Testing Catalog

SALIVA • BLOOD SPOT • SERUM • DRIED URINE
About ZRT Laboratory

The only way to know if hormones are in balance is to test them.

Therefore, it’s vital to partner with a lab that understands subtle differences between testing methods, and has both the experience and technology to deliver the most accurate results.

With numerous peer-reviewed studies validating that hormone test results support symptomatology, science now recognizes that hormones are a fundamental part of treating the whole body. Evidence shows that hormonal imbalances are the root cause of many chronic health issues.

With 20 years of experience and results from over 8 million tests, ZRT Laboratory is a recognized leader in innovative and meaningful hormone and wellness testing. Health care providers in all 50 states and 96 countries, and research teams worldwide, use our tests, including the CDC, the NIH and many renowned universities.

Breast cancer researcher and biochemist David Zava, PhD founded ZRT in 1998. His desire to innovate the science of hormone testing provides the guiding force behind development of all ZRT’s technology.

FOUNDER

David T. Zava

Breast cancer researcher and biochemist David Zava, PhD founded ZRT in 1998. His desire to innovate the science of hormone testing provides the guiding force behind development of all ZRT’s technology.
Overview of Kits

ZRT Laboratory Standard Kits

BLOOD + URINE | Pages 18
- Comprehensive Thyroid Profile
  Dried Urine: I, Se, Br, Li, As, Cd, Hg, Crtn
  Blood Spot: T4, Tgbn, TSH, fT3, fT4, TPOab
- Comprehensive Metals & Nutrients Profile
  Dried Urine: I, Se, Br, Li, As, Cd, Hg, Crtn
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DRIED BLOOD SPOT | Pages 10 - 11
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- Female Blood Profile I
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- Female Blood Profile II
  E2, Pg, T, SHBG, DS, C, TSH, fT3, fT4, TPOab
- Male Blood Profile I
  E2, T, PSA, SHBG, DS, C
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- CardioMetabolic Profile | Specialty Profile, Page 16
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- Metals & Nutrients - Blood Profile | Specialty Profile, Page 19
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SALIVA | Pages 8 - 9, 17
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- Female / Male Saliva Profile II: E2, Pg, T, DS, Cx2
- Female / Male Saliva Profile III: E2, Pg, T, DS, Cx4
- Hormone Trio: E2, Pg, T
- Adrenal Stress: DS, Cx4
- Diurnal Cortisol: Cx4

SALIVA + BLOOD | Page 12
- Comprehensive Female Profile I
  Saliva: E2, Pg, T, DS, Cx4
  Blood Spot: TSH, fT3, fT4, TPOab
- Comprehensive Female Profile II
  Saliva: Cx4
  Blood Spot: E2, Pg, T, SHBG, DS, TSH, fT3, fT4, TPOab
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  Saliva: Cx4
  Blood Spot: E2, T, DS, Cx4
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- Saliva: DS, Cx4

### CORTISOL AWAKENING RESPONSE | Page 18
- Saliva: DS, Cx6

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### FERTILITY | Page 17
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- Metals & Nutrients - Urine Profile
- Metals & Nutrients - Blood Profile
- Comprehensive Metals & Nutrients Profile
- Comprehensive Thyroid Profile

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  - Dried Urine: GABA, Glu, Gly, DA, Epi, NE, HIST, 5-HT, PEA, DOPAC, HVA, 5-HIAA, NMN, VMA, Crtn

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### HEAVY METALS & NUTRIENTS | Pages 18 - 19
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- Comprehensive Thyroid Profile

### COMPLEMENTARY SERVICES

### ZRT Laboratory Test Kits

Our all-inclusive test kits are simple and convenient for both patients and providers. All kits (except serum) are designed for private sample collection at home, at the optimal time.

