THYROID DISORDERS

Thyroid Disease, Autoimmune Thyroid Disease, Hyperthyroidism, Hypothyroidism, Thyroid Cancer

A medical condition impairing the function of the thyroid.

Diagnosis Male & Female

Related Diagnoses:

- Anovulation
- Ejaculatory disorders
- Autoimmune disorders
- Repeated implantation failure
- Antiphospholipid syndrome
- Klinefelter syndrome
- Oligozoospermia
- Hypospermia
- Delayed ejaculation
- Oligoasthenoteratozoospermia
- Endometrial hyperplasia
- Teratospermia
- Lupus erythematosus
- Hyperthyroidism
- Hyperprolactinemia
- Hypoandrogenism
- Hypoprolactinemia

About Thyroid disorders

A thyroid disease is a medical condition impairing the function of the thyroid. It is the most common endocrinopathy ever. Affects 10% of the adult population. Five times more common in women. The thyroid hormones act on nearly every cell in the body. Imbalance in production of thyroid hormones arises from dysfunction of the thyroid gland itself, the pituitary gland, which produces thyroid-stimulating hormone (TSH), or the hypothalamus, which regulates the pituitary gland via thyrotropin-releasing hormone (TRH). Concentrations of TSH increase with age, requiring age-corrected tests. Moreover, the thyroid gland continuously interacts with the ovaries, and the thyroid hormones are involved in almost all phases of reproduction. Thyroid dysfunctions are relatively common among women of reproductive age, and can affect fertility in various ways, resulting in anovulatory cycles, high prolactin levels, and sex hormone imbalances. Undiagnosed and untreated thyroid disease can be a cause of subfertility. Subclinical hypothyroidism (SCH), also known as mild thyroid failure, is diagnosed when peripheral thyroid hormone levels are within the normal reference laboratory range, but serum thyroid-stimulating hormone levels are mildly elevated. Thyroid autoimmunity (TAI) is characterized by the presence of anti-thyroid antibodies, which include anti-thyroperoxidase and anti-thyroglobulin antibodies. SCH and TAI may remain latent, asymptomatic, or even undiagnosed for an extended period. It has also been demonstrated that controlled ovarian hyperstimulation has a significant impact on thyroid function, particularly in women with TAI.

Thyroid disorders include:

It is a heterogeneous group of diseases

a) morphological changes (goiter - enlargement of the thyroid gland, thyroid tumor)

b) functional changes (hypothyreosis - abnormally decreased activity, hyperthyroidism - abnormally increased activity, autoimmune thyreopathy)

Autoimmune thyroid disease

The principal diseases of the human thyroid gland are goiter (diffuse or nodular), hyperthyroidism, hypothyroidism, autoimmune thyroiditis, and neoplasm. The thyroiditis types cause inflammation of thyroid tissue and can release preformed hormone from the colloid space, causing thyrotoxicosis, which is transient and followed by recovery or development of hypothyroidism. In acute and subacute thyroiditis, thyroid tenderness and neck pain are often present. On the other hand, silent thyroiditis is
devoid of the local symptoms.

**Hyperthyroidism**
Hyperthyroidism, also known as over active thyroid and hyperthyreosis, is the condition that occurs due to excessive production of thyroid hormone by the thyroid gland. Signs and symptoms vary between people and may include irritability, muscle weakness, sleeping problems, a fast heartbeat, poor tolerance of heat, diarrhea, enlargement of the thyroid, and weight loss. Symptoms are typically less in the old and during pregnancy. Hyperthyroidism occurs in about 0.2-0.4% of all pregnancies. Most cases are due to Graves’ disease although less common causes (e.g. toxic nodules and thyroiditis) may be seen. An uncommon complication is thyroid storm in which an event such as an infection results in worsening symptoms such as confusion and a high temperature and often results in death.

**Hypothyroidism**
Hypothyroidism, often called underactive thyroid or low thyroid and sometimes hypothyreosis, is a common disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone. It can cause a number of symptoms, such as poor ability to tolerate cold, a feeling of tiredness, and weight gain. In children, hypothyroidism leads to delays in growth and intellectual development, which is called cretinism in severe cases. Hypothyroidism is common in pregnancy with an estimated prevalence of 2-3% and 0.3-0.5% for subclinical and overt hypothyroidism.

**Thyroid cancers**
In most cases, thyroid cancer presents as a painless mass in the neck. It is very unusual for thyroid cancers to present with symptoms, unless they have been neglected. One may be able to feel a hard nodule in the neck. Diagnosis is made using a needle biopsy and various radiological studies. Thyroidectomy and dissection of central neck compartment is initial step in treatment of thyroid cancer in majority of cases.

