Test Definition: F2ISO
F2-Isoprostanes, U

Overview

Useful For
The assessment of in vivo lipid peroxidation and considered to be an index of systemic oxidative stress over time

Additional Tests

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACT</td>
<td>Creatinine, U</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Testing Algorithm
When F2-Isoprostanes testing is performed, urine creatinine will always be performed at no additional charge.

Method Name
F2ISO: Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
AACT: Enzymatic Colorimetric Assay

NY State Available
Yes

Specimen

Specimen Type
Urine

Specimen Required

Patient Preparation: Patient should not have taken nonsteroidal anti-inflammatory drugs within 72 hours or aspirin within 2 weeks prior to collection of a specimen.

Container/Tube: Plastic, 5-mL urine tube (T465)

Specimen Volume: 5mL

Collection Instructions:
1. Collect a random urine specimen.
2. No preservative.

Forms
If not ordering electronically, complete, print, and send a Cardiovascular Test Request Form (T724) with the specimen.

Specimen Minimum Volume
1 mL
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Reject Due To

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

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>Urine</td>
<td>Refrigerated (preferred)</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td>90 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient</td>
<td>7 days</td>
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Clinical and Interpretive

Clinical Information

Oxidative stress results from the generation and overaccumulation of reactive oxygen and nitrogen species and has been shown to damage lipoproteins, lipids, DNA, and proteins. Furthermore, oxidative stress may modulate modifications to these lipoproteins and DNA such that endothelial function and inflammatory processes are altered, ultimately resulting in the initiation and progression of atherosclerosis and cardiovascular disease (CVD). Isoprostanes are a series of prostaglandin-like compounds produced via the free-radical catalyzed peroxidation of arachidonic acid, independent of the cyclooxygenase-derived prostaglandins. F2-isoprostanes are considered the "gold standard" test for quantifying lipid peroxidation/oxidative stress in vivo. 15-F2t-isoprostane (15-F2t-IsoP), also referred to as 8-iso-PGF2 alpha or 8-isoprostane F2 alpha, is 1 of the F2-isoprostanes produced in abundance in vivo and has demonstrated potency as a vasoconstrictor within the vasculature of the heart, brain, lung, and kidneys. Generation of 15-F2t-IsoP induces downstream effects including proliferation of vascular smooth muscle cells and release of endothelin. Additional evidence suggests that F2-isoprostanes may increase aspirin resistance to platelet aggregation within platelets and whole blood.

F2-isoprostanes are advantageous over other markers of lipid peroxidation due to their in vivo and in vitro stability and are detectable in a variety of human tissues and biological fluids including plasma, urine, lavage fluid, RBCs, and cerebrospinal fluid. Quantitation of F2-isoprostanes in a random urine specimen is considered to be the most accurate and robust measurement of circulating isoprostanes and is a noninvasive method of assessment.

Reference Values

> or =18 years: < or =1.0 ng/mg creatinine

<18 years: not established

Interpretation

Elevated urinary F2-isoprostanes reflect widespread oxidative stress and systemic burden of lipid peroxidation end products. Quantitation of F2-isoprostanes in urine is highly dependent upon the methodology utilized; however, mass spectrometry methods (gas chromatography-mass spectrometry or liquid chromatography-tandem mass spectrometry) assays yield superior sensitivity and analytical specificity compared with immunoassays.

F2-isoprostanes demonstrate superior clinical sensitivity compared to other oxidative stress biomarkers but lack clinical specificity for any particular disease. Pharmacological treatment with antioxidant supplementation, hypoglycemic agents in diabetes, smoking cessation, and weight reduction have all been shown to decrease production of F2-isoprostanes.
Cautions

For the most accurate assessment of lipid oxidation status, individuals should not be on aspirin or other nonsteroidal anti-inflammatory drugs, have smoked, or have had acute changes in statin mono- or combination therapies.

Patients should not take nonsteroidal antiinflammatory drugs (NSAIDs) within 72 hours or aspirin within 2 weeks prior to providing a urine specimen for analysis.

Clinical Reference


Performance

Method Description

F2-isoprostane (15-F2t-IsoP) and prostaglandin F2 alpha (PGF2 alpha) are separated and quantified in urine by liquid chromatography-tandem mass spectrometry (LC-MS/MS). Deuterium-labeled 15-F2t-IsoP and PGF2 alpha internal standards are added to the samples which are then positive-pressure filtered to remove particulates and sediment from the urine. A Cyclone MAX mixed mode anion exchange turboflow column is used for sample clean-up, while a Waters Xbridge C8 analytical column is used for separation of 15-F2t-IsoP and PGF2 alpha. From this column, the sample is transferred to an API 5000 MS/MS for instrumental analysis. The ratios of the extracted peak areas of 15-F2t-IsoP and PGF2 alpha to their respective deuterium labeled internal standards are used to calculate the concentration of the respective analyte present. PGF2 alpha is not clinically reported, as its analysis is conducted only to ensure complete separation from 15-F2t-IsoP. (Milne GL, Sanchez SC, Musiek, ES, Morrow JD: Quantification of F2-isoprostanes as a biomarker of oxidative stress. Nature Prot 2007;2:221-226)

PDF Report

No

Day(s) and Time(s) Test Performed

Wednesday: 11 a.m.

Analytic Time

2 days

Maximum Laboratory Time

9 days

Specimen Retention Time

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

CPT Code Information
82542

LOINC® Information

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<th>Order LOINC Value</th>
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<tr>
<td>F2ISO</td>
<td>F2-Isoprostanes, U</td>
<td>90783-2</td>
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<td>88677</td>
<td>15-F2t-Isoprostane, U</td>
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