Test Definition: LHPED

Luteinizing Hormone (LH), Pediatrics, Serum

Overview

Useful For

Diagnosis of precocious puberty and delayed puberty in children

Highlights

In children, luteinizing hormone, along with follicle-stimulating hormone, is used to diagnose delayed and precocious (early) puberty.

This assay is sensitive to 0.02 IU/L and is more appropriate for use in children.

This assay offers a 10-fold increase in analytical sensitivity over existing automated immunoassays.

Method Name

Chemiluminescent Immunoassay (CIA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

This test is only available for pediatric patients. If testing request is for a patient 18 years of age or older, order LH / Luteinizing Hormone (LH), 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: 0.25 mL
Collection Instructions:
1. Within 2 hours of collection, centrifuge the specimen.
2. For red top tubes, aliquot serum into a plastic vial immediately.
3. For serum gel tubes, serum may sit on gel refrigerated but must be aliquoted into a plastic vial within 4 hours.

Specimen Minimum Volume

0.13 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Luteinizing hormone (LH) is a glycoprotein hormone consisting of 2 noncovalently bound subunits (alpha and beta). LH is produced by the anterior pituitary gland under regulation of the hypothalamic gonadotropin releasing hormone (GnRH) and feedback from gonadal steroid hormones. In children, LH, along with follicle-stimulating hormone (FSH), is used to diagnose precocious (early) and delayed puberty.

Precocious puberty refers to the appearance of physical and hormonal signs of pubertal development at an earlier age than is considered normal (before 8 years of age in girls and 9 years of age in boys). Evaluation of precocious puberty includes measurement of LH and FSH to determine whether gonadotropins are increased in relation to chronologic age (gonadotropin-dependent) or whether sex steroid secretion is occurring independent of LH and FSH (gonadotropin-independent). In gonadotropin-dependent precocious puberty, basal LH levels are often elevated into the pubertal range and show a pubertal (heightened) response to GnRH stimulation. In gonadotropin-independent precocious puberty, the LH level is low at baseline and fails to respond to GnRH stimulation.

Delayed puberty is defined clinically by the absence or incomplete development of secondary sexual characteristics by age 14 years in boys and by age 12 years in girls. Delayed puberty usually results from inadequate gonadal steroid secretion that, in turn, is most often caused by a defective gonadotropin secretion from the anterior pituitary, due to defective production of GnRH from the hypothalamus. Random measurements of LH and FSH, together with estradiol (girls) or testosterone (boys), are useful to distinguish between primary and secondary causes of delayed puberty.

Reference Values

Females
<1 year: <0.02-18.3 IU/L
1-8 years: <0.02-0.3 IU/L
9-10 years: <0.02-4.8 IU/L
11-13 years: <0.02-11.7 IU/L
14-17 years: <0.02-16.7 IU/L

Tanner Stages*
Stage I (1-8 years): <0.02-0.3 IU/L
Stage II: <0.02-4.1 IU/L
Stage III: 0.6-7.2 IU/L
Stage IV-V: 0.9-13.3 IU/L
*Puberty onset (transition from Tanner stage I to Tanner stage II) occurs for girls at a median age of 10.5 (+/- 2) years. There is evidence that it may occur up to 1 year earlier in obese girls and in African-American girls. Progression through Tanner stages is variable. Tanner stage V (adult) should be reached by age 18.

Males
<1 year: <0.02-5.0 IU/L
1-8 years: <0.02-0.5 IU/L
9-10 years: <0.02-3.6 IU/L
11-13 years: 0.1-5.7 IU/L
14-17 years: 0.8-8.7 IU/L

Tanner Stages*
Stage I (1-8 years): <0.02-0.5 IU/L
Stage II: 0.03-3.7 IU/L
Stage III: 0.09-4.2 IU/L
Stage IV-V: 1.3-9.8 IU/L
*Puberty onset (transition from Tanner stage I to Tanner stage II) occurs for boys at a median age of 11.5 (+/- 2) years. For boys there is no proven relationship between puberty onset and body weight or ethnic origin. Progression through Tanner stages is variable. Tanner stage V (adult) should be reached by age 18.

Interpretation

In young children, high levels of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), along with the development of secondary sexual characteristics at an unusually young age, are an indication of gonadotropin-dependent precocious puberty (also called central precocious puberty). Prepubertal levels of LH and FSH in children exhibiting some signs of pubertal changes may be an indication of gonadotropin-independent precocious puberty (also refer as precocious pseudopuberty). In precocious pseudopuberty the signs and symptoms are the result of elevated levels of estrogen in girls or testosterone in boys.

In delayed puberty, LH and FSH levels can be normal or below what is expected for a youth within this age range. The test for LH response to gonadotropin releasing hormone in addition to other testing may help to diagnose the reason for the delayed puberty.

Cautions

No clinically significant cross-reactivity has been demonstrated with follicle-stimulating hormone, human chorionic gonadotropin, free alpha subunit of pituitary glycoprotein hormones, or free beta subunit of luteinizing hormone. Cross-reactivity with thyrotropin (TSH) (<5%) might be observed at TSH concentrations of 500 mIU/L.

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. Jameson JL, ed. Reproductive Endocrinology. In: Harrison's Endocrinology. 2nd ed. McGraw-Hill. 2010;144-241
2. Wei C, Davis N, Honour J, Crowne E: The investigation of children and adolescents with abnormalities of pubertal timing. Ann Clin Biochem. 2017 Jan;54(1):20-32

Performance

Method Description

The AnshLite LH CLIA is a quantitative three-step sandwich type immunoassay. In the first step, calibrators, controls, and unknown samples are added to luteinizing hormone (LH) antibody-coated microtiter wells and incubated. After washing, the wells are incubated with biotinylated LH antibody solution. After the second incubation and washing, the wells are incubated with streptavidin horseradish peroxidase conjugate solution. Finally, the antibody-antigen and conjugate complex bound to the well is detected by addition of a luminogenic substrate (AnshLite chemiluminescence substrate solution). The relative light output units are directly proportional to the concentration of LH in the samples.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday, Wednesday, Friday

Report Available

2 to 6 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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

Test Definition: LHPED

Luteinizing Hormone (LH), Pediatrics, Serum

CPT Code Information

83002

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
LHPED	LH, Pediatrics, S	83103-2

Result ID	Test Result Name	Result LOINC® Value
62999	LH, Pediatrics, S	83103-2