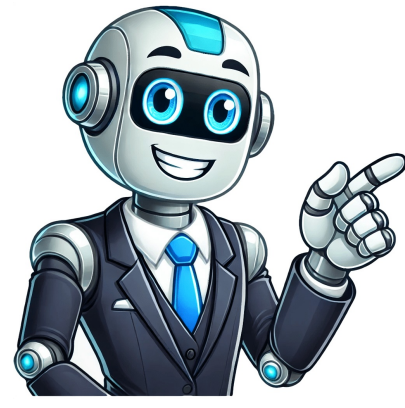


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Hormone panel test

A blood hormone test is a useful tool to study the levels of the female hormones responsible for regulating the female ovarian cycle. It can help us to determine the potential fertility of a woman.The main hormones that are analyzed in women check are: FSH, LH, estradiol, progesterone, AMH, prolactin, and TSH.Along with a transvaginal ultrasound scan, a female hormone check up allows us to predict the status of a woman's ovarian reserve. This blood test is therefore a highly useful tool when it comes to determining the egg count of a woman and if the woman is ovulating adequately.The female sex hormonesA woman's menstrual cycle is regulated by the hypothalamic-pituitary-ovarian axis (HPO).The hypothalamus and the pituitary gland are two structures which are located in the brain. They have many functions, one of which is to regulate hormones found in blood.For their part, the ovaries are responsible for releasing the sex hormones, which exert their function over the uterus. In addition, these hormones are responsible for the appearance of the secondary female characteristics in women.Hormonal regulation of the menstrual cycleHence, any abnormality that affects the release of hormones by the HPO axis can lead to menstrual irregularities and, as a result, infertility.This is why getting your hormones tested with a simple hormone analysis is a crucial female fertility test.The regulation process of the menstrual cycle can be split into two different parts: the hypothalamic-pituitary function and the ovarian function. The following sections will provide you with more information on the hormones involved in each:Hormones produced by the pituitary glandThe principal hormones produced by the pituitary gland, also called gonadotropins, are follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Both act upon on the ovary and trigger the release of estrogen and progesterone. Female pituitary hormonesIn turn, estrogen and progesterone then have an effect upon the pituitary gland, blocking the effect of hormones produced by the pituitary gland, thus closing the cycle. This process is known as feedback regulation or negative feedback.TSH and prolactin are also released by the pituitary gland under the influence of the ovarian cycle.Here, we are going to elaborate on the function of each one of these hormones:FSHThis gonadotropin affects the ovary by favoring the development and maturation of ovarian follicles, a series of sac-like structures where the eggs grow and mature.LHResponsible for triggering the follicle maturation process and ovulation (egg release). This then leads to the formation of the corpus luteum (empty follicle after ovulation) and the release of progesterone.TSHThe thyroid-stimulating hormone is released by the pituitary gland and regulates the activity of the thyroid gland.ProlactinThis hormone is especially important during pregnancy, since it stimulates milk production by the mammary glands as well as progesterone synthesis in the corpus luteum.Pituitary hormones in womenIf you would like to read more about this subject you can from more information here: Gonadotropins & Their Use in Assisted Reproduction.Hormones produced by the ovariesThe hormones released by the ovary, thanks to the action of gonadotropins, are the sex hormones. Each of these we will discuss in more detail:Estradiol (E2)This is an estrogenic hormone released by the growing ovarian follicle. Among other functions related to sexual development, it is responsible for activating the release of LH and thus inducing ovulation in each menstrual cycle. In addition, and together with progesterone, it is involved in preparing the endometrium for embryo implantation.Progesterone (P4)This is a steroid hormone released mainly by the corpus luteum, and the placenta in pregnancy. It acts during the second phase of the menstrual cycle (luteal phase), preparing the endometrium for embryo implantation. It is also responsible for maintaining the endometrium during pregnancy. If pregnancy does not occur, the level of progesterone drops and this causes the expulsion of the endometrium in what is known as menstruation.Anti-Müllerian hormone (AMH)A hormone secreted by the granulosa cells of the antral and preantral follicles of the ovary throughout a woman's reproductive life. It plays a key role in follicle formation and development. In addition, AMH is an indirect marker of ovarian reserve.What hormones do the ovaries produce?For more information on how the female menstrual cycle works, we recommend the following article: The Different Phases of the Menstrual Cycle.When and how to test hormone levels in womenA fertility hormone test involves taking a blood sample to determine