Orders can be placed online at myZRT.com or by phone at 866.600.1636 or +1.503.466.2445.
Saliva, blood spot and dried urine are used for the minimally-invasive hormone testing that is the hallmark of ZRT Laboratory. The simplicity of sample collection and stability of samples in storage and transport have made these ideal for clinical use as well as research. Serum testing is now also available for some tests. See the tables for a list of all our current offerings.

The American Medical Association's Current Procedural Terminology (CPT®) codes are provided for informational purposes only to assist with billing. ZRT assumes no responsibility for billing errors due to reliance on the published CPT codes.

### Directory of Tests & CPT Codes

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</table>

* Tested in saliva, blood spot, and serum. Saliva measures free (bioavailable) hormone levels; blood spot and serum measure total (free plus protein bound) levels.

** Explanation of assay type abbreviations:

- EIA = Enzyme Immunoassay
- GC-MS/MS = Gas Chromatography/Tandem Mass Spectrometry
- ICPMS = Inductively Coupled Plasma Mass Spectrometry
- ITA = Immunoturbidimetric Assay
- LC-MS/MS = Liquid Chromatography/Tandem Mass Spectrometry
- LIA = Luminescence Immunoassay
- TRFIA = Time-Resolved Fluorescence Immunoassay

*** Any test offered as a Single Test can be added to any other test or profile at a discounted price.

**** Creatinine is included with all urine tests as a correction factor for urine dilution.

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<th>Tests</th>
<th>CPT Code</th>
<th>Assay Type**</th>
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<td>LC-MS/MS</td>
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Today’s health care practitioners face the challenge of helping patients cope with hormone imbalance. Whether that’s women suffering from hot flashes and night sweats or men troubled by symptoms of low testosterone, accurate testing is the best way to make sure hormone dosing is optimal.

Matching the type of testing with the type of supplementation has a great impact on the clinical usefulness of hormone assessments. If you’re measuring with the wrong method, tissue uptake of supplemented hormone may not be accurately reflected in test results – leading to inappropriate dosing.

**Serum vs. Blood Spot**
While testing endogenous hormones in serum or blood spot reveals the same levels, assessing topical hormone supplementation with serum testing grossly underestimates the amount of hormone being delivered to tissues. Blood spot tests blood in the capillary beds (arterial/venous/lymphatic) of the finger, and thus better reflects tissue hormone levels.

**Serum vs. Saliva**
With saliva measuring the bioavailable (non-protein-bound) fraction of circulating hormones that can freely diffuse into tissues, it provides a more accurate assessment of topical hormone supplementation than serum. Serum levels do not rise significantly after topical dosing. By contrast, saliva levels do – reflecting tissue delivery of the topically applied hormone.

**Blood Spot vs. Saliva**
Blood spot and saliva are highly accurate methods for assessing oral, topical, vaginal, injectable and pellet hormone delivery. However, saliva is not accurate for troche or sublingual hormone therapies because these deliver high amounts of hormone locally to the salivary glands – giving a false-high determination of whole body exposure to the supplemented hormone.

**Blood Spot / Saliva vs. Urine**
Urine testing cannot accurately assess topical or oral medications – as it is not reflective of tissue uptake – and may show no uptake with topical or extremely high levels with oral medications. Urine testing is not recommended for assessing vaginal hormone delivery as there is a high risk of contamination of the urine sample leading to false-high results. Blood spot or saliva testing provide the best assessment of oral, topical and vaginal hormone supplementation.

**Saliva vs. Urine**
Urinary hormone testing is the only way to see how the body is metabolizing hormones. Both saliva and urine can be used for measuring diurnal cortisol levels; but urinary free cortisol output reflects an average of the time since the previous urine void (hours), while saliva provides an instantaneous assessment at the time saliva was collected.
When providers are measuring endogenous hormones, we see that levels are the same whether you measure in serum or in blood spot.

There is a big difference, however, when patients are supplementing with topical hormones. What we see in a situation like that is that levels go up very high in the capillary blood – that is the blood from the fingertip – but they don’t go up very high in serum.