**Associated diseases**

**Autoimmune thyroid disease**
- Autoimmune thyroiditis

**Hyperthyroidism**
- congestive heart failure
- coronary artery disease
- Sjögren syndrome
- rheumatoid arthritis
- arthritis psoriatica
- chronic periartthritis
- Myasthenia gravis
- diabetes mellitus

**Hypothyroidism**
- depression
- congestive Heart Failure
- coronary Artery Disease
- hyperlipidemia
- Carpal Tunnel Syndrome
- fibromyalgia
- anemia
- diabetes
- myxedema

**Thyroid cancers**
- swollen lymph nodes
- diarrhea
- cough
- high blood pressure
- hypothyroidism
- Hashimoto's thyroiditis
- thyroid nodules

**Complications**

**Autoimmune thyroid disease**
Common general complications include:
- goiter
- heart problems
- mental health issues
- birth defects

**Hyperthyroidism**

Common general complications include:
- heart problems
- brittle bones
- eye problems
- red, swollen skin

**Hypothyroidism**

- goiter (a swelling of the neck or larynx resulting from enlargement of the thyroid gland (thryomegaly)
- heart problems
- mental health issues
- peripheral neuropathy (damage to or disease affecting nerves, which may impair sensation, movement, gland or organ function, or other aspects of health)
- myxedema
- infertility
- birth defects

**Thyroid cancers**

Spread of the cancer to the lungs, bones, or other parts of the body.

**Risk factors**

**Autoimmune thyroid disease**

- smoking
- iodine excess
- family history of thyroid nodules

**Hyperthyroidism**

- certain viral infections
- pregnancy
- a history of other autoimmune disorders
- age
- gender - women are more likely than men to develop hyperthyroidism
- genetic factors - a family history of toxic diffuse goiter
- other factors - start taking iodine supplements, this can increase your risk of hyperthyroidism
- thyroid surgery
- stress
- smoking
- diet

**Hypothyroidism**

- a family history of thyroid dinase
- autoimmune disorders (type 1 diabetes, rheumatoid arthritis)
- thyroid surgery
- exposed to radiation to your neck

**Thyroid cancers**

- gender and age
- a diet low in iodine
- radiation - exposure to ionizing radiation is a well-documented risk factor for cancer, the thyroid may be irradiated more than other tissues because of its position in the body and its ability to concentrate iodine

---

**Impact on fertility**

**Male Infertility**

The two most common types of thyroid diseases are hypothyroidism and hyperthyroidism. Studies assessing the role of hypo- and hyperthyroidism in male infertility have also been conducted in human subjects. Hypothyroidism may result in a decrease in the sex hormone binding globulin (SHBG) levels and a decrease in total serum testosterone levels, as well as a decrease in the LH and the follicle stimulating hormone (FSH) levels. In cases of prolonged pre-pubertal hypothyroidism due to drop in LH and FSH levels, the Leydig and Sertoli cells, respectively are less stimulated to differentiate into mature cells, negatively affecting spermatogenesis. This increases the number of cells in the testes but decreases the number of mature cells. Thus, in patients with hypothyroidism, increased testicular size is
observed along with a significant drop in mature germ cells within the seminiferous tubules.

Fortunately, hypothyroidism is very rare in males with an occurrence rate of only 0.1% in the general population.

**Hypothyroidism adversely affected semen quality by compromising semen volume and progressive sperm motility.**

It is therefore evident that hypothyroidism adversely affects male fertility. Similarly, all the studies on hyperthyroidism also reported adverse effects on male reproductive organs and fertility. Male infertility is more common than previously thought in males with hyperthyroidism, possibly in correlation with elevated levels of testosterone, LH, and FSH. Hyperthyroidism delays Leydig cell development and adversely affects spermatogenesis.

**Female Infertility**

Autoimmune thyroid diseases (AITD); are the most common autoimmune conditions encountered in females in reproductive age characterized by presence of antibodies against to some structure of thyroid gland such as thyroglobulin (TG), thyroid peroxidase (TPO) and thyroid microsomal (TM). All AITD, to some extent, have implications for fertility and obstetrics. The presence of antithyroid antibodies may react against the structures of the placenta or fertilized egg and cause problems in embryo implantation.