the levels of the reproductive hormones described above.When to perform the hormone analysis?It should be noted that the blood test should be done between the third and fifth day of the menstrual cycle, that is, within 3-5 days after the start of your menstruation. During this time your hormones are in basal levels and can be compared with reference values.Nevertheless, the hormone progesterone should be checked on day 21 of the cycle to determine if ovulation has happened or not.Optimal moment to perform female hormone analysisFinally, AMH testing can be done anytime during the cycle. AMH levels due not alter during the course of the menstrual cycle, because this hormone is synthesized by the antral and preantral follicles that form the ovarian egg reserve.Normal hormone levelsIt is crucial that the female hormone is well regulated in order for ovulation to occur, followed by fertilization and embryo implantation in the wombTo check that there is no irregularity in this tight regulation of hormones, we measure the levels of sex hormones in blood. These hormone levels can then be compared with normal, or reference values, which you can find in the table below:We will now discuss what the normal ranges of female hormone values are and what their measurement is for:FSHThis helps to check the ovarian reserve. Levels between 3 to 9 mIU/ml indicate a good ovarian reserve. A value below 6 indicates that the ovarian reserve is excellent, from 6 to 9 good, between 9 to 10 moderate, and 10-13 indicate a diminished egg count. Values above 13 mIU/ml show a very low ovarian reserve, and typically occurs when menopause starts.LHLH levels should range between 2 and 10 mIU/ml. High levels (above 20) show that ovulation is about to occur. Along with progesterone, measuring LH helps to determine if the woman is ovulating normally. If LH levels are too high, it can indicate the presence of certain disorders, including PCOS (Polycystic Ovary Syndrome).TSHLevels should range between 0.2 and 4.7 mIU/ml on day 3 of the cycle. Higher or lower levels can indicate hyperthyroidism or hypothyroidism, respectively. Both alterations can have a negative impact on ovulation and subsequently affect fertility.Estradiol (E2)At the beginning of the cycle, estradiol levels range between approximately 27 pg/ml to 161 pg/ml. Ideally, in a fertile woman, the level should be below 50 pg/ml. Abnormally elevated levels may indicate the presence of cysts or poor ovarian reserve.Normal hormone levels in womenProgesterone (P4)Normal progesterone levels on day 21 of the cycle must range between 5 and 20 ng/ml (ideally 10 ng/ml or below) to confirm that ovulation has happened. On day 3, they should be lower than 1.5 ng/ml.ProlactinIn non-pregnant women, prolactin levels are between 0-20 ng/ml, whilst in pregnant women they range from 10 and 300 ng/ml. If higher than 30 ng/ml, this indicates the presence of hyperprolactinemia. As such hormone regulation is altered and as a consequence so is ovulation. Moreover, if prolactin levels in a non-pregnant women are above 80 ng/ml, it indicates that the pituitary gland is not working as is should. This could be due to the presence of a tumor or PCOS.AMHThe normal values are from 0.7-1 and 3.5 ng/ml. AMH levels below 0.7-1 indicate a diminished ovarian reserve, while levels above 3.5 ng/ml indicate an excessive ovarian development. If the latter is the case, your doctor must take special care during the ovarian stimulation protocol of a fertility treatment.Further information on ovarian reserve tests can be found in this article: Can a Woman's Egg Count Be Measured with a Blood Test?Other hormonesThe following list is composed of hormones that are checked much less frequently. Although sometimes it can be helpful to study them when it comes to diagnosing a fertility problem. Hence it is also important to take them into consideration.Free triiodothyronine (FT3)helps us to assess the function of the thyroid gland. Its value on day 3 should range between approximately 1.4 and 4.4 pg/ml.Free thyroxine (FT4)levels should be between 0.8 and 2 ng/dl. Low levels can indicate thyroid gland insufficiency or pituitary gland disorders.Total testosterone (T)Normal T levels in women lie between 24 and 47 ng/dl. Elevated levels are usually an indicator of PCOS.Inhibin BWWhen levels are lower than 45 pg/ml, it indicates ovarian reserve abnormalities or a poor response to stimulation.Other hormonal values in womenFemale hormonal imbalanceOnce the woman's hormonal profile is known and the results have been analyzed, the fertility treatment will be personalized for her individual situation. If the results shows irregularities, the specialist will prescribe the steps to follow.Furthermore, if trying for a baby without success, the doctor can indicated if it is necessary to