What providers have concluded from that – because they’re only looking at serum – is that the hormones are not going in the body. What we know now is that topical delivery is very effective, and we can see those increased levels by measuring in blood spot.

So if you’re measuring in serum, and you see there’s nothing there, you’re missing the boat.

David Zava, PhD

Guide to Steroid Hormone Testing in Different Body Fluids Following Different Routes of Hormone Administration

<table>
<thead>
<tr>
<th>Body Fluid</th>
<th>No Exogenous Steroids</th>
<th>Oral Steroids</th>
<th>Topical Steroids</th>
<th>Vaginal Steroids</th>
<th>Troche / Sublingual Steroids</th>
<th>Pellet / IM Steroids</th>
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<tbody>
<tr>
<td>Serum</td>
<td>yes</td>
<td>yes</td>
<td>no²</td>
<td>no²</td>
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<tr>
<td>Saliva</td>
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<td>yes</td>
<td>yes³</td>
<td>yes</td>
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<td>Dried Urine</td>
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<td>no²</td>
<td>no⁶</td>
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<td>Dried Blood Spot</td>
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<td>yes⁶</td>
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</table>

Key
1. **Overestimation**: Metabolites interfere with immunoassays
2. **Underestimation**: Hormone levels not reflective of tissue uptake
3. **Overestimation**: Requires range adjustment
4. **Overestimation**: Direct contamination of oral mucosa / saliva
5. **Overestimation**: Direct contamination of urine
6. **Overestimation**: IF fingertips contaminated with topical hormones
About Saliva Testing

Saliva testing identifies bioavailable hormone levels – the active quantity that’s free to move into body tissue. Its non-invasive nature also make it the gold standard for tests requiring multiple collections, such as diurnal cortisol.

- ZRT developed the methodology making saliva hormone testing commercially viable
- Only lab to perform extraction — the accepted methodology for research studies
- No special shipment methods required
- Samples are stable during shipping, even over the weekend and holidays

Suitable for:

- Assessing “free” (unbound to carrier proteins) hormone levels
- Monitoring hormone replacement given orally, topically, vaginally or via pellets
- Determining diurnal cortisol levels (4 times during 1 day) for adrenal stress assessment

Not Suitable for:

- Monitoring sublingual / troche hormone replacement
- Patients with dry mouth, e.g. due to Sjögren’s Syndrome
Saliva Profiles

Female / Male Saliva Profiles I, II & III

Three convenient saliva profiles are offered to assess sex and adrenal hormone levels. These profiles test waking levels of estradiol, progesterone, testosterone, DHEA-S, and cortisol, while Profile II includes a bed-time cortisol test and Profile III a full diurnal cortisol profile at four time points during the day (morning, noon, evening, night).

- Saliva Profile I includes: E2, Pg, T, DS, C
- Saliva Profile II includes: E2, Pg, T, DS, Cx2
- Saliva Profile III includes: E2, Pg, T, DS, Cx4

Consider for Women:
Baseline levels before hormone replacement therapy, amenorrhea, PMS, dysfunctional uterine bleeding (DUB), estrogen dominance symptoms, hypogonadism, sexual dysfunction, osteoporosis, fibrocystic breast disease, infertility screening, polycystic ovarian syndrome (PCOS) screening, anovulation, menopausal symptoms, screening for adrenal fatigue. Ideal for monitoring HRT dosing.

Consider for Men:
Monitor for estrogen dominance, hypogonadism, andropause, fatigue, low libido, erectile dysfunction, infertility, osteoporosis screening, and adrenal dysfunction.

Hormone Trio - Saliva

Combines three of our most popular saliva hormone tests at a lower price than individual tests.

- Hormone Trio includes: E2, Pg, T

Consider for Women:
Baseline levels before hormone replacement therapy, amenorrhea, PMS, DUB (dysfunctional uterine bleeding), estrogen dominance symptoms, hypogonadism, sexual dysfunction, osteoporosis, fibrocystic breast disease, PCOS screening, anovulation, menopausal symptoms. Ideal for monitoring HRT dosing.

