

DIABETES BIOMARKERS

Diabetes Mellitus is a metabolic disorder characterized by high blood glucose levels and the presence of glucose in the urine. Diabetes Mellitus Type-1, caused by autoimmune destruction of the pancreatic beta cells which produce insulin, is induced by insufficient amounts of insulin. Diabetes Mellitus Type-2 is characterized by tissue-wide insulin resistance, caused by reduced levels of insulin receptors or decreased affinity of the receptors for insulin.

QPS DIABETES BIOMARKER ASSAYS

Glucose

High blood glucose levels are characteristic for diabetes. Glucose is excreted in the urine when the blood glucose level exceeds the reabsorptive capacity of the kidneys.

Proinsulin

Proinsulin is a precursor from insulin produced by beta cells of the islets of Langerhans. Proinsulin is cleaved by proteases yielding equimolar amounts of insulin and C-peptide.

Insulin

Insulin is the only physiologic hormone which lowers blood glucose levels. It facilitates the entry of glucose into cells where it is needed as energy source.

C-peptide

C-peptide is a biologically inactive product of the cleavage of proinsulin. However, as it has a much longer circulating half-life than insulin, making it a better marker for beta cell function than insulin.

Glucagon

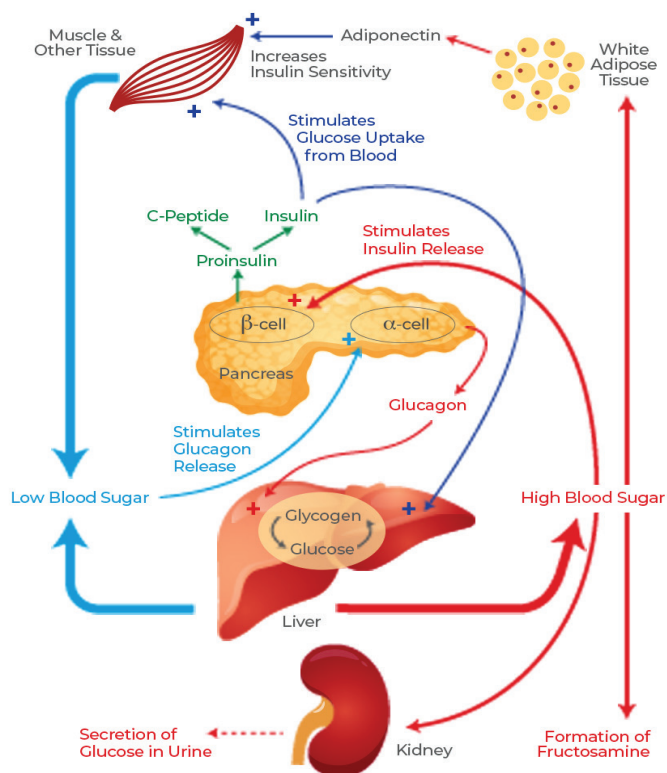
Glucagon is an hormone involved in carbohydrate, fat and protein metabolism. In diabetic patients, the glucagon levels are too high relative to the patient's needs.

Adiponectin

Adiponectin is a protein secreted from white adipose tissue. It increases the insulin sensitivity and decreases plasma glucose by increasing oxidation of tissue fat. Increased levels of adiponectin are correlated with type 1 diabetes.

Fructosamine

Fructosamine is formed by a non-enzymatic Maillard reaction between glucose and amino acid residues of plasma proteins. In diabetic patients, elevated blood glucose levels correlate with increased fructosamine formation. Fructosamine is a medium term indicator of diabetic control (2-3 weeks), whereas glucose only provides information about the glucose level at the moment the sample is taken.



QPS DIABETES BIOMARKER PANEL

Biomarker	Type of Assay	Matrix
Glucose	Enzyme Assay	NaF oxalate plasma, serum and urine
Proinsulin	ELISA	Serum
Insulin	ELISA	Serum
C-Peptide	ELISA	Serum
Adiponectin	ELISA	Serum
Fructosamine	Enzyme Assay	EDTA plasma

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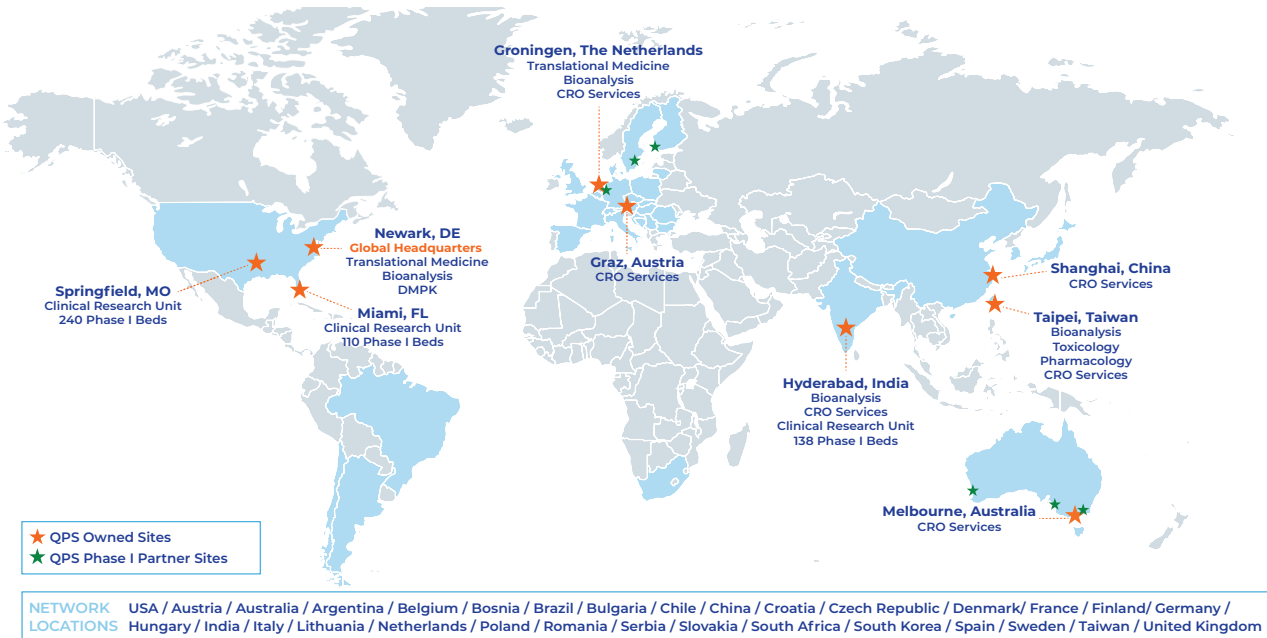
QPS CLINICAL RESEARCH OPERATIONS SERVICES

- ▶ Project Management
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- ▶ Clinical & Medical Monitoring
- ▶ Data Management & Biostatistics
- ▶ Medical Writing
- ▶ Quality Assurance
- ▶ Regulatory & Medical Affairs
- ▶ Safety & Pharmacovigilance
- ▶ Clinical Program Management

QPS DIABETES BIOMARKER ASSAY PANEL

- ▶ QPS is ready for your diabetes biomarker panel samples, including: glucose, proinsulin, insulin, C-peptide, glucagon adiponectin and fructosamine.
- ▶ QPS has enzyme assays and ELISA assays to cover all of your diabetes biomarker assay needs.
- ▶ Visit the QPS Assay Finder for a full list of >800 assays: <https://www.qps.com/service/qps-assay-finder/>

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