

Estradiol and Estrone in Serum by LC-MS/MS

Test Highlights

- High sensitivity and specificity for estrone and estradiol
- Analytical sensitivity: 1 pg/mL
- Small sample volume (0.25 mL of serum or plasma)
- Reference intervals for children, men, and postmenopausal women

Clinical Significance

- Estrogens in menstruating women are produced primarily by the ovarian follicles and in smaller amounts from the adrenal gland. In hypogonadal men and postmenopausal women, the adrenal gland androgens are a major source of estrogens. Estrogen concentrations vary through the menstrual cycle, with highest concentration just before ovulation and the lowest concentration at the early follicular stage of a cycle. Only a few percent of estrogens present in the circulation are in a free form; approximately 30 percent is weakly bound to albumin, and approximately 65 percent is strongly bound to sex hormone-binding globulin.
- In females, estrogen testing can be used for the diagnosis of precocious or delayed puberty, primary and secondary amenorrhea, menopause status, assessment of hypothalamic and pituitary function, ovarian failure, and follicular maturation. Increased estrone levels may be associated with increased concentrations of circulating androgens.
- During fertility treatment, estrogens can be monitored for the evaluation of ovulation induction, for correlating the number and maturity of the stimulated follicles, and to avoid overstimulation.
- In males, elevated estrogens may cause gynecomastia.

Indications for Ordering

- Precocious puberty
- Hypoestrogenism
- Evaluation of ovarian function
- Monitoring of estradiol replacement therapy
- Anti-estrogen therapy

- Amenorrhea
- Menopause
- Fertility treatment
- Gynecomastia
- Assessment of the status of 17 β -hydroxysteroid dehydrogenase isoenzymes

Methodology

Estrogens are extracted from the sample, derivatized and analyzed by liquid chromatography tandem mass spectrometry (LC-MS/MS). The high specificity of tandem mass spectrometry is enhanced by the measurement of two product ions of each estrogen and the internal standard. This assures specificity of the analysis for every sample and eliminates potential interferences.

References

1. Haymond S, Gronowski AM. Reproductive related disease. In: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. Burtis CA, Ashwood ER, Bruns DE eds. 4th edition, New York: Saunders; 2005:2097-2152.
2. Kol S. Hormonal therapy of the infertile women. In: Endocrine replacement therapy in clinical practice. Meikle AW ed., New Jersey: Humana; 2003:525-537.
3. Kushnir MM, Rockwood AL, Bergquist J, Varshavsky M, Roberts WL, Yue B, et al. High sensitivity tandem mass spectrometry assay for serum estrone and estradiol. Am J Clin Pathol 2007 (in press).
4. Kushnir MM, Rockwood AL, Nelson GJ, Yue B, Urry FM. Assessing analytical specificity in quantitative analysis using tandem mass spectrometry. Clin Biochem 2005;38:319-327.

Test Information

0093247 Estradiol, Males, Children, or Postmenopausal Females, by Tandem Mass Spectrometry
 0093248 Estrogens, Fractionated, by Tandem Mass Spectrometry
 0093249 Estrone, by Tandem Mass Spectrometry

For specific collection, transport, and testing information, refer to the ARUP Web site at www.aruplab.com.

For information on test selection, ordering, and interpretation, refer to ARUP Consult® at www.arupconsult.com.