The older the woman, the higher the probability of anti-TPO antibodies. Anti-TPO antibodies increase with age. Hypothyroidism – negatively affects the rate of abortion, especially in the first trimester. Abortions occur 2 times more often. It also negatively affects sexual function such as decreased desire, increased pain in sex and also affects the orgasm of women.

Women with hypothyreosis often have oligomenorrhea, amenorrhea. Despite an increased prolactin, anovulation is present. Therefore, the menstrual cycle is completely affected.

**Prevention**

**Autoimmune thyroid disease**

In regards to the prevention of autoimmune thyroiditis, there is no real access to adopt to avoid. People with personal or family history of autoimmune disease should also be controlled.

**Hyperthyroidism**

Naturally occurring hyperthyroidism cannot be prevented. Hyperthyroidism caused by taking too much thyroid drugs can be prevented. Periodically get blood tests to control thyroid levels.

**Hypothyroidism**

Hypothyroidism may be prevented in a population by adding iodine to commonly used foods. This public health measure has eliminated endemic childhood hypothyroidism in countries where it was once common.

**Thyroid cancers**

Number of people with thyroid caner do not have/display any known risk factors which makes it difficult to prevent it. Nevertheless, avoiding radiation exposure can significantly reduce the risk of development of cancer.
Symptoms

Autoimmune thyroid disease

The symptoms are often related to the stage of thyroiditis. There are many different signs and symptoms for thyroiditis, none of which are exclusively limited to this disease. Many of the signs imitate symptoms of other diseases, so thyroiditis can sometimes be difficult to diagnose. Common hypothyroid symptoms manifest when thyroid cell damage is slow and chronic, and may include fatigue, weight gain, feeling "fuzzy headed," depression, dry skin, and constipation. Other, rarer symptoms include swelling of the legs, vague aches and pains, decreased concentration and so on. When conditions become more severe, depending on the type of thyroiditis, one may start to see puffiness around the eyes, slowing of the heart rate, a drop in body temperature, or even incipient heart failure. On the other hand, if the thyroid cell damage is acute, the thyroid hormone within the gland leaks out into the bloodstream causing symptoms of thyrotoxicosis, which is similar to those of hyperthyroidism. These symptoms include weight loss, irritability, anxiety, insomnia, fast heart rate, and fatigue. Elevated levels of thyroid hormone in the bloodstream cause both conditions, but thyrotoxicosis is the term used with thyroiditis since the thyroid gland is not overactive, as in the case of hyperthyroidism.

Hyperthyroidism

Hyperthyroidism may be asymptomatic or present with significant symptoms. Some of the symptoms of hyperthyroidism include nervousness, irritability, increased perspiration, heart racing, hand tremors, anxiety, difficulty sleeping, thinning of the skin, fine brittle hair, and muscular weakness—especially in the upper arms and thighs.

Hypothyroidism

People with hypothyroidism often have no or only mild symptoms. Numerous symptoms and signs are associated with hypothyroidism, and can be related to the underlying cause, or a direct effect of having not enough thyroid hormones.

- fatigue
- dry, coarse skin
- feeling cold
- cool extremities
- poor memory and concentration
- myxedema (mucopolysaccharide deposits in the skin)
- constipation, dyspepsia
- hair loss
- weight gain with poor appetite
- slow pulse rate
- shortness of breath
- swelling of the limbs
- hoarse voice
- delayed relaxation of tendon reflexes
- in females, heavy menstrual periods (and later light periods)
- carpal tunnel syndrome
- abnormal sensation
- pleural effusion, ascites, pericardial effusion
- poor hearing

Thyroid cancers

Most often the first symptom of thyroid cancer is a nodule in the thyroid region of the neck. However, many adults have small nodules in their thyroids, but typically under 5% of these nodules are found to be cancerous. Sometimes the first sign is an enlarged lymph node. Later symptoms that can be present are pain in the anterior region of the neck and changes in voice due to an involvement of the recurrent laryngeal nerve.
Therapies

Self therapy

Yoga

Yoga normalizes the function of the thyroid, pituitary, pineal and adrenal glands by stimulating it.

Conventional medicine

Pharmacotherapy

Levothyroxine is a stereoisomer of thyroxine which is degraded much slower and can be administered once daily in patients with hypothyroidism. Natural thyroid hormone from pigs is also used, especially for people who cannot tolerate the synthetic version. Graves’ disease may be treated with the thioamide drugs propylthiouracil, carbimazole ormethimazole, or rarely with Lugol’s solution. Hyperthyroidism as well as thyroid tumors may be treated with radioactive iodine. Percutaneous Ethanol Injections, PEI, for therapy of recurrent thyroid cysts and metastatic thyroid cancer lymph nodes is an alternative to the usual surgical method.