turn to assisted reproduction. Sometimes, a solution may be directed intercourse or artificial insemination (AI). In other circumstances, they may chose to proceed with (IVF), or even ovodonation. We're already 773! Join our invITRA community FAQs from usersCan you tell if I have fertility problems from my hormone values?By Paloma Sánchez Gómez M. D. (gynecologist). Hormone analysis provides a lot of information to study fertility. It is advisable to look at the ovarian reserve in women over 35 years of age, or those with irregular menstrual cycles, previous ovarian surgery, oncology patients, etc.In addition, the analysis of FSH, LH, estradiol, prolactin and progesterone provides valuable information for the study of fertility. Read moreAt what age should AMH be examined?By Elena Santiago Romero M.D. (gynecologist). Anti-Müllerian hormone is produced by the ovary, and its blood levels are an indicator of a woman's ovarian reserve.To ensure everything works as expected, we recommend that the first measurement is done from age 20 and not later than age 30. By doing this, if a woman has a diminished ovarian reserve at a young age, she would have time to decide whether she wants to have a baby now or cryopreserve some eggs to become a mother in the future.Is having your progesterone levels below the reference value on day 21 serious?By Andrea Rodrigo B.Sc., M.Sc. (embryologist). Levels of progesterone on day 21 of the cycle that are too low can indicate that ovulation (egg release from the ovary) has not taken place as expected. Without ovulation, a pregnancy cannot occur.Can anxiety affect female hormone levels?By Andrea Rodrigo B.Sc., M.Sc. (embryologist). Yes, stress and anxiety can affect a woman's hormonal system, and subsequently the menstrual cycle.Do low AMH levels equal low ovarian reserve?By Andrea Rodrigo B.Sc., M.Sc. (embryologist). Yes, although it should be checked with other tests such as FSH testing or an antral follicle count via transvaginal ultrasound.You can find out more about these tests in this article: Ovarian reserve testWhat is the best day to do a blood test to examine female fertility?By Andrea Rodrigo B.Sc., M.Sc. (embryologist). Ideally, in order to obtain an accurate result for FSH, LH and estradiol levels, it should be done on day 3 of the cycle, after the start of the menstrual period. Progesterone, on the other hand, should be tested on day 21. Finally, AMH levels can be checked at any time during the cycle, as its levels are independent from the cycle.What are injectable female hormones used for?By Andrea Rodrigo B.Sc., M.Sc. (embryologist). Injectable female hormones are used in fertility treatment cycles to artificially control the menstrual cycle It allows for an optimization of the ovarian stimulation cycle in fertility treatment cycles, thereby increasing the chances of success.If you would like more information about this, then please visit the following article: Ovarian induction.Does stress affect the outcome of hormone level tests in women?By Marta Barranquero Gómez B.Sc., M.Sc. (embryologist). The answer is yes. Periods of stress in women may alter their hormonal cycle. Moreover, these situations may even cause the absence of menstruation at certain times, affecting female fertility.Recommended readingFor more information on the function of sex hormones in both males and females you can read this comprehensive guide: Male & Female Sex Hormones - Definition & Functions.Finally, if you are interested in learning more on the different female fertility tests, continue reading here: Female Fertility Tests - How Do You Know if You Can't Get Pregnant?A hormone test for women can reveal important information about your health. These tests can detect fertility problems, where you are in your menstrual cycle, or whether you're starting perimenopause. Hormone blood tests can also play a role in diagnosing medical conditions such as thyroid disease or diabetes. In some instances, they can show how well a medication is working. Illustration by Michela Buttignol for Verywell Health Hormone blood tests can look at several key hormones: In most cases, healthcare providers use hormone test results combined with other factors—such as symptoms, medical history, and other test results—to reach a diagnosis. Estrogen isn't a single hormone. You have many types of estrogens. Only three of them are commonly tested: Estrone (E1). The main post-menopausal hormoneEstradiol (E2). The main female hormone before menopause and outside of pregnancyEstriol (E3). A form that increases during pregnancy E2 is the most often tested form. It's the major hormone responsible for sexual function and also plays a major role in: Healthy bonesFemale characteristicsOther aspects of health Estradiol is primarily produced by the ovaries and levels vary