LEYDIG CELL

Interstitial Cells Of Leydig

The cell found in interstitial tissue of testicles responsible for production of androgens - male hormones.

Reproductive cells ♂ Male

About Leydig cell

Function

Leydig cells have a great influence on male reproduction capability. They represent a basal cell component of testicles ensuring the major portion of hormonal production of androgens, commonly called as “male hormones”. The most popularized of androgens is testosterone. Leydig cells can be found next to seminiferous tubules as the part of the interstitial tissue, forming together the parenchyma testis – basic testicular tissue (Pic.1). There are a lot of aspects of male body dependent on the testosterone production of Leydig cells including fetal differentiation of male sex, sperm cell production, the development of male secondary characteristics, body constitution and others.

Development

Leydig cells are differentiated between 8th and 20th week of gravidity as “fetal” type. After the birth they differentiate into their final form as “adult” type of Leydig cells (higher testosterone production then “fetal” type) and they are tranquilised until the puberty.

Hormonal regulation of Leydig cell

The regulation of the Leydig cell production of the testosterone begins outside of testes. The hormonal cascade that regulates Leydig cells starts at hypothalamus where gonadotropin-releasing hormone (GnRH) is produced. This hormone activates the anterior pituitary, which consequently produces luteinizing hormone (LH) to stimulate testosterone production in Leydig cells. Leydig cell perceive luteinizing hormone through LH receptors located in the plasmatic membrane. Their number can increase thanks to presence of prolactin also produced by the anterior pituitary. The increase of LH receptor on Leydig cells intensify the response of cells to LH hormone. Leydig cell production can be also negatively affected by the inhibin, hormone produced in Sertoli cells in seminiferous tubules (regulated by follicle-stimulating hormone from anterior pituitary; FSH).

Low blood concentrations of testosterone stimulate the hypothalamic release of GnRH. GnRH then stimulates the anterior pituitary to secrete LH into the bloodstream. In the testis, LH binds to LH receptors on Leydig cells and stimulates the release of testosterone. When concentrations of testosterone in the blood reach a critical threshold, testosterone itself will bind to androgen receptors on both the hypothalamus and the anterior pituitary, inhibiting the synthesis and secretion of GnRH and LH, respectively.

Declination of Leydig cell hormonal production

The declination in Leydig cell activity can occur in men beginning at 40 to 50 years of age. The resulting reduction in circulating testosterone concentrations can lead to symptoms of andropause, also known as male menopause. Men report feelings of fatigue, reduced muscle mass, depression, anxiety, irritability, loss of libido, and insomnia. A reduction in spermatogenesis resulting in lowered fertility is also reported, and sexual dysfunction can also be associated with andropausal symptoms.

Pathology of Leydig cells
Pathological conditions of Leydig cells may lead to male infertility. Some of such conditions are:

1. Leydig cell tumour
   - usually benign
   - hormonal production may continue

2. Adrenomyeloneuropathy
   - decreased concentration of testosterone despite higher-than-normal levels of LH (and FSH)

Find more about related issues

Diagnoses

Azoospermia
Complete absence of sperm in the ejaculate of a man.
Learn more at: www.fertilitypedia.org/therapy/diag/azoospermia

Undescended testes
In the case of cryptorchidism one or both testes are absent from the scrotum. It is the most common etiologic factor of azoospermy in the adult.
Learn more at: www.fertilitypedia.org/therapy/diag/undescended-testes

Thyroid disorders
A medical condition impairing the function of the thyroid.
Learn more at: www.fertilitypedia.org/therapy/diag/thyroid-disorders

Kallmann syndrome
A genetic condition where the primary symptom is a failure to start puberty or a failure to fully complete puberty.
Learn more at: www.fertilitypedia.org/therapy/diag/kallmann-syndrome

Sperm autoantibodies
Antibodies that bind to sperm, inhibiting their movement, stopping recognition and entry into the egg.
Learn more at: www.fertilitypedia.org/therapy/diag/sperm-autoantibodies

Testicular cancer
Cancer that develops in the testicles.
Learn more at: www.fertilitypedia.org/therapy/diag/testicular-cancer

Obstructive azoospermia
Absence of sperm in the ejaculate despite normal spermatogenesis, caused by an obstruction of the genital tract.
Learn more at: www.fertilitypedia.org/therapy/diag/obstructive-azoospermia

Organs

Testes
Male gonads which produce both sperm and androgens, such as testosterone, and are active throughout the reproductive lifespan of the male.
Learn more at: www.fertilitypedia.org/edu/organs/testes

Reproductive functions
Spermatogenesis
Process in which spermatozoa are produced from male primordial germ cells in testicles by way of mitosis and meiosis.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/spermatogenesis

Sources

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