Surgical therapy

Thyroid surgery is performed for a variety of reasons. A nodule or lobe of the thyroid is sometimes removed for biopsy or for the presence of an autonomously function igadenoma causing hyperthyroidism. A large majority of the thyroid may be removed, a subtotal thyroidectomy, to treat the hyperthyroidism of Graves’ disease, or to remove agoitre that is unsightly or impinges on vital structures.

A complete thyroidectomy of the entire thyroid, including associated lymph nodes, is the preferred treatment for thyroid cancer. Removal of the bulk of the thyroid gland usually produces hypothyroidism, unless the person takes thyroid hormone replacement. Consequently, individuals who have undergone a total thyroidectomy are typically placed on thyroid hormone replacement for the remainder of their lives. Higher than normal doses are often administered to prevent recurrence.

If the thyroid gland must be removed surgically, care must be taken to avoid damage to adjacent structures, the parathyroid glands and the recurrent laryngeal nerve. Both are susceptible to accidental removal and/or injury during thyroid surgery. The parathyroid glands produce parathyroid hormone (PTH), a hormone needed to maintain adequate amounts of calcium in the blood. Removal results in hypoparathyroidism and a need for supplemental calcium and vitamin D each day. In the event the blood supply to any one of the parathyroid glands is endangered through surgery, the parathyroid gland(s) involved may be re-implanted in surrounding muscle tissue. The recurrent laryngeal nerves provide motor control for all external muscles of the larynx except for the cricothyroid muscle, which also runs along the posterior thyroid. Accidental laceration of either of the two or both recurrent laryngeal nerves may cause paralysis of the vocal cords and their associated muscles, changing the voice quality.

Other therapies

Radioiodine therapy

Large goiters that cause symptoms but do not harbor cancer, after evaluation and biopsy of suspicious nodules, can be treated by an alternative therapy with radioiodine. The iodine uptake can be high in countries with iodine deficiency, but low in iodine sufficient countries. The 1999
release of recombinant human TSH, Thyrogen, in the USA, can boost the uptake to 50-60% allowing the therapy with Iodine 131. The gland shrinks by 50-60% but can cause hypothyroidism and rarely pain syndrome, which arises due to radiation thyroiditis. It is short lived and treated by steroids.

**Assisted reproduction**

When treating infertility caused by thyroid disease, fertility treatment may be a effective option. This can be in the form of in-vitro fertilisation (IVF) depending on your conditions.

We recommend thyroid screening before IVF. In particular, thyroid stimulating hormone (TSH) and (thyroxine) FT4, as well as antibodies. The basic laboratory test for suspected thyroid dysfunction is the determination of thyroid stimulating hormone concentration in the blood.

If TSH is normal, thyroid malfunction may be excluded, with rare exceptions, and no further examination is needed. TSH elevations above 3.8-4.1 mIU / l have been shown in most cases for subclinical or fully developed hypothyroidism (decreased thyroid function). In some cases, serum concentration of the thyroid hormone (free thyroxine FT4) may also be added and we rarely investigate free trihydrate (FT3).

To explain the cause of hypothyroidism, serum concentrations of thyroid antibodies (more specific and more sensitive anti-thyroid TPOAb antibodies or less specific and sensitive anti-thyroglobulin antibodies - TgAb) and thyroid ultrasound are used. Thyroid antibody positivity is indicative of the autoimmune cause of hypothyroidism.

TSH decreased below 0.4 mIU / l (or 0.3-0.5 mIU / l according to the investigational method used). The causes of decreased (or suppressed) TSH may be more. In addition to increased thyroid gland activity (peripheral hyperthyroidism), central hypothyroidism (due to adenohypophysis) or suppression of TSH due to thyroid hormone treatment can be caused. To distinguish these causes, serum FT4 and FT3 should be investigated. Rather, in rare cases, the so-called TRH test is needed.

If hyperthyroidism (thyrotoxicosis, increased thyroid function) is confirmed in laboratory, its cause must be investigated. For this purpose, serum TSH receptor (TRAK) and thyroid ultrasound are tested in the first place. The TRAK positivity and a typical ultrasound finding are indicative of the autoimmune type of hyperthyroidism - Graves-Basedow's thyrotoxicosis.

