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**Lab Dept:** Chemistry

**Test Name:** GLUCAGON, PLASMA

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***General Information***

**Lab Order Codes:** GLG

**Synonyms:** N/A

**CPT Codes:** 82943 - Glucagon

**Test Includes:** Glucagon level reported in pg/mL.

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***Logistics***

**Test Indications:** Useful for diagnosis and follow-up of glucagonomas and other glucagon-producing tumors. Assessing diabetic patients with problematic hyper- or hypoglycemic episodes (extremely limited utility).

Glucagon is routinely measured along with serum glucose, insulin and C-peptide levels, during the mixed-meal test employed in diagnostic workup of suspected postprandial hypoglycemia. However, it plays only a minor role in the interpretation of this test.

**Lab Testing Sections:** Chemistry - Sendouts

**Referred to:** Mayo Medical Laboratories (Test:GLP)

**Phone Numbers:** MML Lab: 612-813-6280

STP Lab: 651-220-6550

**Test Availability:** Daily, 24 hours

**Turnaround Time:** 2 - 6 days, test set up 1 day per week

**Special Instructions:** Requires a pre-chilled EDTA tube for collection.

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***Specimen***

**Specimen Type:** Blood

**Container:** Pre-chilled Lavender top (EDTA) tube

**Draw Volume:** 6 mL (Minimum: 1.5 mL) blood

**Processed Volume:** 2 mL (Minimum: 0.45 mL) plasma

**Collection:** Routine venipuncture. After collection, specimen must be chilled in wet ice for 10 minutes. Submit the specimen to the laboratory immediately for processing.

**Special Processing:** Lab Staff: Centrifuge specimen immediately after it has cooled on ice for 10 minutes, remove plasma aliquot into a screw-capped round bottom plastic vial. Store and ship at frozen temperatures. Blood should not remain at room temperature for any length of time. Forward promptly.

**Patient Preparation:** N/A

**Sample Rejection:** Mislabeled or unlabeled specimens; gross hemolysis

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***Interpretive***

**Reference Range:**

<b>Age:</b>	<b>Range (pg/mL):</b>
<= 6 hours	100 – 650
1 – 2 days	70 - 450
2 – 4 days	100 - 650
4 – 14 days	Declining gradually to adult levels
>14 days	< or = 80

Glucagon levels are inversely related to blood glucose levels at all ages. This is particularly pronounced at birth and shortly thereafter, until regular feeding patterns are established. This explains the higher levels immediately after birth, which then first fall as the glucagon release mobilizes the infant's glucose stores, then rise again as stores are depleted, finally normalizing towards adult levels as regular feeding patterns are established.

Interpretation: Elevated glucagon levels in the absence of hypoglycemia may indicate the presence of a glucagon-secreting tumor. Successful treatment of a glucagon-secreting tumor is associated with normalization of glucagon levels.

Inappropriate elevations in glucagon levels in hyperglycemic type I diabetic patients indicate that paradoxical glucagon release may contribute to disease severity. This can be observed if insulin treatment is inadequate and patients are ketotic. However, glucagon measurement plays little, if any, role in the diagnostic workup of diabetic ketoacidosis, which is based on demonstrating significantly elevated plasma or serum glucose (>250 mg/dL), circulating ketones (beta-hydroxy butyrate), and acidosis (typically with increased anion gap).

In diabetic patients, low glucagon levels (undetectable or in the lower quartile of the normal range) in the presence of hypoglycemia indicate impairment of hypoglycemic counter-regulation. These patients may be particularly prone to recurrent hypoglycemia. This can be a permanent problem due to islet alpha-cell destruction or other, less well understood processes (eg, autonomic neuropathy). It can also be functional, most often due to over tight blood-glucose control, and may be reversible after decreasing insulin doses.

**Critical Values:**

N/A

**Limitations:**

Results obtained with different glucagon assays can differ substantially. This can be caused by use of different calibration standards. Different glucagon assays may also exhibit variable cross-reactivity with different isoforms of glucagon, not all of which are biologically active. Some assays, including this one, remove biologically inactive isoforms before measurement, while others do not. All these factors contribute to the differences between different assays. Serial measurements should, therefore, always be performed using the same assay.

Precise reference ranges for appropriate glucagon responses for given blood glucose ranges are not well established and vary widely from assay to assay. Expert advice should be sought when interpreting glucagon, insulin, and C-peptide levels obtained during mixed-meal testing.

Tumor marker tests, including glucagon, are not specific for malignancy. All immunometric assays can, on rare occasions, be subject to hooking at extremely high analyte concentrations (false-low results), heterophilic antibody interference (false-high results), or autoantibody interference (unpredictable effects). If the laboratory result does not fit the clinical picture, these possibilities should be considered.

**Methodology:**

Immunoassay Following Extraction

**References:**

[Mayo Medical Laboratories](#) (November 2017)

**Updates:**

6/11/2013: Moved from Esoterix Laboratories to Mayo Medical Laboratories.