throughout the menstrual cycle. They're highest at ovulation and lowest at menstruation. E2 levels slowly decrease as you age. The largest drop occurs at menopause when the ovaries "switch off." Everyone has some estradiol in their bodies, regardless of their biological sex. You may need an estrogen test if you have symptoms of an estrogen-related condition or: What's considered normal for estradiol levels depends on your menstrual cycle and phase of life. Testing for fertility looks at three phases of the menstrual cycle: Follicular phase: This lasts from the first day of your period until ovulation, usually about 14 days. It's named for the follicle housing the egg before it's released during ovulation.Periovulatory phase: This is an approximately three-day period around the time of ovulation.Luteal phase: This lasts from ovulation until the start of menstruation. After ovulation, the follicle releases estrogen and progesterone to prepare your uterus for a fertilized egg to implant. Estrogen levels are measured in picograms (one-millionth of a gram) per milliliter (pg/mL). E2 Test Timing Range (pg/ml) Follicular phase 19.5-144.2 Periovulatory phase 64.9-356.7 Luteal phase 55.8-214.2 Postmenopausal 32.2 or lower Source: University of North Carolina Medical Center Low estrogen levels may be a sign of: High estrogen levels may occur with conditions such as: Certain medications are also known to increase estrogen levels. These include steroid hormones, phenothiazines, tetracycline antibiotics, and ampicillin. You may need one if you're having symptoms of a hormonal imbalance. These are value on day 3 of your menstrual cycle, when levels are more distinct. However, progesterone tests to check ovulation are typically done on day 21 of your cycle. Progesterone is essential for regulating menstruation and fetal development. During the luteal phase, it helps prepare the uterus to receive a fertilized egg. What happens next depends on whether the egg is fertilized: If the egg is not fertilized, progesterone levels plummet, and a new menstrual cycle begins. If the egg is fertilized, progesterone levels remain high. This stimulates the growth of blood vessels that supply the lining of the uterus (endometrium) and makes glands in the endometrium that release nutrients to nourish the developing embryo. You may need a progesterone test to determine: As with estrogen, what's considered normal for progesterone depends on the timing of the test. Midway through the menstrual cycle, progesterone levels start climbing. Between six and 10 days later, if there's no fertilized egg, levels drop off. If the egg is fertilized, levels rise through the earliest stage of pregnancy. Progesterone levels are measured in nanograms per milliliter (ng/mL) or nanomoles per liter (nmol/L). Progesterone Test Timing Range (ng/mL) Range (nmol/L) Follicular phase 1 or lower 3.18 or lower Mid-cycle 5-20 15.9-63.6 1st trimester 11.2-90 35.62-286.2 2nd trimester 25.6-89.4 81.41-284.29 3rd trimester 48-above 300 152.64-above 954 Postmenopausal 1 or lower 3.18 or lower Source: University of North Carolina Medical Center If progesterone levels are low during pregnancy, it could be a sign that you're at risk of miscarriage or premature labor. You may be given a synthetic form of progesterone to prevent early labor. High progesterone levels usually do not signal any health problems unless they continue for a long time. In those instances, high levels may indicate an increased risk of breast cancer. Blood tests can detect pregnancy between six and eight days after ovulation. By contrast, to be accurate, home pregnancy (urine) tests should be taken after your period is late. That's between 12 and 16 days after ovulation. Follicle-stimulating hormone (FSH) is produced by the pituitary, a pea-sized gland in the brain. FSH stimulates the growth of an egg in the ovary to get it ready for fertilization. FSH can be checked with either blood or urine tests. Healthcare providers may look at a single sample or, to look for fluctuations, several samples taken over a 24-hour period. The pituitary gland produces more FSH when estrogen and other hormone levels begin to drop before menopause when the ovaries are losing their reproductive potential. In adult females, the FSH test may be used in diagnosing: This hormone also changes over the course of your menstrual cycle and lifetime. FSH is measured in milli-international units per milliliter (mIU/mL). FSH Test Timing Range (mIU/mL) Follicular phase 3.5-12.5 Ovulatory phase 4.7-21.5 Luteal phase 1.7-7.7 Postmenopausal 25.8-134.8 Source: Laboratory Corporation of America. Abnormal FSH levels are often caused by a disease of the pituitary gland or the hypothalamus (a part of the brain). The hypothalamus has several functions, including: Balance Temperature regulation