

Related Products	Code	Description
Highly purified HbA1c	P186-0B	>96% pure HbA1c supplied liquid frozen

Get in touch to order an evaluation sample, or purchase directly at www.bbisolutions.com
 Int: +44 (0) 1495 363000 USA: 1-800-423-8199 China: +860 216 1042216