

# UNDERSTANDING HORMONE HIGHS & LOWS



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## ESTROGENS

Estradiol (E2) is the most potent of the three natural estrogens, which include estrone (E1) and estriol (E3). Estrogens play important roles in stimulating growth of the reproductive tissues, maintaining healthy bones, increasing the levels of neurotransmitters in the brain, and helping keep the cardiovascular system healthy.

**LOW ESTRADIOL** in premenopausal women is unusual unless they experience an anovulatory cycle (no ovulation) or are supplementing with birth control pills, which can suppress endogenous (made in the body) production of estrogens by the ovaries. A low estradiol level is much more common in postmenopausal women or in women of any age who have had their ovaries surgically removed (oophorectomy) and/or those who have not been treated with hormone replacement. Symptoms and conditions commonly associated with estrogen deficiency include hot flashes, night sweats, sleep disturbances, foggy thinking, vaginal dryness, incontinence, thinning skin, bone loss, and heart palpitations.

**HIGH ESTRADIOL** in premenopausal women is usually caused by excessive production of androgens (testosterone and DHEA) by the ovaries and adrenal glands, which are converted to estrogens by the ‘aromatase’ enzyme found in adipose (fat) tissue. When estrogen levels are high in postmenopausal women, this is usually due to estrogen supplementation or slow clearance from the body (sluggish liver function).

Excess estrogen levels, especially in combination with low progesterone, may lead to the symptoms of “estrogen dominance,” including: mood swings, irritability, anxiety, water retention, fibrocystic breasts, weight gain in the hips, bleeding changes (due to overgrowth of the uterine lining and uterine fibroids) and thyroid deficiency. Estradiol, even at normal, premenopausal levels, can cause estrogen dominance symptoms if not balanced by adequate progesterone. Diet, exercise, nutritional supplements, cruciferous vegetable extracts, herbs and foods that are natural aromatase inhibitors



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and bioidentical progesterone can help to reduce the estrogen burden and symptoms, naturally.

## PROGESTERONE

Progesterone is manufactured in the ovaries at about 10-30 mg of progesterone each day during the latter half of the menstrual cycle (luteal phase). Younger women with regular cycles generally make adequate progesterone, consistent with their having fewer symptoms of estrogen excess. Progesterone is important in normal menstrual cycles, breast development, maintaining pregnancy, relaxing blood vessels and influencing neurotransmitters in the brain.

**LOW PROGESTERONE** in premenopausal women is more commonly seen with anovulatory cycles, (no ovulation), luteal insufficiency (ovulation with low progesterone production), or use of contraceptives containing synthetic progestins. A lower level of progesterone is more common in postmenopausal women who no longer ovulate, who have had their ovaries removed, or who use synthetic progestins in HRT (Provera). Synthetic progestins are not detected by the highly specific immunoassays used to quantify progesterone.

**HIGH PROGESTERONE** in normal premenopausal and postmenopausal women can occur with excessive supplementation, incidental exposure

(e.g., transference from someone using progesterone cream), and/or sluggish metabolism. Transdermal (through the skin) progesterone is well absorbed at physiological levels (10-30 mg/day). Progesterone results higher than the reference range can occur with topical doses greater than 30 mg.

Note: a significant number of individuals in this range are without adverse symptoms, indicating that a high progesterone level is associated with few side effects. Symptoms of high progesterone are relatively benign and include excessive sleepiness, dizziness, bloating, susceptibility to yeast infections, and functional estrogen deficiency (more problematic when estradiol levels are low/low normal).

## RATIO OF PROGESTERONE/ESTRADIOL

The ideal ratio of progesterone/estradiol ranges from 100-500 in premenopausal and postmenopausal women supplementing with progesterone. The ideal ratio is not useful in postmenopausal women with low estrogen levels and women on synthetic hormones; e.g. oral contraceptives or conventional hormone replacement therapy (HRT).