Consider for Men:
Monitor for estrogen dominance, hypogonadism, andropause, fatigue, low libido, erectile dysfunction, osteoporosis screening.

Diurnal Cortisol Profile

The full diurnal cortisol profile at four time points during the day.

- Diurnal Cortisol Profile includes: Cx4

Consider for:
Stress, immune dysfunction, chronic fatigue, and / or multiple symptoms of adrenal imbalance.

For Adrenal Stress & Cortisol Awakening Response see page 17-18.
Blood Testing

About Blood Testing
Blood spot testing is the ideal method for measuring cardiometabolic markers, thyroid hormones and vitamin D. It’s also a convenient way to assess blood levels of sex steroid hormones.
While serum testing is widely accepted, the lesser known blood spot test method offers results that have been proven equivalent to serum. In fact, blood spot offers distinct advantages over serum testing for monitoring topical and sublingual hormone supplementation.

About Dried Blood Spot Testing
- ZRT developed the science for accurately measuring steroid hormones in dried blood spot and is the only lab to offer this technology commercially
- No phlebotomist, freezing / refrigeration or special shipment required
- Hormones and other analytes are stable at room temperature for 30 days

About Serum Testing
- Broadly accepted method for measuring hormones & other analytes

Dried Blood Spot Testing is Suitable for:
- Patients with dry mouth and / or children who may have difficulty collecting saliva
- Monitoring all hormone replacement therapy (oral, topical, vaginal, sublingual, pellet)
- Assessing interstitial tissue / capillary hormone levels
- Assessing thyroid health, fertility parameters, toxic and nutritional elements, and cardiometabolic risk factors

Not Suitable for:
- Patients who are uncomfortable about collecting their own sample (samples may be collected in provider’s office)

Serum is Suitable for:
- Measuring endogenous hormones
- Monitoring hormone replacement given orally, or via patch or pellets

Not Suitable for:
- Monitoring topical or intravaginal hormone replacement therapy

Blood Profiles

Hormone Trio - Blood Spot
Combines three of our most popular hormone tests at a lower price than individual tests.

✓ Hormone Trio includes: E2, Pg, T

Consider for Women:
Baseline levels before hormone replacement therapy, amenorrhea, PMS, DUB (dysfunctional uterine bleeding), estrogen dominance symptoms, hypogonadism, sexual dysfunction, osteoporosis, fibrocystic breast disease, PCOS screening, anovulation, menopausal symptoms. Ideal for monitoring HRT dosing.

Consider for Men:
Monitor for estrogen dominance, hypogonadism, andropause, fatigue, low libido, erectile dysfunction (ED), osteoporosis screening.
Blood Profiles

Female Blood Profiles I & II
Two dried blood spot profiles are offered for women:
Profile I tests sex and adrenal hormone levels in blood, as an alternative to Saliva Profile I for those women who have difficulty producing enough saliva for testing, or who are using sublingual hormones that might interfere with the saliva test. SHBG is included in the profile so that free (unbound) testosterone can be calculated, since most of the testosterone circulating in the blood is bound to SHBG. Profile II includes the same tests as Profile I with the addition of the Essential Thyroid Profile tests.

- Female Blood Spot Profile I includes:
  - E2, total; Pg, total; T, total; SHBG; DS; C
- Female Blood Spot Profile II adds:
  - TSH, fT3, fT4, TPOab
- Female Serum Profile includes:
  - E2, Pg, T, SHBG, DS, C, TSH, fT3, fT4, TPOab

Female Blood Profile I tests the primary female sex hormones and their major binding globulin, and screens for adrenal health through morning cortisol.
Consider for assessment of total baseline levels before hormone replacement therapy, adrenal fatigue, amenorrhea, anovulation, DUB (dysfunctional uterine bleeding), estrogen dominance symptoms, fibrocystic breast disease, hypogonadism, infertility screening, menopausal symptoms, osteoporosis, PCOS screening, PMS, sexual dysfunction.