---

**Find more about related issues**

**Diagnoses**

**Anovulation**
Failure of the ovaries to release an oocyte over a period of time generally exceeding 3 months.
Learn more at: [www.fertilitypedia.org/therapy/diag/anovulation](http://www.fertilitypedia.org/therapy/diag/anovulation)

**Ejaculatory disorders**
A class of sexual disorders defined as the subjective lack of normal ejaculation.
Learn more at: [www.fertilitypedia.org/therapy/diag/ejaculatory-disorders](http://www.fertilitypedia.org/therapy/diag/ejaculatory-disorders)

**Autoimmune disorders**
A condition arising from an abnormal immune response to a normal body part.
Learn more at: [www.fertilitypedia.org/therapy/diag/autoimmune-disorders-1](http://www.fertilitypedia.org/therapy/diag/autoimmune-disorders-1)
Repeated implantation failure
The absence of implantation after three or more transfers of high quality embryos or after placement of 10 or more embryos in multiple transfers.
Learn more at: www.fertilitypedia.org/therapy/diag/repeated-implantation-failure

Antiphospholipid syndrome
A condition when immune system mistakenly attacks some of the standard proteins in blood.
Learn more at: www.fertilitypedia.org/therapy/diag/antiphospholipid-syndrome-do-rf

Klinefelter syndrome
The set of symptoms that result from two or more X chromosome in males.
Learn more at: www.fertilitypedia.org/therapy/diag/klinefelter-syndrome

Oligozoospermia
Semen with a low concentration of sperm and is a common finding in male infertility.
Learn more at: www.fertilitypedia.org/therapy/diag/oligozoospermia

Hypospermia
A condition in which a man has an unusually low ejaculate (or semen) volume.
Learn more at: www.fertilitypedia.org/therapy/diag/hypospermia

Delayed ejaculation
A man's inability for or persistent difficulty in achieving orgasm, despite typical sexual desire and sexual stimulation.
Learn more at: www.fertilitypedia.org/therapy/diag/delayed-ejaculation

Oligoasthenoteratozoospermia
Male fertility diagnosis defined as a combination of low sperm concentration, reduced motility and abnormal sperm morphology in the ejaculate.
Learn more at: www.fertilitypedia.org/therapy/diag/oligoasthenoteratozoospermia

Endometrial hyperplasia
Thickening of the lining of the uterus.
Learn more at: www.fertilitypedia.org/therapy/diag/endometrial-hyperplasia

Teratospermia
Teratospermia is a condition characterized by the presence of sperm with abnormal morphology that affects fertility in males.
Learn more at: www.fertilitypedia.org/therapy/diag/teratospermia

Lupus erythematosus
Collection of autoimmune diseases in which the human immune system becomes hyperactive and attacks normal, healthy tissues.
Learn more at: www.fertilitypedia.org/therapy/diag/lupus-erythematosus

Hyperthyroidism
Condition that occurs due to excessive production of thyroid hormone by the thyroid gland.
Learn more at: www.fertilitypedia.org/therapy/diag/hyperthyroidism

Hyperprolactinemia
The presence of abnormally high levels of prolactin in the blood.
Learn more at: www.fertilitypedia.org/therapy/diag/hyperprolactinemia
Hypoandrogenism
A medical condition characterized by not enough androgenic activity in the body. Learn more at: www.fertilitypedia.org/therapy/diag/hypoandrogenism

Hypoprolactinemia
A deficiency in the serum levels of the prolactin hormone. Learn more at: www.fertilitypedia.org/therapy/diag/hypoprolactinemia

**Organs**

Hypothalamus
A region of the forebrain that regulates body temperature, some metabolic processes and governs the autonomic nervous system. Learn more at: www.fertilitypedia.org/edu/organs/hypothalamus

Ovary
The ovum-producing organs of the internal female reproductive system. Learn more at: www.fertilitypedia.org/edu/organs/ovary

Pituitary gland
An endocrine gland, about the size of a pea, whose secretions control the other endocrine glands and influence growth, metabolism, and maturation. Learn more at: www.fertilitypedia.org/edu/organs/pituitary-gland

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

Thyroid gland
One of the largest endocrine glands in the body, controls rate of use of energy sources, protein synthesis, and body's sensitivity to other hormones. Learn more at: www.fertilitypedia.org/edu/organs/thyroid-gland

Uterus
The uterus is the largest and major organ of the female reproductive tract that is the site of fetal growth and is hormonally responsive. Learn more at: www.fertilitypedia.org/edu/organs/uterus

