Lab Dept: Chemistry

Test Name: ESTRADIOL

General Information

Lab Order Codes: EEST

Synonyms: N/A

CPT Codes: 82670 – Estradiol

Test Includes: Estradiol level reported in pg/mL.

Logistics

Test indications:
- Evaluation of hypogonadism and oligo-ameorrhea in females.
- Assessing ovarian status, including follicle development, for assisted reproduction protocols (e.g., in vitro fertilization).
- In conjunction with luteinizing hormone measurements, monitoring of estrogen replacement therapy in hypogonadal premenopausal women.
- Evaluation of feminization, including gynecomastia, in males.
- Diagnosis of estrogen-producing neoplasms in males and females.
- As part of the diagnosis and workup of suspected disorders of sex steroid metabolism (e.g., aromatase deficiency and 17 alpha-hydroxylase deficiency)
- As an adjunct to clinical assessment, imaging studies and bone mineral density measurement in the fracture risk assessment of postmenopausal women.
- Monitoring antiestrogen therapy (e.g., aromatase inhibitor therapy)

Lab Testing Sections: Chemistry - Sendouts

Referred to: Mayo Clinic Laboratories – (Mayo Test: EEST)

Phone Numbers:
MIN Lab: 612-813-6280
STP Lab: 651-220-6550

Test Availability: Daily, 24 hours

Turnaround Time: 2-4 days

Special Instructions: N/A

Specimen

Specimen Type: Blood
Container: Red NO GEL tube

Draw Volume: 3.6 mL (Minimum: 2.4 mL) blood

Processed Volume: 1.2 mL (Minimum: 0.8 mL) serum

Collection: Routine blood collection

Special Processing: Lab Staff: Centrifuge specimen, remove serum aliquot into a plastic screw-capped vial. Store and ship refrigerated.

Patient Preparation: N/A

Sample Rejection: Specimens collected in gel tubes; mislabeled or unlabeled specimens

**Interpretive**

**Reference Range:** Children 1-14 days: Estradiol levels in newborns are very elevated at birth but fall to prepubertal levels within a few days.

<table>
<thead>
<tr>
<th>Tanner Stage</th>
<th>Mean Age</th>
<th>Reference Range (pg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I (&gt;14 days and prepubertal)</td>
<td>7.1 years</td>
<td>Undetectable - 13</td>
</tr>
<tr>
<td>Stage II</td>
<td>12.1 years</td>
<td>Undetectable - 16</td>
</tr>
<tr>
<td>Stage III</td>
<td>13.6 years</td>
<td>Undetectable - 26</td>
</tr>
<tr>
<td>Stage IV</td>
<td>15.1 years</td>
<td>Undetectable – 38</td>
</tr>
<tr>
<td>Stage V</td>
<td>18 years</td>
<td>10 - 40</td>
</tr>
<tr>
<td>Adults:</td>
<td></td>
<td>10 - 40</td>
</tr>
</tbody>
</table>

**Females**

<table>
<thead>
<tr>
<th>Tanner Stage</th>
<th>Mean Age</th>
<th>Reference Range (pg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I (&gt;14 days and prepubertal)</td>
<td>7.1 years</td>
<td>Undetectable - 20</td>
</tr>
<tr>
<td>Stage II</td>
<td>10.5 years</td>
<td>Undetectable – 24</td>
</tr>
<tr>
<td>Stage III</td>
<td>11.6 years</td>
<td>Undetectable - 60</td>
</tr>
<tr>
<td>Stage IV</td>
<td>12.3 years</td>
<td>15 - 85</td>
</tr>
<tr>
<td>----------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>Stage V</td>
<td>14.5 years</td>
<td>15 – 350 E2 levels vary widely through the menstrual cycle</td>
</tr>
<tr>
<td>Adult</td>
<td>Premenopausal</td>
<td>15 – 350 E2 levels vary widely through the menstrual cycle</td>
</tr>
<tr>
<td></td>
<td>Postmenopausal</td>
<td>&lt;10</td>
</tr>
</tbody>
</table>

**Critical Values:**
N/A

**Limitations:**
Fulvestrant is a member of a new class of drugs called “selective estrogen receptor degraders (SERDS).” Fulvestrant has modest cross-reactivity (1-5%) in estradiol immunoassays, but because the peak dose levels of this drug are between 10-fold (reproductive age women) and greater than 200-fold (postmenopausal women) higher than the naturally circulating estradiol concentrations in the treated women, this causes dramatically false-high estradiol results in immunoassays, when blood sampling occurs in close temporal proximity of dosing.

By contrast, estradiol measurements by mass spectrometry display greater than 1000-fold lower cross reactivity (<0.001%), meaning that the impact of Fulvestrant on serum estradiol measurements by mass spectrometry is negligible, even if blood sampling occurs at peak dose.

**Methodology:**
Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)

**References:**
Mayo Clinic Laboratory (January 2021)