Female Blood Profile II is a more comprehensive assessment of hormonal and thyroid imbalances. The Female Serum Profile includes the same tests.

Male Blood Profiles I & II
Two dried blood spot profiles are offered for men:
Profile I tests sex and adrenal hormone levels in blood, and includes a PSA test to help assess prostate health. Profile II includes the same tests as Profile I with the addition of the Essential Thyroid Profile tests.

- Male Blood Spot Profile I includes:
  - E2, total; T, total; PSA; SHBG; DS; C
- Male Blood Spot Profile II adds:
  - TSH, fT3, fT4, TPOab
- Male Serum Profile includes:
  - E2, T, PSA, SHBG, DS, C, TSH, fT3, fT4, TPOab

Male Blood Profile I tests the primary male sex hormones and their major binding globulin, and screens for adrenal health through morning cortisol.
Consider for monitoring for estrogen dominance, hypogonadism, andropause, fatigue, low libido, erectile dysfunction (ED), infertility, osteoporosis screening, adrenal dysfunction.

Male Blood Profile II is a more comprehensive assessment of hormonal and thyroid imbalances. The Male Serum Profile includes the same tests.

Essential Thyroid Profile
Thyroid dysfunction can explain a wide variety of symptoms because of the central role of thyroid hormones in directing the metabolic activity of cells. A properly regulated thyroid is essential to a wide array of biochemical processes in the body. This profile can help detect both overt and subclinical thyroid disease, as well as monitor thyroid replacement therapy.

- Available in Dried Blood Spot
- Essential Thyroid Profile includes: TSH, fT3, fT4, TPOab

Essential Thyroid Profile provides assessment of thyroid health, including screening for hypo- or hyperthyroidism, determining Free T4 and Free T3 levels, testing for autoimmune thyroid disease, and monitoring thyroid replacement dosages.

Consider for:
Alopecia, anxiety, arthralgias, constipation, depression, fatigue, Hashimotos, hyperlipidemia, hypertension, infertility, menstrual disorders (DUB, amenorrhea), mood disorders, obesity, sleep disorders, and weight issues.
Comprehensive Female Profiles

These profiles include both saliva and dried blood spot tests, and provide a broad assessment of possible hormonal imbalances because they assess sex, adrenal, and thyroid hormone levels. These three hormone systems work in harmony, and an imbalance in one system affects the balance of the others as well. Comprehensive testing allows the health care provider to determine appropriate treatment to restore balance and achieve overall wellness.

- **Comprehensive Female Profile I** includes:
  - Saliva: E2, Pg, T, DS, Cx4
  - Blood Spot: TSH, fT3, fT4, TPOab

- **Comprehensive Female Profile II** includes:
  - Saliva: Cx4
  - Blood Spot: E2, total; Pg; T, total; SHBG; DS; TSH; fT3; fT4; TPOab

Comprehensive Female Profile I combines ZRT’s popular Salivary Hormone Profile III with our Essential Thyroid Profile tests in dried blood spot. Comprehensive Female Profile II tests only the diurnal cortisol in saliva, while the sex and thyroid hormones are all tested in dried blood spot. Allows physicians to assess baseline levels before hormone replacement therapy; ideal for monitoring HRT dosing. Full assessment of thyroid health, including screening for hypo or hyperthyroidism, determining Free T4 levels as well as Free T3 levels, testing for autoimmune thyroid disease, and monitoring thyroid replacement dosage.

Consider for:
- Amenorrhea, PMS, DUB (dysfunctional uterine bleeding), estrogen dominance symptoms, hypogonadism, sexual dysfunction, osteoporosis, fibrocystic breast disease, infertility screening, PCOS screening, anovulation, menopausal symptoms, screening for adrenal fatigue, and thyroid dysfunction.