**Reproductive cells**

Endometrial cell
Cells composing an inner layer of the uterine lining. Learn more at: www.fertilitypedia.org/edu/reproductive-cells/endometrial-cell

Endometrium
The innermost layer of uterus forming the uterine lumen where the implantation of an oocyte happens. Learn more at: www.fertilitypedia.org/edu/reproductive-cells/endometrium

Leydig cell
The cell found in interstitial tissue of testicles responsible for production of androgens - male hormones. Learn more at: www.fertilitypedia.org/edu/reproductive-cells/leydig-cell
Sertoli cells
The cell in seminiferous epithelium responsible for nutrition and development of germ (sperm) cells.
Learn more at: www.fertilitypedia.org/edu/reproductive-cells/sertoli-cells

Spermatogonium
An undifferentiated male germ cell with self-renewing capacity representing the first stage of spermatogenesis.
Learn more at: www.fertilitypedia.org/edu/reproductive-cells/spermatogonium

Biological control

Follicle-stimulating hormone
FSH is a hormone secreted by the anterior pituitary gland. It regulates the development, growth, pubertal matur
reproductive functions of the body
Learn more at: www.fertilitypedia.org/edu/biological-control/follicle-stimulating-hormone

Gonadotropin-releasing hormone
A releasing hormone responsible for the release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) from the
anterior pituitary.
Learn more at: www.fertilitypedia.org/edu/biological-control/gonadotropin-releasing-hormone

Luteinizing hormone
A hormone, that stimulates ovulation and the development of the corpus luteum in females, and the production of androgens
in males.
Learn more at: www.fertilitypedia.org/edu/biological-control/luteinizing-hormone

Testosterone
Steroid hormone produced primarily in the testes of the male; responsible for the development of secondary sex
characteristics in the male.
Learn more at: www.fertilitypedia.org/edu/biological-control/testosterone

Thyroid hormones
Tyrosine-based hormones produced by thyroid gland and that regulate metabolism, heat production, protein synthesis, and
many other body functions.
Learn more at: www.fertilitypedia.org/edu/biological-control/thyroid-hormones

Thyroid-stimulating hormone
A hormone that stimulates the thyroid gland to produce thyroxine, and then triiodothyronine, which stimulates the metabolism
of tissue in the body.
Learn more at: www.fertilitypedia.org/edu/biological-control/thyroid-stimulating-hormone

Thyrotropin-releasing hormone
A releasing hormone produced by the hypothalamus that stimulates the release of thyrotropin (TSH) and prolactin from the
anterior pituitary.
Learn more at: www.fertilitypedia.org/edu/biological-control/thyrotropin-releasing-hormone

Reproductive functions

Endometrial receptivity
Period when the womb is receptive for implantation of the free-lying blastocyst.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/endometrial-receptivity
Fetal development
The process in which a human embryo or fetus gestates during pregnancy, from fertilization until birth.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/fetal-development

Implantation
The very early stage of pregnancy at which the embryo adheres to the wall of the uterus.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/implantation

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

⚠️ Risk factors

Anemia
A decrease in the amount of red blood cells or hemoglobin in the blood.
Learn more at: www.fertilitypedia.org/therapy/rf/anemia

Diabetes mellitus
A condition in which the body either does not produce enough, or does not properly respond to insulin, a hormone produced in the pancreas.
Learn more at: www.fertilitypedia.org/therapy/rf/diabetes-mellitus

Emotional stress
Learn more at: www.fertilitypedia.org/therapy/rf/emotional-stress

High level of prolactin
The presence of abnormally high levels of prolactin in the blood.
Learn more at: www.fertilitypedia.org/therapy/rf/high-level-of-prolactin

Low level of FSH
A condition with low serum follicle–stimulating hormone (FSH) concentration.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-fsh

Low level of LH
A serum luteinizing hormone (LH) levels under normal serum concentration for gender and age.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-lh

Low level of prolactin
A condition characterized by a deficiency of prolactin in the blood.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-prolactin

Low level of testosterone
An abnormally low testosterone production which may occur because of testicular or hypothalamic-pituitary dysfunction.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-testosterone

Poor dietary habits
Eating habits are one of the few factors within our control that impact not only our chances of falling pregnant.
Learn more at: www.fertilitypedia.org/therapy/rf/poor-dietary-habits
Radiation exposure
A damage to body caused by a large dose of radiation.
Learn more at: www.fertilitypedia.org/therapy/rf/radiation-exposure

Smoking
Long-lasting inhalation of the smoke of burning tobacco.
Learn more at: www.fertilitypedia.org/therapy/rf/smoking-1