## TESTOSTERONE

Testosterone is an anabolic hormone produced predominately by the ovaries in women and the testes in men, and to a lesser extent in the adrenal glands. It is essential for creating energy,

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maintaining optimal brain function (memory), regulating the immune system, and building and maintaining the integrity of structural tissues such as skin, muscles, and bone. Premenopausal testosterone levels usually fall within the high-normal range and postmenopausal levels at low-normal range. In men testosterone levels peak in the teens and then fall throughout adulthood.

**LOW TESTOSTERONE** is most commonly caused by aging, removal of the ovaries or testes, suppression of ovarian and testicular production by stress hormones (cortisol), use of contraceptives and synthetic HRT, and/or damage to the ovaries, testes and adrenal glands by trauma, medications, or radiation therapies. Chronically low testosterone can cause loss of bone and/or muscle mass, erectile dysfunction, thinning skin, vaginal dryness, low libido, incontinence, fatigue, aches and pains, depression, and memory lapses.

**HIGH TESTOSTERONE** is usually the result of excessive production by the ovaries, testes and adrenal glands or supplementation with androgens (testosterone, DHEA). Slightly elevated testosterone (range 50-60 pg/ml) is often seen in postmenopausal women as they transition into menopause. High testosterone in premenopausal women is associated with polycystic ovarian syndrome (PCOS), which in turn is caused by insulin resistance/metabolic

syndrome. Symptoms include loss of scalp hair, increased body and facial hair, acne, and oily skin. Supplementation with topical testosterone at doses in excess of levels produced by the ovaries (0.3-1 mg) or testes (5-10 mg) can raise testosterone to levels beyond physiological range.

### **DHEA**

DHEA is a testosterone precursor shown to have direct effects on the immune system independent of testosterone.

DHEA and its sulfated form, DHEAS, are produced predominately by the adrenal glands. Youthful levels are at the high end of the range; levels decrease with age and are usually at the lower end of normal in healthy middle-aged individuals. Athletes tend to have higher than normal DHEAS levels. Low DHEAS can be caused by adrenal exhaustion and is commonly seen in accelerated aging and diseases such as cancer. High DHEAS is associated with insulin resistance/PCOS (polycystic ovaries) or DHEA supplementation.

### **CORTISOL**

Cortisol is produced by the adrenal glands in response to stressors, both daily (e.g. waking up, low blood sugar) and unusual (e.g. emotional upset, infections, injury, surgery). Cortisol levels are highest in the morning, and then drop steadily throughout the day to their lowest point during sleep.

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Cortisol is essential in regulating and mobilizing the immune system against infections and reducing inflammation. It helps to mobilize glucose, the primary energy source for the brain, and maintain normal blood sugar levels.

While normal levels of cortisol are essential for life and optimal functioning of other hormones, particularly thyroid hormone, chronically elevated levels can be detrimental to health. Stress and persistently elevated cortisol levels can contribute to premature aging and chronic illness.

**LOW CORTISOL**, particularly if low throughout the day indicates adrenal exhaustion, caused by some form of stressor, e.g. emotional stress, sleep deprivation, poor diet, nutrient deficiencies (particularly low vitamins C and B5), physical or chemical insults (chemo, radiation) or synthetic glucocorticoid medications that suppress cortisol production. Chronic stress depletes cortisol and is associated with symptoms of fatigue, allergies (immune dysfunction), chemical sensitivity, cold body temp, and sugar craving.

Symptoms of thyroid deficiency can also stem from low cortisol. Adequate sleep, gentle exercise, meditation, proper diet (adequate protein), 'bioidentical' progesterone, adrenal extracts, herbal, and nutritional

supplements are often helpful in correcting low cortisol (hypoadrenia).

**HIGH CORTISOL** suggests some form of adrenal stress (see above), supplementation with topical hydrocortisone or use of corticosteroid medication. Heightened cortisol production by the adrenal glands is a normal response to routine stress and essential for health; when stress is chronic and cortisol output remains high over a prolonged period (months/years), breakdown of normal tissues (muscle wasting, thinning of skin, bone loss) and immune suppression can result. Common symptoms of chronic high cortisol include sleep disturbances, fatigue, depression, weight gain in the waist, anxiety.

For more information and recommended reading please visit [www.zrtlab.com](http://www.zrtlab.com).

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