

## Overview

### Useful For

Evaluation of suspected insulinoma characterized by hypoglycemia and increased serum insulin concentration

Detecting drugs that stimulate insulin secretion

Drugs detected by this procedure are:

- The first-generation sulfonylureas: chlorpropamide (Diabinese), tolazamide, and tolbutamide (Orinase)
- The second-generation sulfonylureas: glimepiride (Amaryl), glipizide (Glucotrol), and glyburide (Glibenclamide)
- The meglitinides: repaglinide (Prandin) and nateglinide (Starlix)
- The thiazolidinediones: pioglitazone (Actos) and rosiglitazone (Avandia)

This test is **not intended for** therapeutic drug monitoring but could be used to monitor compliance.

### Highlights

If hypoglycemia is the result of an insulin-stimulating drug, this test will detect the drug at physiologically significant concentrations during an episode of hypoglycemia.

### Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

### NY State Available

Yes

## Specimen

### Specimen Type

Serum Red

### Specimen Required

**Patient Preparation:** Specimen must be collected during an episode of hypoglycemia.

**Supplies:** Sarstedt Aliquot Tube, 5 mL (T914)

**Collection Container/Tube:** Red top (serum gel/SST are **not acceptable**)

**Submission Container/Tube:** Plastic vial

**Specimen Volume:** 1.5 mL

**Collection Instructions:** Centrifuge and aliquot serum into a plastic vial.

### Forms

If not ordering electronically, complete, print, and send a [Therapeutics Test Request](#) (T831) with the specimen.

### Specimen Minimum Volume

0.5 mL

Reject Due To

|                 |    |
|-----------------|----|
| Gross hemolysis | OK |
| Gross lipemia   | OK |
| Gross icterus   | OK |

Specimen Stability Information

| Specimen Type | Temperature        | Time    | Special Container |
|---------------|--------------------|---------|-------------------|
| Serum Red     | Frozen (preferred) | 28 days |                   |
|               | Ambient            | 7 days  |                   |
|               | Refrigerated       | 28 days |                   |

Clinical & Interpretive

Clinical Information

The metabolic and hormonal profiles of insulinoma and sulfonylurea-induced hypoglycemia are identical. Therefore, in the evaluation of the hypoglycemic patient, the possible use of oral hypoglycemic agents as the cause for low blood glucose and elevated serum insulin must be considered. Absence of hypoglycemic drugs in serum during an episode of low blood glucose should be demonstrated before considering pancreatic exploration for suspected insulinoma.

Reference Values

- Negative
- Screening cutoff concentrations
- Chlorpropamide: 100 ng/mL
- Glimepiride: 20 ng/mL
- Glipizide: 5 ng/mL
- Glyburide: 5 ng/mL
- Nateglinide: 5 ng/mL
- Pioglitazone: 20 ng/mL
- Repaglinide: 5 ng/mL
- Rosiglitazone: 20 ng/mL
- Tolazamide: 50 ng/mL
- Tolbutamide: 20 ng/mL

**Note:** If a drug is detected at a concentration greater than the cutoff, the report will indicate that specific drug is **positive**. The test cutoff listed for each drug is lower than the concentration that will cause increased insulin and decreased glucose.

Interpretation

Use of hypoglycemic agents outside of the context of treatment of type 2 diabetes is likely to cause hypoglycemia

associated with elevated serum insulin. Patients presenting with hypoglycemia due to ingestion of a first-, second-, or third-generation hypoglycemic agents will have drug present in serum greater than the minimum effective concentration (see Reference Values). Presence of drug indicates that the patient has recently ingested a hypoglycemic agent.

**Cautions**

Proper interpretation requires that the specimen be collected during or close to the time of a hypoglycemic episode. Drugs will not be detected (and are not likely to be present) if blood is drawn when blood glucose is normal in nondiabetic patients.

All drugs that stimulate insulin secretion undergo extensive metabolism before excretion. The parent drug is therefore not present in urine. Blood serum is the specimen of choice for detecting use of the hypoglycemic drugs; urine or plasma is not an acceptable specimen.

This screen does not include the first-generation sulfonylurea acetohexamide.

Other drugs that do not induce hypoglycemia, thiazolidinediones such as troglitazone and lobeglitazone, and are designed to make tissues more sensitive to insulin are not included in this screen test.

Drugs that lower blood glucose through mechanisms not related to stimulation of insulin secretion, such as acarbose, metformin, and miglitol, are not included in this screen test.

**Clinical Reference**

1. Ben-Ami H, Nagachandran P, Mendelson A, Edoute Y. Drug-induced hypoglycemic coma in 102 diabetic patients. Arch Intern Med. 1999;159(3):281-284
2. Milone MC, Shaw LM. Therapeutic drugs and their management. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:420-453

**Performance****Method Description**

Serum specimens are subjected to organic extraction. The extract is analyzed by liquid chromatography tandem mass spectrometry.(Unpublished Mayo method)

**PDF Report**

No

**Day(s) Performed**

Monday, Wednesday, Friday

**Report Available**

2 to 6 days

**Specimen Retention Time**

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

Fees & 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 account representative. For assistance, contact [Customer Service](#).

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

G0480

80377 (if appropriate for select payers)

LOINC® Information

| Test ID | Test Order Name              | Order LOINC® Value |
|---------|------------------------------|--------------------|
| HYPOG   | Hypoglycemic Agent Screen, S | 68318-5            |

| Result ID | Test Result Name | Result LOINC® Value |
|-----------|------------------|---------------------|
| 21295     | Chlorpropamide   | 48329-7             |
| 21296     | Tolazamide       | 21566-5             |
| 21297     | Tolbutamide      | 21567-3             |
| 21298     | Glimepiride      | 48325-5             |
| 21299     | Glipizide        | 48326-3             |
| 21300     | Glyburide        | 48327-1             |
| 21301     | Repaglinide      | 48328-9             |
| 609767    | Nateglinide      | 49487-2             |
| 609768    | Pioglitazone     | 100351-6            |
| 609769    | Rosiglitazone    | 100352-4            |