Test Definition: ROXUR

Oxalate, Random, Urine

Overview

Useful For

Monitoring therapy for kidney stones using random urine specimens

Identifying increased urinary oxalate as a risk factor for stone formation

Diagnosis of primary or secondary hyperoxaluria

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
OXCO1	Oxalate, Random, U (mmol/L)	No	Yes
OXCO3	Oxalate, Random, U (mg/L)	No	Yes
CRETR	Creatinine, Random, U	No	Yes
RAT11	Oxalate/Creatinine Ratio	No	Yes

Method Name

OXCO1: Enzymatic Using Oxalate Oxidase
CRETR: Enzymatic Colorimetric Assay
OXCO3, RAT11: Calculation

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

A timed 24-hour urine collection is the preferred specimen for measuring and interpreting this urinary analyte. Order OXU / Oxalate, 24 Hour, Urine.

Random collections normalized to urinary creatinine may be of some clinical use in patients who cannot collect a 24-hour specimen, typically small children. Therefore, this random test is offered for children under 16 years old.

Specimen Required

Patient Preparation: Avoid taking large doses (>2 g orally/24 hours) of vitamin C prior to specimen collection.
Supplies: Urine Tubes, 10 mL tube (T068)

Container/Tube: 10-mL plastic tube or a clean, plastic container with no metal cap
Specimen Volume: 7 mL
Collection Instructions:
1. Collect a random urine specimen.
2. No preservative.
3. Specimen pH should be between 4.5 and 8 and will stay in this range if kept refrigerated. Specimens with pH above 8 may indicate bacterial contamination, and testing will be cancelled. **Do not** attempt to adjust pH as it will adversely affect results.

Forms
If not ordering electronically, complete, print, and send a Renal Diagnostics Test Request (T830) with the specimen.

Specimen Minimum Volume
6 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	14 days	
	Ambient	72 hours	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information
Oxalate is an end product of glyoxalate and glycerate metabolism. Humans have no enzyme capable of degrading oxalate, therefore it must be eliminated by the kidney.

In tubular fluid, oxalate can combine with calcium to form calcium oxalate stones. In addition, high concentrations of oxalate may be toxic to kidney cells.

Increased urinary oxalate excretion results from inherited enzyme deficiencies (primary hyperoxaluria), gastrointestinal disorders associated with fat malabsorption (secondary hyperoxaluria), or increased oral intake of oxalate-rich foods or vitamin C.

Since increased urinary oxalate excretion promotes calcium oxalate stone formation, various strategies are employed to lower oxalate excretion.

Reference Values
No established reference values

Interpretation

An elevated urine oxalate (>0.46 mmol/day) may suggest disease states such as secondary hyperoxaluria (fat malabsorption), primary hyperoxaluria (alanine glyoxalate transferase enzyme deficiency, glyceric dehydrogenase deficiency), idiopathic hyperoxaluria, or excess dietary oxalate or vitamin C intake.

In stone-forming patients, high urinary oxalate values, sometimes even in the upper limit of the normal range, are treated to reduce the risk of stone formation.

The urinary oxalate creatinine ratio varies widely in young children from below 0.35 mmol/mL at birth, to below 0.15 mmol/mL at 1 year of age, to below 0.10 mmol/mL at 10 years of age, and below 0.05 mmol/mL at 20 years of age (see table below).(1)

Table. Oxalate/Creatinine (mg/mg)

Age (year)	95th Percentile
0-0.5	<0.175
0.5-1	<0.139
1-2	<0.103
2-3	<0.08
3-5	<0.064
5-7	<0.056
7-17	<0.048

Cautions

Ingestion of ascorbic acid (>2 g/day) may falsely elevate the measured urinary oxalate excretion.

Do not collect in metal-capped containers.

Clinical Reference

1. Matos V, Van Melle G, Werner D, Bardy D, Guignard JP. Urinary oxalate and urate to creatinine ratios in a healthy pediatric population. Am J Kidney Dis. 1999;34(2):e1. doi:10.1053/AJKD034000e6
2. Wilson DM, Liedtke RR. Modified enzyme-based colorimetric assay of urinary and plasma oxalate with improved sensitivity and no ascorbate interference: reference values and sample handling procedures. Clin Chem. 1991;37(7):1229-1235
3. Lieske JC, Wang X. Heritable traits that contribute to nephrolithiasis. Urolithiasis. 2019;47(1):5-10
4. Lieske JC, Turner ST, Edeh SN, Smith JA, Kardia SLR. Heritability of urinary traits that contribute to nephrolithiasis. Clin J Am Soc Nephrol. 2014;9(5):943-950
5. Zhao F, Bergstralh EJ, Mehta RA, et al. Predictors of Incident ESRD among Patients with Primary Hyperoxaluria Presenting Prior to Kidney Failure. Clin J Am Soc Nephrol. 2016;11(1):119-126. doi:10.2215/CJN.02810315

Performance

Method Description

The assay utilizes oxalate oxidase, which oxidizes oxalate to carbon dioxide and peroxide. In the presence of peroxidase,

the peroxide oxidatively couples 3-methyl-2-benzothiazolinone and 3-dimethylaminobenzoic acid to form indamine dye, which is measured spectrophotometrically at 600 nm.(Kasidas GP, Rose GA. Continuous-flow assay for urinary oxalate using immobilized oxalate oxidase. Ann Clin Biochem, 1985;22:412-419; package insert: Oxalate kit. Trinity Biotech; V 11/2017)

PDF Report
No

Day(s) Performed
Monday through Saturday

Report Available
3 to 5 days

Specimen Retention Time
7 days

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.

Test Classification
This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
83945
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ROXUR	Oxalate, Random, U	15086-2

Result ID	Test Result Name	Result LOINC® Value
CRETR	Creatinine, Random, U	2161-8
OXCO1	Oxalate, Random, U (mmol/L)	15086-2
OXCO3	Oxalate, Random, U (mg/L)	2700-3

RAT11	Oxalate/Creatinine Ratio	13483-3