

Female Hormone Profiles in Saliva & Dried Blood Spot

Why Profiles?

When patients have hormone-related symptoms, it is usually not a clear-cut case of one hormone level being abnormal, or even one hormone system. In fact, because of the role that hormones play as chemical messengers to wake up the genome in specific target tissues throughout the body, it makes sense that all hormone systems work in concert with each other to maintain a state of balance. This could be likened to the instruments in an orchestra playing together in harmony; when one instrument is off key or playing too loudly or softly (analogous to too much or too little hormone), the overall harmony is affected. In a similar manner, the adrenal, thyroid, and sex hormones work in harmony, and when one or more of the hormones in any one system become unbalanced, this affects the harmony or balance of the whole system. Symptoms common to hormonal imbalances in the endocrine systems are seen as the body struggles to maintain balance, but does not succeed. Without an overall picture of which hormone systems are affected, it is often difficult to know the best clinical course of action for correcting the imbalance.

Hormone “Profiles” at ZRT are multiple hormone tests bundled into one convenient kit. Priced lower than the sum of the individual tests, these provide a more economical method to assess a patient’s overall hormonal status, giving a better picture of the hormone imbalances that are causing symptoms. Instead of treating a secondary hormonal imbalance caused by an abnormality in only one of the hormonal systems (e.g., hot flashes caused by low estradiol), you can address the underlying issues that lie at the root of the problem, and therefore, better guide your patients towards overall wellness.

Blood Spot or Saliva Profile?

A variety of profiles is offered, using saliva only, blood spot only or a combination of saliva and blood spot. These are described in more detail under “Which Profile?” Some hormones (estradiol, progesterone, testosterone, DHEA-S and

Available Tests

Saliva Profile III

Tests: E2, Pg, T, DHEA-S, C x 4 (saliva)

Assess baseline levels before hormone replacement therapy, or for amenorrhea, PMS, dysfunctional uterine bleeding, estrogen dominance symptoms, PCOS screening, or menopausal symptoms. Also ideal for monitoring HRT dosing.

Female Comprehensive Profile I

Tests: E2, Pg, T, DHEA-S, C x 4 (saliva);
TSH, ft3, ft4, TPOab (blood spot)

Assess baseline levels before hormone replacement therapy; also ideal for monitoring HRT dosing. Full assessment of thyroid health, including screening for hypo or hyperthyroidism, testing for autoimmune thyroid disease, and monitoring thyroid replacement dosage.

Female Blood Profile II

Tests: E2, Pg, T, SHBG, DHEA-S, C, TSH,
ft3, ft4, TPOab (blood spot)

Assess baseline levels before hormone replacement therapy; also ideal for monitoring HRT dosing. Full assessment of thyroid health, including screening for hypo or hyperthyroidism, testing for autoimmune thyroid disease, and monitoring thyroid replacement dosage.

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Hormone Testing

Minimally-invasive home test kits

cortisol) can be determined in either blood spot, serum or saliva, and so your choice depends on which of these is the most suitable for the individual patient. Saliva is an excellent way to assess sex and adrenal hormone levels in women, and we find a good correlation with symptoms. However, in individuals who produce very little saliva, saliva collection may not be possible and in those who use hormones in a sublingual or troche supplement, saliva hormone testing is not appropriate and blood testing is a better choice. In individuals using sublingual hormones, it is difficult to know how much of the hormone in saliva results from direct saturation of the oral mucosa and salivary glands (resulting in false-high salivary levels) versus how much hormone is entering the salivary gland and saliva from the blood circulation.

