MAYO CLINIC LABORATORIES

Test Definition: UE3

Estriol, Unconjugated, Serum

Overview

Useful For

As an adjunct biomarker in the prenatal diagnosis of disorders of fetal steroid metabolism, including Smith-Lemli-Opitz syndrome (1,2) and X-linked ichthyosis (placental sulfatase deficiency disorders)

Evaluating primary or secondary fetal adrenal insufficiency after excluding other rare single gene defects, including aromatase deficiency, 17 alpha-hydroxylase deficiency and/or various forms of congenital adrenal hyperplasia

Method Name

Immunoenzymatic Assay

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 0.6 mL Serum
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

Serum: 0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	90 days	

Clinical & Interpretive

Clinical Information

Estrogens are involved in development and maintenance of the female phenotype, germ cell maturation, and pregnancy. There are 3 major biologically active estrogens in humans: estrone (E1), estradiol (E2), and estriol (E3). Like all members of the steroid hormone family, they diffuse into cells and bind to specific nuclear receptors, which in turn alter gene transcription in a tissue specific manner. E2 is the most potent natural human estrogen, closely followed by E1, while E3 possess only 20% of the E2 affinity for the estrogen receptor. In men and nonpregnant women, E1 and E2 are formed from the androgenic steroids, androstenedione and testosterone, respectively. E3 is derived largely through conversion of E2, and to a lesser degree from 16a-metabolites of E1. E2 and E1 can also be converted into each other, and both can be inactivated via hydroxylation and conjugation.

During pregnancy E3 becomes the dominant estrogen. The fetal adrenal gland secretes dehydroepiandrosterone-sulfate, which is converted to E3 in the placenta and diffuses into the maternal circulation. The half-life of unconjugated E3 (uE3) in the maternal blood system is 20 to 30 minutes since the maternal liver quickly conjugates E3 to make it more water soluble for urinary excretion. E3 levels increase throughout the course of pregnancy, peaking at term.

Reference Values

Males: <0.07 ng/mL
Females: <0.08 ng/mL

For International System of Units (SI) conversion for Reference Values, see www.mayocliniclabs.com/order-tests/si-unit-conversion.html.

Interpretation

A low uE3 level can indicate the possibility of aromatase deficiency, congenital adrenal hyperplasia, primary or secondary (including maternal corticosteroid therapy) fetal adrenal insufficiency and/or fetal demise.

This test is reported in ng/mL only. If the multiple of the median (MoM) is desired, please consider ordering QUAD1 / Quad Screen (Second Trimester) Maternal, Serum.

Cautions

In rare cases, some individuals can develop antibodies to mouse or other animal antibodies (often referred to as human anti-mouse antibodies [HAMA] or heterophile antibodies), which may cause interference in some immunoassays. Caution should be used in interpretation of results and the laboratory should be alerted if the result does not correlate with the clinical presentation.

Clinical Reference

1. Bradley LA, Palomaki GE, Knight GJ, et al. Levels of unconjugated estriol and other maternal serum markers in pregnancies with Smith Lemli Opitz (RSH) syndrome fetuses [letter]. Am J Med Genet. 1999;82:355-358
2. Reisch N, Idkowiak J, Hughes B. Prenatal diagnosis of congenital adrenal hyperplasia caused by P450 oxidoreductase

deficiency. J Clin Endocrinol Metab. 2013;98(3):E528-E536. doi:10.1210/jc.2012-3449
3. Thaniyaporn S, Chanane W, Supatra S, et al. Association between isolated abnormal levels of maternal serum unconjugated estriol in the second trimester and adverse pregnancy outcomes. J Matern Fetal Neonatal Med. 2016;29:13, 2093-2097
4. Minsart AF, Van Onderbergen A, Jacques F, et al. Indication of prenatal diagnosis in pregnancies complicated by undetectable second-trimester maternal serum estriol levels. J Prenat Med. 2008;2(3):27-30
5. Yarbrough ML, Stout M, Gronowski AM. Pregnancy and its disorders. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1655-1696

Performance

Method Description

The instrument used is the Beckman Coulter UniCel DxI 800. The Access Unconjugated Estriol Assay is a competitive binding immunoenzymatic assay. A sample is added to a reaction vessel with estriol-alkaline phosphatase conjugate, paramagnetic particles coated with goat anti-rabbit IgG, and polyclonal rabbit anti-estriol. Estriol in the sample competes with estriol-alkaline phosphatase conjugate for a limited number of binding sites on the specific anti-estriol antibody. After incubation in a reaction vessel, materials bound to the solid phase are held in a magnetic field while unbound materials are washed away. Then the chemiluminescent substrate Lumi-Phos 530 is added to the vessel and light generated by the reaction is measured with a luminometer. The light production is inversely proportional to the concentration of estriol in the sample. The amount of analyte in the sample is determined by means of a stored, multipoint calibration curve.(Package Insert: Access Unconjugated Estriol Assay. Beckman Coulter, Inc; 2019)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

1 to 3 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

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 cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

82677

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
UE3	Estriol, Unconjugated, S	2250-9

Result ID	Test Result Name	Result LOINC® Value
UE3	Estriol, Unconjugated, S	2250-9