# Overview

## Useful For

- Diagnosing insulinoma, when used in conjunction with proinsulin and C-peptide measurements
- Management of diabetes mellitus

## Method Name

Electrochemiluminescence Immunoassay (ECLIA)

## NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Advisory Information

Patients on insulin therapy may develop anti-insulin antibodies. These antibodies may interfere in the assay system, causing inaccurate results. In such individuals, measurement of free insulin FINS / Insulin, Free, Serum should be performed.

### Specimen Required

#### Patient Preparation:

1. Patient should be fasting.

2. **For 12 hours before this test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.

### Supplies

- Aliquot Tube, 5 mL (T465)

### Collection Container/Tube:

- **Preferred:** Serum gel
- **Acceptable:** Red top

**Submission Container/Tube:** Plastic, 5 mL, aliquot tube

### Specimen Volume

1 mL

### Collection Instructions:

1. Avoid hemolysis

2. Label specimens with corresponding collection times.
Test Definition: INS
Insulin, S

3. Centrifuge and aliquot within 2 hours of collection

**Additional Information:** If multiple specimens are drawn, send separate order for each specimen.

**Specimen Minimum Volume**
0.5 mL

**Reject Due To**

<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross lipemia</td>
<td>OK</td>
</tr>
<tr>
<td>Other</td>
<td>Autopsy specimen</td>
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</table>

**Specimen Stability Information**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
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</thead>
<tbody>
<tr>
<td>Serum</td>
<td>Frozen (preferred)</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerated</td>
<td>7 days</td>
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**Clinical and Interpretive**

**Clinical Information**

Insulin is a hormone produced by the beta cells of the pancreas. It regulates the uptake and utilization of glucose and is also involved in protein synthesis and triglyceride storage.

Type 1 diabetes (insulin-dependent diabetes) is caused by insulin deficiency due to destruction of insulin-producing pancreatic islet (beta) cells. Type 2 diabetes (noninsulin dependent diabetes) is characterized by resistance to the action of insulin (insulin resistance).

Insulin levels may be increased in patients with pancreatic beta cell tumors (insulinoma).

**Reference Values**

2.6-24.9 mcIU/mL

For SI unit Reference Values, see [https://www.mayocliniclabs.com/order-tests/si-unit-conversion.html](https://www.mayocliniclabs.com/order-tests/si-unit-conversion.html)

**Interpretation**

During prolonged fasting, when the patient's glucose level is reduced to <40 mg/dL, elevated insulin level plus elevated levels of proinsulin and C-peptide suggest insulinoma.

Insulin levels generally decline in patients with type 1 diabetes mellitus.

In the early stage of type 2 diabetes, insulin levels are either normal or elevated. In the late stage of type 2 diabetes, insulin levels decline.

In normal individuals, insulin levels parallel blood glucose levels.
To compare insulin and C-peptide concentrations (ie, insulin to C-peptide ratio):

- Convert insulin to pmol/L: insulin concentration in mcIU/mL x 6.945 = insulin concentration in pmol/L.

- Convert C-peptide to pmol/L: C-peptide concentration in ng/mL x 331 = C-peptide concentration in pmol/L.

**Cautions**

Human antimouse antibodies (HAMA) may interfere with the assay.

This assay has 100% cross-reactivity with recombinant human insulin (Novolin R and Novolin N). It does not recognize other commonly used analogues of injectable insulin (ie, insulin lispro, insulin aspart, and insulin glargine).

**Clinical Reference**


**Performance**

**Method Description**

The Roche cobas insulin method is a sandwich electrochemiluminescence immunoassay that employs a biotinylated monoclonal insulin-specific antibody and a monoclonal insulin-specific antibody. Insulin in the specimen reacts with both the biotinylated monoclonal insulin-specific antibody (mouse) and the monoclonal insulin-specific antibody (mouse) labeled with a ruthenium complex, forming a sandwich complex. Streptavidin-coated microparticles are added and the mixture is aspirated into the measuring cell where the microparticles are magnetically captured onto the surface of the electrode. Unbound substances are then removed with ProCell. Application of voltage to the electrode induces the chemiluminescent emission, which is then measured. (Package insert: Roche Insulin reagent, Roche Diagnostic Corp., Indianapolis, IN 10/2010, V1)

**PDF Report**

No

**Day(s) and Time(s) Test Performed**

Monday through Friday: 5 a.m.-12 a.m.

Saturday: 6 a.m.-6 p.m.

**Analytic Time**

Same day/1 day

**Maximum Laboratory Time**

3 days

**Specimen Retention Time**

3 months

**Performing Laboratory Location**

Rochester

**Fees and Codes**
Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification

This test has been cleared or approved by the U.S. Food and Drug Administration and is used per manufacturer’s instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

83525

LOINC® Information

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<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tbody>
<tr>
<td>INS</td>
<td>Insulin, S</td>
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<table>
<thead>
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