MAYO CLINIC LABORATORIES

# Test Definition: GENTA

Gentamicin, Trough, Serum

## Overview

### Useful For
Monitoring adequacy of drug clearance during gentamicin therapy

### Method Name
Colorimetric

### NY State Available
Yes

## Specimen

### Specimen Type
Serum

### Specimen Required
**Collection Container/Tube:**
**Preferred:** Serum gel
**Acceptable:** Red top
**Submission Container/Tube:** Plastic vial
**Specimen Volume:** 0.5 mL
**Collection Instructions:**
1. Serum gel tubes should be centrifuged within 2 hours of collection.
2. Red-top tubes should be centrifuged, and the serum aliquoted into a plastic vial within 2 hours of collection.

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

### Specimen Minimum Volume
0.25 mL

### Reject Due To

| | |
|---|---|
| Gross hemolysis | Reject |

### Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Serum | Refrigerated (preferred) | 7 days | |
| | Ambient | 72 hours | |

| | | | |
|---|---|---|---|
| | Frozen | 14 days | |

## Clinical & Interpretive

### Clinical Information

Gentamicin is an antibiotic used to treat life-threatening blood infections caused by gram-negative bacilli, particularly *Citrobacter freundii*, *Acinetobacter* species, *Enterobacter* species, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Providencia stuartii*, *Pseudomonas aeruginosa*, and *Serratia* species. It is often used in combination with beta-lactam therapy.

A gentamicin minimal inhibitory concentration (MIC) of 4.0 mcg/mL or less is considered susceptible for gram-negative bacilli. A MIC of 500 mcg/mL or less is considered synergistic when combined with appropriate antibiotics for treatment of serious enterococcal infections.

Conventional dosing of gentamicin is usually given 2 to 3 times per day by intravenous or intramuscular injections in doses to achieve peak blood concentration between 3.0 to 12.0 mcg/mL depending on the type of infection. Gentamicin also may be administered at higher doses (usually 5-7 mg/kg) once per day to patients with good renal function (known as pulse dosing). Dosing amount or interval must be decreased to accommodate for reduced renal function.

Ototoxicity and nephrotoxicity are the primary toxicities associated with gentamicin. This risk is enhanced in presence of other ototoxic or nephrotoxic drugs. Monitoring of serum levels and symptoms consistent with ototoxicity is important. For longer durations of use, audiology/vestibular testing should be considered at baseline and periodically during therapy.

### Reference Values

Therapeutic: <2.0 mcg/mL
Toxic: >2.0 mcg/mL

### Interpretation

Goal levels depend on the type of infection being treated. Goal trough levels should be less than 2.0 mcg/mL for conventional dosing. Prolonged exposure to trough levels exceeding 2.0 mcg/mL may lead to toxicity.

### Cautions

Patient samples that contain the drug sisomicin will yield falsely elevated values for gentamicin. However, this drug is not usually coadministered with gentamicin.

High concentrations of penicillins or cephalosporins have been shown to inactivate gentamicin in vitro. The degree of inactivation is dependent on the particular aminoglycoside being measured, the type and concentration of the penicillin or cephalosporin that is also present, and the storage conditions of the sample. For patients receiving additional antibiotics of these types, 5 to 7 samples should be assayed immediately or stored frozen.

Interfering heterophile antibodies occur at low frequency in the general population. These antibodies can cause autoagglutination of the microparticle reagent leading to undetected erroneously low results.

### Clinical Reference

1. Wilson JW, Estes LL: Mayo Clinic Antimicrobial Therapy Quick Guide, 2008
2. Hammett-Stabler CA, Johns T: Laboratory guidelines for monitoring of antimicrobial drugs. Clin Chem 1998 May;44(5):1129-1140
3. Gonzalez LS III, Spencer JP: Aminoglcosides: a practical review. Am Fam Physician 1998 Nov 15;58(8):1811-1820

## Performance

### Method Description

The CEDIA Gentamicin II Assay uses recombinant DNA technology to produce a unique homogeneous enzyme immunoassay system. The assay is based on the bacterial enzyme beta-galactosidase, which has been genetically engineered into two inactive fragments: enzyme acceptor and enzyme donor. These fragments spontaneously reassociate to form fully active enzyme that, in the assay format, cleaves a substrate, generating a color change that can be measured spectrophotometrically. In the assay, analyte in the sample competes with analyte conjugated to one inactive fragment of beta-galactosidase for antibody binding site. If analyte is present in the sample, it binds to antibody, leaving the inactive enzyme fragments to form active enzymes. If analyte is not present in the sample, antibody binds to analyte conjugated on the inactive fragment, inhibiting the reassociation of inactive beta-galactosidase fragments, and no active enzyme is formed. The amount of active enzyme formed, and resultant absorbance change are directly proportional to the amount of drug present in the sample.(Package insert: CEDIA Gentamicin II Assay. Thermo Scientific; 09/2022)

### PDF Report

No

### Day(s) Performed

Monday through Sunday

### Report Available

Same day/1 day

### Specimen Retention Time

1 week

### Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

## 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.

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## Test Classification

This test has been cleared, approved, or is exempt by the US 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

80170

## LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| GENTA | Gentamicin, Trough, S | 3665-7 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| GENTA | Gentamicin, Trough, S | 3665-7 |