HIGH LEVEL OF LH

Lh Hypersecretion, Excess Lh

A condition with high blood luteinizing hormone (LH) leading to irregular periods and reduced fertility in both females and males.

⚠ Risk factor ♂ Female

About High level of LH

High level of luteinizing hormone (LH) is referred as a condition with high serum luteinizing hormone LH concentration. Physiologic high LH levels are seen during the LH surge; typically they last 48 hours.

During the reproductive years, typical levels are between 1–20 IU/L (Pic. 1). The reference ranges for the blood content of LH during the menstrual cycle (Pic. 2) denoted by biological stage may be used in closely monitored menstrual cycles in regard to other markers of its biological progression, with the time scale being compressed or stretched to how much faster or slower, respectively, the cycle progresses compared to an average cycle.

Persistently high LH levels are indicative of situation where the normal restricting feedback from the gonad is absent, leading to an elevated pituitary production of both LH and follicle-stimulating hormone (FSH). While this is typical in menopause, it is abnormal in the reproductive years. The negative effect of high LH levels may occur when levels are elevated during other times than around the time of expected ovulation. The result may be irregular periods and interference with ovulation and conception. Levels progressively increase in aging males as testosterone levels concurrently decline.

LH triggers the production of sex hormones (such as testosterone) from the Leydig cells of the testis. If testicles don’t work correctly (e.g. due to testicular failure) they don’t produce enough testosterone despite LH influence and thus the production of LH is elevated to compensate it. While testosterone promotes the production of sperm and masculine (male) characteristics, they are affected by low testosterone and high LH levels.

Diagnosis is measured by multiple blood tests or by urinary exams to evaluate the amount of LH. The measuring for LH is usually done in conjunction with other hormone tests such as FSH, testosterone, estradiol and progesterone. In men, an LH test may be used to determine the cause for infertility, to determine the cause for low testosterone, or to aid in the diagnosis of pituitary or hypothalamic disorders. The results of these other tests (such as FSH) will help determine next steps. Subsequent treatment is based on the underlying cause and often includes treatment of other hormone imbalance.

Symptoms

Women:

- infertility
- irregular or absent menstrual cycle

Men:

- infertility
- low testosterone level
- low muscle mass
- decreased libido
- mood swings

Associated diseases
- polycystic ovary syndrome (PCOS) – a condition due to elevated androgens (male sex hormones)
- primary ovarian failure (POF) - absent menarche (first menstruation) or premature depletion of ovarian follicles before the age of 40
- Turner syndrome
- Swyer syndrome - the failure of the sex glands to develop
- testicular failure
- hypogonadism – low production of testosterone
- gonadal dysgenesis - underdeveloped and dysfunctioning reproductive organs

Complications

Elevated LH level leads to the development of surplus of man’s sexual hormones (androgens) and estrogen in women. Excess of androgen promotes the development of diabetes, heart diseases, emergence of acne, hair loss on the scalp, etc. Higher level of estrogen and the lack of progesterone lead to delayed ovulation, an excessive thickening of the inside layer of the uterus and to the development of amenorrhea (absence of menstruation) or urine bleedings. Further, high levels of LH promote follicular atresia (degeneration) and early miscarriage.

In men, elevated LH level is associated with decreased level of testosterone and thus predicts ischemic heart disease events in older men.

Risk factors

- exposure to radiation
- chemotherapy
- autoimmune disease
- germ cell tumor
- viral infection (mumps)
- overweight
- polycystic ovary syndrome (PCOS)
- epilepsy
- gonadal tumor
- thyroid disease
- diabetes mellitus

Prevention

There is no prevention for elevated LH levels except the avoiding of the being overweight, the radiation or chemotherapy treatment.

How it can affect fertility

For women, LH excess affects ovaries, and in men, it affects the testes. Elevations in serum LH may result in increased androgen production that diminishes follicular function and reduces early embryo viability. Although LH receptors have not yet been identified in oocytes, excessive LH may disrupt granulosa cells (producing sex steroids) communication in the cumulus oophorus (cells surrounding the oocyte), which is critical to maintain the oocyte in the dictyate stage of meiosis (stage of arrested eggs until puberty) until ovulation. Elevated LH levels during the preovulatory period (before ovulation) may also negatively influence post-ovulatory (after ovulation) events such as conception and implantation.

A significant reduction in the rate of fertilization is observed in women with elevated LH levels undergoing treatment with in vitro fertilization (IVF). A higher likelihood of pregnancy is observed when the LH level is <10 IU/L and the miscarriage rate is significantly higher in women with LH levels >10 IU/L.

