PRE-DIABETES

Specimen Type: Serum, Whole Blood **Collection Tube:** 1 SST, 1 Purple Top

TEST COMPONENTS

- HDL Cholesterol
- Triglycerides
- hs-CRP
- Leptin
- Adiponectin
- Insulin
- Glucose
- Hemoglobin A1c
- C-peptide
- HOMA-IR (calculated)
- eAG (calculated)
- Type 2 Diabetes Risk Assessment (weighted value calculation)

OVERVIEW

Pre-diabetes is a condition that occurs before the onset of Type 2 Diabetes. Diabetes researchers believe that during the pre-diabetic period, significant damage is already happening within the body.[1] They suggest that by the time a person is diagnosed with pre-diabetes, their pancreas has already lost up to 80% of its ability to produce insulin. [2,3]

Pre-Diabetes involves elevated blood glucose and hemoglobin A1c, but it is also characterized by physical and biochemical abnormalities: changes in appetite/excess caloric intake, weight gain, elevated hs-CRP, blood lipid dysregulation such as low HDL and high triglycerides, and increases in fasting glucose and insulin.[4-15]

Many individuals with Pre-Diabetes do not know they have it. Not all pre-diabetic individuals are obese, and unmanaged diabetes increases the likelihood that one will develop diabetes within 10 years, according to the National Institutes of Health.

CLINICAL SIGNIFICANCE

A Pre-Diabetes diagnosis involves blood glucose and hemoglobin A1c monitoring. Although hemoglobin A1c testing is done to evaluate progression of the disease in diabetics, it may not be the most practical approach in a pre-diabetic patient,[16] who may benefit from a more personalized plan of care. Early prevention is key.

The incorporation of modifiable lifestyle factors including diet, exercise, and resistance training[17] into daily practice is key to preventing the progression of Pre-Diabetes to full blown diabetes. Laboratory testing to evaluate hormone involvement in weight management,[18] degree of metabolic dysfunction,[4,5] level of insulin resistance,[4] and extent of inflammation[19-22] is essential for the prevention, reversal, and management of both disease states.

Insulin: Elevated fasting insulin often indicates insulin resistance, which predisposes a person to cardiovascular disease, stroke, and diabetes.

Glucose: Too much or too little blood sugar can reflect a metabolic abnormality or decreased sensitivity to endogenous insulin, which is a hallmark of insulin resistance, and potentially, diabetes.

HOMA-IR: Reflects both the presence and extent of any insulin one currently expresses. Higher HOMA-IR values represent greater degrees of insulin resistance.

Hemoglobin A1c: High HbA1c levels are strongly associated with an increased risk for diabetic complications such as heart disease, neuropathy, retinopathy (blindness), and nephropathy (kidney disease).

Estimated Average Glucose: Derived from an HbA1c result, this is considered easier to work with among patients and providers as this measure is expressed in the same units as fasting blood glucose readings (mg/dL), and therefore can be compared directly.

C-Peptide: Levels can help distinguish between Type 1 and Type 2 Diabetes. Type 1 diabetics will typically have low C-peptide levels, while type 2 diabetics will typically have normal or high C-peptide levels.

Adiponectin: High levels of adiponectin are generally good, as it is an indicator of efficient cellular energy production and metabolism. Excess body fat naturally secretes inflammatory materials, which suggests an intricate relationship between low adiponectin, high inflammation, and obesity.

Leptin: Hormone released by fat cells that helps control body weight through its effect on the appetite centers in the brain.

hs-CRP: High Sensitivity C-Reactive Protein (hs-CRP) reflects the presence of inflammation in the body, and recent studies indicate that low-grade inflammation is associated with an increased risk for developing Type 2 Diabetes.

Triglycerides: Elevated triglycerides are often a sign of other conditions that increase the risk for heart disease and stroke, including obesity and metabolic syndrome.

HDL Cholesterol: High levels are desirable and can reduce the risk of heart disease and stroke.

Type 2 Diabetes Risk Assessment: This score is an estimate of your risk for developing Type 2 Diabetes. It is not intended as the sole indicator of risk.

THE IMPACT OF MICRONUTRIENT STATUS ON PRE-DIABETES

Lifestyle choices - particularly the incorporation of an optimal diet - is the foundation for good health, health outcomes, and quality of life. Studies have implicated the systemic decrease in the availability of nutrient-dense foods and their replacement with processed and refined products in the rise of illness and deteriorating health. Micronutrient deficiencies, which often result from an inadequate and suboptimal diet (including excess caloric intake), are linked to multiple inflammatory illnesses and chronic disease states including metabolic syndrome, pre-diabetes, Type 2 Diabetes, and cardiovascular disease. [9-23-27]

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