Hunger and satiation These glands can be affected by PCOS, cancer treatment, a congenital defect (a condition you're born with), or other diseases and disorders. While testosterone is usually regarded as the "male sex hormone," it's also part of the female hormonal makeup. In females, testosterone is produced in the ovaries and adrenal glands. Most of it is then converted to estradiol with the help of an enzyme called aromatase. Dehydroepiandrosterone (DHEA) is also classified as an androgen, but it is normally present in females as well. You may need a testosterone or DHEA test because of: Irregular or missed periods Possible ovarian conditions, including PCOS and ovarian cancer Weight gain Acne Development of male traits (excess hair growth, male pattern baldness, deepening voice) Infertility Decreased sex drive Testosterone doesn't fluctuate like female hormones, so the timing of tests isn't important. Testosterone is measured in nanograms per deciliter (ng/dL) or nmol/L. Testosterone Range (ng/dL) Testosterone Range (nmol/L) 15-70 0.5-2.4 Source: Icahn School of Medicine at Mount Sinai Normal DHEA levels depend on your age. It's measured in micrograms per deciliter (mg/dL) or micromoles per liter (mmol/L). Age DHEA Range (mg/dL) DHEA Range (mmol/L) 18-19 145-395 3.92-10.66 20-29 65-380 1.75-10.26 30-39 45-270 1.22-7.29 40-49 32-240 0.86-6.48 50-59 26-200 0.7-5.4 60-69 13-10 0.35-3.51 69-older 17-90 0.46-2.43 Source: Icahn School of Medicine at Mount Sinai High testosterone could mean steroid use, PCOS, cancers of the adrenal glands or ovaries, orcongenital adrenal hyperplasia. Low libido is associated with low levels of testosterone. A drop in testosterone can also indicate perimenopause. Testosterone naturally drops during menopause, causing myriad symptoms including:Diminished sex drive, sexual pleasure, and orgasmic responseLow energyDepression High DHEA levels on blood tests may be a sign of conditions such as congenital adrenal hyperplasia or cancer of the adrenal gland. Thyroid function is determined by the levels of a group of hormones. These hormones are produced by the pituitary and thyroid glands. The three main ones include: Thyroid-stimulating hormone (TSH): A pituitary hormone that tells the thyroid gland to produce more hormone Thyroxine (T4): An inactive thyroid hormone that can be converted to an active state Triiodothyronine (T3): The active thyroid hormone, most of which comes from converted thyroxine Thyroid peroxidase antibodies (TPOAb): An enzyme that helps your body produce thyroid hormones. Thyroid peroxidase antibodies interfere with the action of this enzyme. High levels of TPOAb can be a sign of Hashimoto's thyroiditis. Thyroid function tests are often included in a female hormone panel because thyroid diseases are more common in women than men. It may also be included to examine whether the thyroid is affecting fertility and pregnancy. You may need a thyroid hormone test if you have symptoms of either an underactive thyroid (hypothyroidism) or an overactive thyroid (hyperthyroidism). Hypothyroidism symptoms include: Fatigue Unintended weight gain Puffy face Intolerance of cold Pain in the joints and muscles Constipation Dry skin Dry, thinning hair Decreased sweating Heavy or irregular menstrual periods Fertility problems Depression Slow heart rate Goiter (enlarged thyroid gland causing a lump in the front of your throat) Hyperthyroidism symptoms include: Anxiety Fatigue Frequent heart palpitations Irritability Weight loss or gain Tremors Rapid heart rate Bulging eyes Goiter Hyperactivity Healthcare providers may use TSH alone or a combination of TSH, T4, and T3 tests to diagnose thyroid disorders. TSH is measured in milli-international units per liter (mIU/L). There's a range for non-pregnant females as well as trimester-specific ranges in pregnancy. TSH Test Timing Range (mIU/L) Non-pregnant 0.5-5 First trimester 0.1-2.5 Second trimester 0.2-3 Third trimester 0.3-3.5 Source: UCLA Health, study by Galoiu S. T4 is measured in micrograms per deciliter (µg/dL). T3 is measured in nanograms per deciliter (ng/dL). Thyroid Hormone Range T4 (Thyroxine) 5-12 µg/dL T3 (Triiodothyronine) 80-220 ng/dL Source: UCLA Health Interpreting TSH results can be confusing. That's because high TSH means low thyroid activity and low TSH means high thyroid activity. Your provider may look at TSH alone or all three hormones together in order to reach a diagnosis. TSH T4+T3 Diagnosis High Low Hypothyroidism High Normal Borderline hypothyroidism Low High Hypert thyroidism Low Normal Early or mild hypert thyroidism Low Low Pituitary disease Source: UCLA Health IF results start out with low TSH and high thyroid hormones and then reverse with further testing, it indicates thyroiditis, which is inflammation of the thyroid gland. Antibody (TPOAb) testing