Comprehensive Male Profiles

These profiles include both saliva and dried blood spot tests, and provide a broad assessment of possible hormonal imbalances because they assess sex, adrenal, and thyroid hormone levels. These three hormone systems work in harmony, and an imbalance in one system affects the balance of the others as well. Comprehensive testing allows the health care provider to determine appropriate treatment to restore balance and achieve overall wellness.

- **Comprehensive Male Profile I** includes:
  - Saliva: E2, T, DS, Cx4
  - Blood Spot: PSA, TSH, fT3, fT4, TPOab

- **Comprehensive Male Profile II** includes:
  - Saliva: Cx4
  - Blood Spot: E2, total; T, total; SHBG; DS; PSA; TSH; fT3; fT4; TPOab

Comprehensive Male Profile I combines a male version of ZRT’s popular Salivary Hormone Profile III with our Essential Thyroid Profile in dried blood spot. For men, PSA is included instead of the less relevant (for men) salivary progesterone.

Comprehensive Male Profile II tests only the diurnal cortisol in saliva, while the sex and thyroid hormones are all tested in dried blood spot. Allows physicians to monitor for estrogen dominance, hypogonadism, andropause; full assessment of thyroid health, including screening for hypo or hyperthyroidism, determining Free T4 levels as well as Free T3 levels, testing for autoimmune thyroid disease, and monitoring thyroid replacement dosages.

Consider for:
- Fatigue, sleep disturbance, decreased cognition, depression, low libido, erectile dysfunction (ED), infertility, loss of bone and muscle mass, weight gain, adrenal and thyroid dysfunction.

- Don’t need PSA? Select one of the female profiles instead.
About Dried Urine Testing

Urine testing is the best way to measure hormone by-products and their respective metabolic pathways, providing a gauge for understanding the body’s hormone metabolism. ZRT’s method of testing dried urine offers discreet, at-home collection versus all-day serial sampling.

- Dried urine testing is the latest scientific advancement pioneered by ZRT Laboratory
- Eliminates the disadvantages of 24-hour liquid urine collections commonly used for testing
- No freezing / refrigeration or special shipment required
- Samples are stable at room temperature for 30 days

Suitable for:
- Measuring steroid hormone metabolites, e.g., for breast cancer risk assessment
- Measuring neurotransmitter levels
- Determining toxic element exposure and iodine / selenium sufficiency for thyroid health
- Determining diurnal cortisol production at 4 time points for stress assessment
- Assessing nocturnal and diurnal melatonin production

Not Suitable for:
- Monitoring topical or intravaginal hormone replacement therapy

Dried Urine Testing is Used in These Speciality Profiles

- Neurotransmitters
- Cortisol / Melatonin
- Heavy Metals & Nutrients
- Urine Hormone Metabolites
Specialty Profiles

NeuroAdvanced Profile

In the neurological system, hormones are synergistic with neurotransmitters – modulating their production, signaling and metabolism. Because of this complex interplay, testing hormones and neurotransmitters together is an ideal way to generate a more precise clinical assessment. Elements are also important for brain health - deficiencies in iodine or selenium compromise the neuroprotective functions of thyroid hormones and lithium is implicated in neuroprotection and regeneration. Heavy metals on the other hand disrupt neurotransmitter synthesis, metabolism, and signaling, contributing to the burden of neurological dysfunction.

Combined testing of neurotransmitters with hormones and/or neurotransmitters with heavy metals and nutrients gives practitioners a diagnostic edge over the traditional psychological inventory. It offers the advantage of zeroing in on which therapies are best suited for individual patients – cutting down on the time-consuming process of trial-and-error for identifying treatment options. This testing also allows practitioners to monitor individual biochemical changes during and after intervention.