In men, high level of LH indicates that testicles don’t produce enough testosterone and it is the message for hypothalamus to produce more LH to compensate it. Basically, high LH level is associated with low level of testosterone and thus impairs the male’s fertility. A man with low levels of testosterone may lose his desire for sex. Testosterone levels can drop during a long period of sexual inactivity. Sexual stimulation and sexual activity cause testosterone levels to rise.
Untreated high levels of LH could cause menstrual disorders and infertility in women and low sperm count in men but the levels could be regulated by treatment.

Find more about related issues

Diagnoses

Gonadal dysgenesis
Any congenital developmental disorder of the reproductive system characterized by a progressive loss of germ cells on the developing gonads.
Learn more at: www.fertilitypedia.org/therapy/diag/gonadal-dysgenesis

Hypogonadism
A medical term which describes a diminished functional activity of the gonads – the testes and ovaries.
Learn more at: www.fertilitypedia.org/therapy/diag/hypogonadism

Polycystic ovary syndrome
A condition in which a woman has an imbalance of female sex hormones. This may lead to changes in the menstrual cycle, cysts in the ovaries, trouble g
Learn more at: www.fertilitypedia.org/therapy/diag/polycystic-ovary-syndrome

Swyer syndrome
A rare disorder characterized by a phenotypic female with an XY karyotype.
Learn more at: www.fertilitypedia.org/therapy/diag/swyer-syndrome

Testicular failure
The inability of the testicles to produce sperm or testosterone.
Learn more at: www.fertilitypedia.org/therapy/diag/testicular-failure

Turner syndrome
Turner syndrome is a genetic disorder in which a female is partly or completely missing one X chromosome that results in ovarian dysgenesis.
Learn more at: www.fertilitypedia.org/therapy/diag/turner-syndrome

Gallery
### Luteinizing hormone (LH)

<table>
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<tr>
<th>Reference range</th>
<th>Males</th>
<th>Prepubertal</th>
<th>0.3-6.0 IU/L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adult</td>
<td>1.8-12.0 IU/L</td>
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<tr>
<td></td>
<td>Females</td>
<td>Prepubertal</td>
<td>0-4.0 IU/L</td>
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<tr>
<td></td>
<td></td>
<td>Pubertal</td>
<td>0.3-31 IU/L</td>
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<td></td>
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<td>Premenopausal (follicular)</td>
<td>1-18 IU/L</td>
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<td>Premenopausal (mid-cycle)</td>
<td>20-105 IU/L</td>
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<td></td>
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<td>Premenopausal (luteal)</td>
<td>0.4-20 IU/L</td>
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<td></td>
<td></td>
<td>Postmenopausal</td>
<td>15.0-62.0 IU/L</td>
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### Pic. 2: Reference ranges for the blood content of luteinizing hormone (LH) during the menstrual cycle

### Pic. 3: Effects of LH on the body

### Sources

- "Luteinizing hormone" (https://en.wikipedia.org/wiki/Luteinizing_hormone) — sourced from Wikipedia licensed under CC BY-SA 3.0
- "Low level of testosterone" (https://fertilitypedia.edu/risk-factors/low-level-of-testosterone) — sourced from Fertilitypedia licensed under CC BY-SA 4.0
- "Effects of metformin treatment on luteal phase progesterone concentration in polycystic ovary syndrome" (http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-879X2004001100007) — by Meenakumari et al. licensed under CC BY 4.0
- "Women with Epilepsy and Infertility Have Different Reproductive Hormone Profile than Others." (http://epilepsycurrents.org/doi/full/10.5689/1535-7597-15.1.26?code=amep-site) — by Harden licensed under CC BY 3.0
- "Early Follicular Phase LH concentration and LH to FSH ratio as Predictor of IVF/ICSI Outcome." (http://www.journaljar.com/article/11869/early-follicular-phase-lh-concentration-and-lh-to-fsh-ratio-as-predictor-of-ivf/icsi-outcome/) — by Al-Anbari licensed under CC BY 4.0
- "Current aspects of polycystic ovary syndrome: A literature review" (http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-42302016000900086/) — by Lopes De Andrade et al. licensed under CC BY-NC 4.0
- "High level of LH" (https://upload.81d/b0a/500/81db0a50009ad32a2e77b8481a998c85f22640d2.png) — by Maryniková, created for Fertilitypedia licensed under CC BY-SA 4.0
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