Overview

Useful For
Monitoring patients receiving 5-alpha reductase inhibitor therapy or chemotherapy
Evaluating patients with possible 5-alpha reductase deficiency

Testing Algorithm
See Steroid Pathways in Special Instructions.

Special Instructions
- Steroid Pathways

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

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required
Container/Tube:
Preferred: Red top
Acceptable: Serum gel

Specimen Volume: 1 mL

Specimen Minimum Volume
0.6 mL

Reject Due To
- Gross hemolysis: OK
- Gross lipemia: OK
- Gross icterus: OK

Specimen Stability Information

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

Clinical Information

The principal prostatic androgen is dihydrotestosterone (DHT). Levels of DHT remain normal with aging, despite a decrease in the plasma testosterone, and are not elevated in benign prostatic hyperplasia (BPH).\(^1\)

DHT is generated by reduction of testosterone by 5-alpha reductase. Two isoenzymes of 5-alpha reductase have been discovered. Type 1 is present in most tissues in the body where 5-alpha reductase is expressed, and is the dominant form in sebaceous glands. Type 2 is the dominant isoenzyme in genital tissues, including the prostate.

Androgenetic alopecia (AGA; male-pattern baldness) is a hereditary and androgen-dependent progressive thinning of the scalp hair that follows a defined pattern.\(^2\) While the genetic involvement is pronounced, but poorly understood, major advances have been achieved in understanding the principal elements of androgen metabolism that are involved. DHT may be related to baldness. High concentrations of 5-alpha reductase have been found in frontal scalp and genital skin and androgen-dependent processes are predominantly due to the binding of DHT to the androgen receptor (AR). Since the clinical success of treatment of AGA with modulators of androgen metabolism or hair growth promoters is limited, sustained microscopic follicular inflammation with connective tissue remodeling, eventually resulting in permanent hair loss, is considered a possible cofactor in the complex etiology of AGA.

Currently available AGA treatment modalities with proven efficacy are oral finasteride, a competitive inhibitor of 5-alpha reductase type 2, and topical minoxidil, an adenosine triphosphate-sensitive potassium channel opener that has been reported to stimulate the production of vascular endothelial growth factor in cultured dermal papilla cells.

Currently, many patients with prostate disease receive treatment with a 5-alpha reductase inhibitor such as finasteride (Proscar) to diminish conversion of DHT from testosterone.

See Steroid Pathways in Special Instructions.

Reference Values

Males

Cord blood: < or =100 pg/mL

< or =6 months: < or =1,200 pg/mL

Tanner Stages

<table>
<thead>
<tr>
<th>Mean</th>
<th>Age</th>
<th>Reference range (pg/mL)</th>
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</thead>
<tbody>
<tr>
<td>Stage I (&gt;6 months and prepubertal)</td>
<td>7.1 years</td>
<td>&lt; or =50</td>
</tr>
<tr>
<td>Stage II</td>
<td>12.1 years</td>
<td>&lt; or =200</td>
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<tr>
<td>Stage III</td>
<td>13.6 years</td>
<td>80-330</td>
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<tr>
<td>Stage IV</td>
<td>15.1 years</td>
<td>220-520</td>
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Test Definition: DHTS
Dihydrotestosterone, S

<table>
<thead>
<tr>
<th>Tanner Stage</th>
<th>Mean Age</th>
<th>Reference range (pg/mL)</th>
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</thead>
<tbody>
<tr>
<td>Stage I (&gt;6 months and prepubertal)</td>
<td>7.1 years</td>
<td>&lt; or =50</td>
</tr>
<tr>
<td>Stage II</td>
<td>10.5 years</td>
<td>&lt; or =300</td>
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<tr>
<td>Stage III</td>
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<tr>
<td>Stage IV</td>
<td>12.3 years</td>
<td>&lt; or =300</td>
</tr>
<tr>
<td>Stage V</td>
<td>14.5 years</td>
<td>&lt; or =300</td>
</tr>
</tbody>
</table>

>19 years: 112-955 pg/mL

Females

Cord blood: < or =50 pg/mL

< or =6 months: < or =1,200 pg/mL


Interpretation
Patients taking 5-alpha reductase inhibitor have decreased dihydrotestosterone (DHT) serum levels.

Patients with genetic 5-alpha reductase deficiency (a rare disease) also have reduced DHT serum levels.

DHT should serve as the primary marker of peripheral androgen production. However, because it is metabolized rapidly and has a very high affinity for sex hormone-binding globulin (SHBG), DHT does not reflect peripheral androgen action. Instead, its distal metabolite, 3-alpha, 17-beta-androstanediol glucuronide, serves as a better marker of peripheral androgen action.

See Steroid Pathways in Special Instructions.

Cautions
Patients with benign prostatic hyperplasia (BPH) or prostatic cancer may not have elevated dihydrotestosterone (DHT) levels even though growth of the prostate gland may be stimulated by DHT.

Clinical Reference
1. Bartsch G, Rittmaster RS, Klocker H: Dihydrotestosterone and the concept of 5 alpha-reductase inhibition in

Document generated February 5, 2021 at 9:47pm CST
Test Definition: DHTS
Dihydrotestosterone, S


Performance

Method Description
Deuterated stable isotope of dihydrotestosterone (DHT) is added to a 0.5-mL serum sample as internal standard. The DHT and internal standard are extracted from the sample by solid phase extraction. This is followed by conventional liquid chromatography on a multiplexed LC System and analysis on a tandem mass spectrometer equipped with an electrospray ionizer. [Lagerstedt SA, O'Kane DJ, Singh RJ: Measurement of plasma free metanephrine and normetanephrine by liquid chromatography-tandem mass spectrometry for diagnosis of pheochromocytoma. Clin Chem 2004;50[3]:603-611]

PDF Report
No

Day(s) and Time(s) Test Performed
Monday, Thursday

Analytic Time
2 days

Maximum Laboratory Time
8 days

Specimen Retention Time
2 weeks

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

82642

G0480 (if appropriate)

LOINC® Information

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<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tbody>
<tr>
<td>DHTS</td>
<td>Dihydrotestosterone, S</td>
<td>1848-1</td>
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<table>
<thead>
<tr>
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<th>Test Result Name</th>
<th>Result LOINC Value</th>
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<tbody>
<tr>
<td>81479</td>
<td>Dihydrotestosterone, S</td>
<td>1848-1</td>
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