Near-identical results are found from conventional blood serum (venipuncture) testing and finger-stick capillary blood spot testing¹⁻³. This makes blood spot testing a convenient alternative to serum testing for endogenous hormone evaluations, so the choice between blood spot and serum in our profiles is a matter of provider preference. However, when testing hormones in women using hormone supplementation, serum and blood spot are only equivalent in women using oral, sublingual, pellet or patch delivery, while blood spot testing is superior to conventional venipuncture serum testing when hormones are delivered as a topical cream or gel, or a troche. When individuals use hormones that are absorbed topically (through the skin) or absorbed through mucous membranes (troches, sublingual drops, vaginally), blood serum levels show very little increase. In striking contrast, salivary and blood spot levels of these sex steroids increase, demonstrating that the hormones have entered tissues of the body. Why? Hormones measured from saliva or capillary blood represent the free or bioavailable fraction of sex steroids in blood that travel to the tissues. In contrast, venous blood on its way back to the heart, is depleted of its bioavailable hormones and more representative of the amount of hormone that was not delivered to the tissues. For a

full, referenced discussion of these phenomena, please see our Provider Data Sheets “About Blood Spot Testing” and “About Saliva Testing.”

Hormones Tested in our Female Profiles & Why

Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age women including endometrial hyperplasia, pre-menstrual syndrome, fibrocystic breasts, and uterine fibroids⁴. In older women using estrogen supplements alone, a deficiency in progesterone can also result in symptoms of estrogen dominance, which include weight gain in the hips and thighs, fibrocystic and tender breasts, uterine fibroids, irritability, water retention, and thyroid problems. These symptoms are also seen in some women approaching menopause, whose estrogen levels swing wildly from high to low without the balancing effects of progesterone. If estrogen dominance is not corrected, it can lead to cancers of the uterus and breasts, and insulin resistance⁵. With the onset of menopause, when ovarian estrogen and progesterone production declines, a new subset of symptoms can result from low estradiol levels, including hot flashes, night sweats, vaginal dryness, sleep disturbances, foggy thinking, more rapid skin aging, and bone loss. Maintaining appropriate levels of estradiol, adequately balanced with progesterone, at any age is essential for optimal health.

Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries⁶. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss

of bone and muscle mass, depression, and memory lapses. SHBG is a protein produced by the liver in response to exposure to any type of estrogen, whether produced naturally by the body, consumed as a synthetic oral contraceptive estrogen, estrogen therapy, or as foods or herbs (phytoestrogens). Released from the liver into the bloodstream, SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body's overall exposure to estrogens. The SHBG level is also used to calculate free (unbound) testosterone levels when blood spot or serum are used instead of saliva to measure sex hormones⁷.

DHEA, mostly found in the circulation in its conjugated form, DHEA sulfate (DHEA-S), is a hormone produced by the adrenal glands, and levels generally reflect adrenal gland function. It is a precursor for the production of estrogens and testosterone, and is therefore normally present in greater quantities than all the other steroid hormones. Its production is highest in the late teens to early 20s, and declines gradually with age. Like cortisol, it is involved with immune function and a balance between the two is essential. Low DHEA can result in reduced libido and general malaise, while high DHEA can have masculinizing effects on women because it metabolizes to androgens, including testosterone. Because of its conversion to estrogens and androgens, it is important to monitor levels of these hormones, as well as levels of DHEA, during supplementation⁸.

Cortisol is an indicator of adrenal function and exposure to stressors. Under normal circumstances, adrenal cortisol production shows a diurnal variation and is highest early in the morning, soon after waking, falling to lower levels in the evening. Normal cortisol production shows a healthy ability to respond to stress. Low cortisol levels can indicate adrenal fatigue (a reduced ability to respond to stressors), and can leave the body more vulnerable to poor blood sugar regulation and immune system dysfunction. Chronically high cortisol is a consequence of high, constant exposure to stressors, and this has serious implications for long-term health, including an increased risk of cancer, osteoporosis, and possibly Alzheimer's disease⁹.

Free T4, free T3, TSH, and TPOab tests can indicate the presence of an imbalance in thyroid function, which can cause a wide variety of symptoms, including feeling cold all the time, low stamina, fatigue (particularly in the evening), depression, low sex drive, weight gain, and high cholesterol. Thyroid deficiency can also be a cause of infertility, which is why these tests are included in the Female Fertility Profiles.

LH and FSH tests are included in the female Fertility Profile to give information on the possible presence of ovarian insufficiency (elevated FSH) or PCOS (elevated LH/FSH).