✓ NeuroAdvanced Profile Includes:
  - GABA, Glu, Gly, DA, Epi, HIST, NE, 5-HT, PEA, DOPAC, HVA, 5-HIAA, NMN, VMA

Consider for:
Testing neurotransmitters in patients with a suspected neurochemical imbalance can help assess individual biochemistry and get to the root of persistent issues such as:

- Mood / affective disorders
- Adrenal dysfunction
- Addictive behaviors
- Sleep problems
- ADD / ADHD or OCD
- PMS / PMDD

✓ Creatinine is measured in all samples to correct results for urine dilution.

Add-On Options

- **Saliva Hormones**
  - E2, Pg, T, DS, C

- **Urine Hormones**
  - E2, Pregnanediol, Allopregnanolone, Androstenedione, T, Epi-T, DHT, DHEA, 5α,3α-Androstanediol

- **Diurnal Cortisol**
  - Dried Urine: Free Cortisol x4, Free Cortisone x4

- **Diurnal Cortisol & Melatonin**
  - Dried Urine: Free Cortisol x4, Free Cortisone x4, Melatonin (MT6s) x4

- **Diurnal Cortisol, Norepinephrine & Epinephrine**
  - Dried Urine: Free Cortisol x4, Free Cortisone x4, NE x4, Epi x4

- **Diurnal Cortisol, Melatonin, Norepinephrine & Epinephrine**
  - Dried Urine: Free Cortisol x4, Free Cortisone x4, Melatonin (MT6s) x4, NE x4, Epi x4

- **Urine Metals & Nutrients**
  - Iodine, Selenium, Bromine, Lithium, Arsenic, Cadmium, Mercury

Sleep Balance Profile

ZRT is the only laboratory offering testing for the circadian rhythm of melatonin in concert with cortisol and cortisone to assess sleep / wake cycle dysfunction. Circulating melatonin is efficiently hydroxylated and conjugated with sulfate in the liver to form its primary metabolite, 6-sulfatoxymelatonin (MT6s), and excreted into urine; it is this metabolite that is measured in the Sleep Balance Profile. Adrenal cortisol, produced in response to stress, is also known for its diurnal variation linked to the sleep/wake cycle. It has the opposite pattern to melatonin production in a healthy individual.

✓ Sleep Balance Profile includes:
  - Dried Urine: MT6s x4, Free Cortisol x4, Free Cortisone x4

Sleep Balance Profile allows physicians to pinpoint imbalances of melatonin and cortisol circadian rhythms associated with acute or chronic sleep disturbances.

Consider for:
Patients with inability to get to sleep, frequent waking, or chronic sleeplessness affecting vitality, cognition, weight, and diabetes / cardiovascular disease risks.

✓ Optional Norepinephrine & Epinephrine Add-on:
  - Gives a better picture when there are adrenal issues

✓ Creatinine is measured in all samples to correct results for urine dilution.
Specialty Profiles | Neurotransmitter Cascade

**Glutamate/GABA, Glycine & Histamine**

- **Glutamine**  
  \[ \text{GA} \xrightarrow{\text{GS}} \text{Vit B6} \xrightarrow{\text{Mg}} \text{Mn} \]  
  \[ \text{Vit B6} \xrightarrow{\text{GAD}} \text{GABA} \]

- **Threonine**  
  \[ \text{Vit B6} \xrightarrow{\text{THRA}} \text{HDC} \]

- **Histidine**  
  \[ \text{Vit B6} \xrightarrow{\text{HVM}} \text{HNMT} \]

**Serotonin & Metabolites**

- **Melatonin**  
  \[ \text{M6H} \xrightarrow{\text{OH}} \text{M6ST} \xrightarrow{\text{Cu}} \text{MAO} \]
  \[ \text{Cu} \xrightarrow{\text{Vit B2}} \text{VIT} \]

- **6-sulfatoxy-melatonin**  
  \[ \text{BH4} \xrightarrow{\text{Fe}} \text{TRPH} \xrightarrow{\text{5-HTP}} \text{Vit B6} \xrightarrow{\text{AADC}} \]