Thyroid cancer
A cancer that starts in the thyroid gland.
Learn more at: www.fertilitypedia.org/therapy/rf/thyroid-cancer

Symptoms

Abnormal sperm morphology
A normal sperm morphology of less than 4% of sperms in an ejaculate.
Learn more at: www.fertilitypedia.org/edu/symptoms/abnormal-sperm-morphology

Absence of ovulation
An anovulatory cycle is a menstrual cycle during which the ovaries do not release an oocyte.
Learn more at: www.fertilitypedia.org/edu/symptoms/absence-of-ovulation-1

Anxiety
The emotional state characterized by unpleasant feelings such as uneasiness, worry, apprehension and dread.
Learn more at: www.fertilitypedia.org/edu/symptoms/anxiety

Constipation
A condition where the feces are hardened because of excess water removal in the colon.
Learn more at: www.fertilitypedia.org/edu/symptoms/constipation

Depression
The emotional state characterized by persistent feel of low self-esteem, loss of interest, sadness and negative attitude.
Learn more at: www.fertilitypedia.org/edu/symptoms/depression

Dry skin
The condition characterized as scaling, itching and cracking of skin.
Learn more at: www.fertilitypedia.org/edu/symptoms/dry-skin

Fatigue
A subjective feeling of tiredness which is distinct from weakness, which has a gradual onset.
Learn more at: www.fertilitypedia.org/edu/symptoms/fatigue

Hair loss
A hair loss that frequently occurs due to an underlying susceptibility of hair follicles to androgenic miniaturisation.
Learn more at: www.fertilitypedia.org/edu/symptoms/hair-loss-1

Immobile or dead spermatozoa in semen
A condition in which spermatozoa in semen are either immobile or dead.
Learn more at: www.fertilitypedia.org/edu/symptoms/immobile-or-dead-spermatozoa-in-semen
Increased testicular size
The condition where the testicles are abnormally enlarged.
Learn more at: www.fertilitypedia.org/edu/symptoms/increased-testicular-size

Infertility
The failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.
Learn more at: www.fertilitypedia.org/edu/symptoms/infertility

Infrequent menstruation
The medical term for infrequent, often light menstrual periods (intervals exceeding 35 days).
Learn more at: www.fertilitypedia.org/edu/symptoms/infrequent-menstruation-1

Irritability
A cognitive effect which results in one experiencing heightened feelings of annoyance, stress, irritability and a tendency towards violent behaviour.
Learn more at: www.fertilitypedia.org/edu/symptoms/irritability

Low concentration of sperm
A condition refers to semen with a low concentration of sperm.
Learn more at: www.fertilitypedia.org/edu/symptoms/low-concentration-of-sperm

Low semen volume
A condition in which a man has an unusually low ejaculate (or semen) volume, less than 1.5 ml.
Learn more at: www.fertilitypedia.org/edu/symptoms/low-semen-volume

Poor memory and concentration
Impairment in process of remembering and attention.
Learn more at: www.fertilitypedia.org/edu/symptoms/poor-memory-and-concentration

Recurrent implantation failure
Failure of implantation in at least three consecutive IVF attempts.
Learn more at: www.fertilitypedia.org/edu/symptoms/recurrent-implantation-failure-1

Recurrent miscarriage
A disease distinct from infertility, defined by two or more failed pregnancies.
Learn more at: www.fertilitypedia.org/edu/symptoms/recurrent-miscarriage

Reduced sperm motility
The decreased ability of sperm cell to move progressively.
Learn more at: www.fertilitypedia.org/edu/symptoms/reduced-sperm-motility

Underweight
A term describing a person whose body weight is considered too low to be healthy.
Learn more at: www.fertilitypedia.org/edu/symptoms/underweight

Therapies

Egg donation
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.
Learn more at: www.fertilitypedia.org/edu/therapies/egg-donation
Thyroid papillary carcinoma - histopathology
A personalized genetic test to diagnose the state of endometrial receptivity in the window of implantation.
Learn more at: www.fertilitypedia.org/edu/therapies/era-test

ICSI
A micromanipulative fertilization technique in which a single sperm is injected directly into an egg.
Learn more at: www.fertilitypedia.org/edu/therapies/icsi

Pharmacotherapy of hyperthyroidism
It is a therapy by thyrostatics (antithyroid drugs) drugs that inhibit the production of thyroid hormones.
Learn more at: www.fertilitypedia.org/edu/therapies/pharmacotherapy-of-hyperthyroidism