WHICH PROFILE?

Comprehensive Saliva & Blood Spot Profiles

For an initial evaluation of overall hormonal status, we strongly recommend the most comprehensive profiles using both saliva and blood spot collection, which give you the "big picture" of where the hormones may be unbalanced. For fertility issues, we have included LH and FSH in the Fertility Profiles.

Comprehensive Female Profile I

Saliva tests: E2, Pg, T, DS, Cx4

Blood spot tests: fT4, fT3, TSH, TPOab

Comprehensive Female Profile II

Saliva tests: Cx4

Blood spot tests: E2, Pg, T, SHBG, DS, fT4, fT3, TSH, TPOab

Fertility Profile

Saliva tests: Cx4

Blood spot tests: E2, Pg, T, SHBG, DS, fT4, fT3, TSH, TPOab, LH, FSH

SALIVA PROFILES

Saliva Profile I

E2, Pg, T, DS, morning C

Saliva Profile II

E2, Pg, T, DS, Cx2 (morning and night)

Saliva Profile III

E2, Pg, T, DS, Cx4 (diurnal)

Note: Saliva profiles do not include thyroid hormones and are not recommended for sublingual hormone users.

BLOOD SPOT PROFILES

Female Blood Spot Profile I

E3, E2, E1, E3, Pg, T, SHBG, DS, C

Female Blood Spot Profile II

E2, Pg, T, SHBG, DS, C, fT4, fT3, TSH, TPOab

Note: Blood profiles assess only waking cortisol - only a single a.m. sample is collected. Best choice for sublingual hormone users or individuals having problems collecting saliva.

References

1. Worthman CM, Stallings JF. Hormone measures in finger-prick blood spot samples: new field methods for reproductive endocrinology. *Am J Phys Anthropol* 1997; 104:1-21
2. Shirtcliff EA, Reavis R, Overman WH, Granger DA. Measurement of gonadal hormones in dried blood spots versus serum: verification of menstrual cycle phase. *Horm Behav* 2001; 39:258-66
3. Edelman A, Stouffer R, Zava DT, Jensen JT. A comparison of blood spot vs. plasma analysis of gonadotropin and ovarian steroid hormone levels in reproductive-age women. *Fertil Steril* 2007; 88:1404-7
4. Northrup C. Estrogen dominance. Available at: <https://www.drnorthrup.com/estrogen-dominance/>
5. Kaaks R. Nutrition, hormones, and breast cancer: is insulin the missing link? *Cancer Causes Control*. 1996; 7:605-25
6. Miller KK. Androgen deficiency in women. *J Clin Endocrinol Metab*. 2001;86:2395-401.
7. Selby C. Sex hormone binding globulin: origin, function and clinical significance. *Ann Clin Biochem*. 1990; 27:532-41.
8. Allolio B, Arlt W, Hahner S. DHEA: why, when, and how much-DHEA replacement in adrenal insufficiency. *Ann Endocrinol (Paris)*. 2007;68:268-73.
9. Magri F, Cravello L, Barili L, Sarra S, Cinchetti W, Salmoiraghi F, Micale G, Ferrari E. Stress and dementia: the role of the hypothalamic-pituitary-adrenal axis. *Aging Clin Exp Res*. 2006;18:167-70.

Useful Resources:

- ▶ Thomas G. Williams. *The Role of Stress and the HPA Axis in Chronic Disease Management*. Point Institute; 2015.
- ▶ American Thyroid Association – www.thyroid.org
- ▶ Richard Shames, Karilee Shames. *Feeling Fat, Fuzzy or Frazzled? A 3-Step Program to: Beat Hormone Havoc, Restore Thyroid, Adrenal, and Reproductive Balance, and Feel Better Fast!* Hudson Street Press; 2005. www.feelingfff.com

Relevant ZRT Provider Data Sheets:

- ▶ About Dried Blood Spot Testing
- ▶ About Saliva Testing
- ▶ Saliva and Blood Cortisol Testing for Adrenal Function
- ▶ Fertility Profile
- ▶ Thyroid Profiles