may be done to see if you have an autoimmune thyroid condition such as Hashimoto's or Graves' disease. TPOAb is measured in international units per microliter. A normal range is less than 9 IU/mL. Your pituitary gland makes luteinizing hormone (LH), which helps control your menstrual cycle. This hormone is responsible for triggering ovulation, or the release of an egg. When you have too much luteinizing hormone, you may have difficulty getting pregnant. Too much LH can also cause problems with menstruation such as irregular periods. Your healthcare provider may want to check your LH levels for a few possible reasons: To look for the cause of infertilityTo help you find the time during your menstrual cycle when you are most likely to get pregnantIf you have irregular periodsTo confirm the start of perimenopause, the transition period before menopause LH is measured in international units per milliliter (IU/mL). Normal LH levels vary during the menstrual cycle. They are also different for someone who has reached menopause. LH Test Timing Range (IU/mL) Follicular phase 1.68 to 15 IU/mL Midcycle peak 21.9 to 56.6 IU/mL Luteal phase 0.61 to 16.3 IU/mL Postmenopausal 14.2 to 52.3 IU/mL. Source: University of Rochester Medical Center High LH levels could mean a few different things: The onset of perimenopause (in older people)Polycystic ovary syndrome (PCOS), a condition that causes cysts to form on the ovariesTurner syndrome, a genetic condition that affects sexual development Low LH levels can be related to: An eating disorder or malnutritionA problem with the pituitary gland Your healthcare provider may also want to check the levels of other types of hormones. Some of these include: Cortisol: Cortisol is an important hormone that impacts things like your metabolism, blood pressure, and stress response. Melatonin: This hormone helps regulate the sleep-wake cycle. Your healthcare provider may want to check your melatonin levels if you are having trouble sleeping. Serotonin: Serotonin is a hormone that helps transmit impulses through your nervous system. High levels of this can mean you have a certain type of serotonin-secreting tumor. Growth hormone: Your child's pediatrician may check their growth hormone levels if they are growing too slowly or too quickly. Adults can also have too much growth hormone. Leptin: Leptin is a hormone that helps your body maintain weight. People with low leptin may have trouble controlling how much they eat. Ghrelin: Ghrelin is produced by your stomach. It helps you know when you are hungry or full. If you have obesity, you may have low ghrelin levels. Insulin: Insulin helps your body use blood glucose. A blood insulin test can help diagnose insulin resistance or find the cause of hypoglycemia. It may also be done to help your healthcare provider develop a treatment plan for type 2 diabetes. Depending on your symptoms and/or the hormone that needs to be tested, you may have a few options for where to have the test done. Most people have their hormone levels tested after a visit to a healthcare provider. Your healthcare provider may want to check your hormone levels because of a symptom you are experiencing or some other concern. Many hormones can be tested with a simple blood test. These tests are usually done in your provider's office or in a separate testing facility. During the test, a sample of blood is collected into a vial using a small needle. Some hormones are checked with a urine or saliva test. These can also be done at a testing facility or in your healthcare provider's office. At-home testing kits are also available. Some home tests check female reproductive hormones as well as cortisol and thyroid hormones. These tests involve collecting a small amount of saliva and mailing it to a laboratory for testing. At-home tests are more convenient than testing at a healthcare provider's office and can be a good option for people who prefer to avoid needles. However, because hormone levels can fluctuate, these tests are not always reliable. At-home tests are also more prone to error. If you get one of these tests, it is also important to discuss the results with your healthcare provider rather than trying to interpret them yourself. Hormone tests are often done as part of routine bloodwork, but your healthcare provider may order them if you're having menstrual issues, changes in sex characteristics, fatigue, loss of sex drive, or problems getting pregnant. Providers may specifically check estrogen, progesterone, FSH, testosterone/DHEA, and thyroid hormone levels. Abnormal readings can indicate that you have a condition such as PCOS, ovarian cysts, thyroid disease, or, possibly, cancer. Tests are one step in the process of diagnosing a condition. If the results are concerning, your provider may order additional tests.