Radiiodine therapy of hyperthyroidism
Radioactive iodine therapy which destroy the function of a hyperactive thyroid gland.
Learn more at: www.fertilitypedia.org/edu/therapies/radiiodine-therapy-of-hyperthyroidism-1

Sperm donation
The procedure in which a man (sperm donor) provides his sperm for fertility treatment.
Learn more at: www.fertilitypedia.org/edu/therapies/sperm-donation

Standard IVF
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.
Learn more at: www.fertilitypedia.org/edu/therapies/standard-ivf

Surgical therapy of hyperthyroidism
Thyroidectomy is a surgical method by which the whole thyroid or a part of is removed.
Learn more at: www.fertilitypedia.org/edu/therapies/surgical-therapy-of-hyperthyroidism

Yoga
A physical, mental, and spiritual practice or discipline which originated in India.
Learn more at: www.fertilitypedia.org/edu/therapies/yoga
Thyroid papillary carcinoma - histopathology

Histopathological image of papillary carcinoma of the thyroid gland obtained by a total thyroidectomy. Hematoxylin and eosin stain.

Thyroid scintigraphy (a form of diagnostic test used in nuclear medicine)

5 different scintigrams taken from thyroids with different syndroms: A) normal thyroid, B) Graves disease, diffuse increased uptake in both thyroid lobes, C) Plummer’s disease (TMNG, toxic multinodular goitre), D) Toxic adenoma, E) Thyroiditis

Anterior thyroid

The human thyroid as viewed from the front.

Thyroid - histology

Section of a thyroid gland under the microscope. 1 follicles, 2 follicular cells, 3 endothelial cells.

Sources

“Hypothyroidism” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Hyperthyroidism” —sourced from Wikipedia licensed under CC BY-SA 3.0

“THYROID” —sourced from World Heritage Encyclopedia licensed under CC BY-SA 3.0

“Thyroid dysfunction and subfertility” —by Cho licensed under CC BY-NC 3.0

“Thyroid disease” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Autoimmune Thyroid Disorders” —by Iddah and Macharia licensed under CC BY 3.0

“Thyroid disease in pregnancy” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Thyroid cancer” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Goitre” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Peripheral neuropathy” —sourced from Wikipedia licensed under CC BY-SA 3.0

“Worldwide Increasing Incidence of Thyroid Cancer: Update on Epidemiology and Risk Factors” —by Pellegriti licensed under CC BY 3.0
 Thyroid Function in Male Infertility [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3826086/] —by Krajewska-Kulak and Sengupta licensed under CC BY 4.0

 Thyroid disorders and fertility [http://www.scopemed.org/fulltextpdf.php?mno=185166]—by Karaca and Akpak licensed under CC BY-NC 4.0

 Autoimmune diseases and pregnancy: analysis of a series of cases [http://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-015-1177-x]—by Gomes et al. licensed under CC BY 4.0

 Infertility [https://en.wikipedia.org/wiki/Infertility#Psychological_impact]—sourced from Wikipedia licensed under CC BY-SA 3.0

 Egg donation [https://en.wikipedia.org/wiki/Egg_donation]—sourced from Wikipedia licensed under CC BY-SA 3.0

 Assisted reproductive technology [https://en.wikipedia.org/wiki/Assisted_reproductive_technology]—sourced from Wikipedia licensed under CC BY-SA 3.0

 Radiation therapy [https://en.wikipedia.org/wiki/Radiation_therapy]—sourced from Wikipedia licensed under CC BY-SA 3.0

 Thyroiditis [https://en.wikipedia.org/wiki/Thyroiditis#Signs_and_symptoms]—sourced from Wikipedia licensed under CC BY-SA 3.0

 Thyroid papillary carcinoma histopathology [https://en.wikipedia.org/wiki/Thyroid_cancer#/media/File:Thyroid_papillary_carcinoma_histopathology_(4).jpg]—by KGH licensed under CC BY-SA 3.0

 Thyroid scintigraphy [https://commons.wikimedia.org/wiki/File:Thyroid_scintigraphy.jpg]—by Perros licensed under CC BY-SA 3.0

 Anterior thyroid [https://en.wikipedia.org/wiki/Thyroid#/media/File:Anterior_thyroid.jpg]—by CFCF licensed under CC BY-SA 3.0

 Thyroid-histology [https://commons.wikimedia.org/wiki/File:Thyroid-histology.jpg]—by Gille licensed under CC BY-SA 3.0