**Catecholamines & Metabolites**

- **Phenylalanine**  
  \[ \text{BH4} \xrightarrow{\text{Fe}} \text{PHEH} \xrightarrow{\text{Vit B6}} \text{Cu} \xrightarrow{\text{Vit B2}} \text{MAO} \]

- **Tyrosine**  
  \[ \text{BH4} \xrightarrow{\text{Fe}} \text{TYRH} \xrightarrow{\text{Vit B6}} \text{AADC} \]

- **DOPA**  
  \[ \text{Vit B6} \xrightarrow{\text{AADC}} \text{MAO} \]

- **Dopamine**  
  \[ \text{Cu} \xrightarrow{\text{Vit C}} \text{DBH} \xrightarrow{\text{Mg}} \text{SAMe} \]

- **Norepinephrine**  
  \[ \text{COMT} \xrightarrow{\text{Mg}} \text{SAMe} \]

- **Epinephrine**  
  \[ \text{COMT} \xrightarrow{\text{Mg, SAMe}} \]

**Neurotransmitters & Metabolites:**

- HVA: homovanillic acid
- NMN: normetanephrine
- PEA: phenylethylamine
- VMA: vanillylmandelic acid
- 5-HIAA: 5-hydroxyindole 3-acetic acid

**Enzymes:**

- AADC: aromatic L-amino acid decarboxylase
- AANMT: aryalkylamine N-methyltransferase
- AD: aldehyde dehydrogenase
- AR: aldehyde reductase
- COMT: catechol-O-methyltransferase
- DBH: dopamine beta hydroxylase
- GA: glutaminase
- GAD: glutamate decarboxylase
- GS: glutamine synthetase
- HDC: histidine decarboxylase
- HIOMT: hydroxyindole-O-methyltransferase
- HNMT: histamine N-methyltransferase
- MAO: monoamine oxidase
- M6H: melatonin 6-hydroxylase
- M6ST: melatonin 6-sulfotransferase
- PHEH: phenylalanine hydroxylase
- PNMT: phenylethanolamine N-methyltransferase
- SERHMT: serine hydroxymethyltransferase
- THRA: threonine aldolase
- TRPH: tryptophan hydroxylase
- TYRH: tyrosine hydroxylase

**Cofactors:**

- BH4: tetrahydrobiopterine
- Cu: copper
- Fe: iron
- Mg: magnesium
- Mn: manganese
- MTHF: methyltetrahydrofolate
- SAMe: S-adenosyl methionine
**Specialty Profiles**

**Weight Management**

The Weight Management Profile identifies hormonal imbalances that contribute to obesity, weight gain and difficulty losing or sustaining a healthy weight. Used as a screening tool, it serves as an early indicator of insulin resistance and risks for metabolic syndrome and diabetes.

- **Weight Management Profile includes:**
  - Saliva: E2, Pg, T, DS, Cx4
  - Blood Spot: TSH, Vitamin D2/D3, Insulin, HbA1c

**Weight Management Profile** allows physicians to isolate specific imbalances of one or more hormones that contribute to weight gain, slowed metabolism, increased body fat deposition, and food / sugar cravings. Facilitates correction of imbalances for proactive weight control, and associated risks for cardiometabolic disease and diabetes.

**Consider for Women:**
With premenstrual weight gain and fluid retention; perimenopausal and / or menopausal weight gain in hips / thigh, and / or inability to lose / tendency to regain weight, central obesity, PCOS, adrenal and thyroid dysfunction; breast cancer risks.

**Consider for Men:**
With andropausal weight gain in hips / thighs (female fat distribution pattern) and / or inability to lose / tendency to regain weight, central obesity, adrenal and thyroid dysfunction; prostate cancer risks.

- **Optional Thyroid Add-on:**
  - Free T3, free T4, and TPOab antibodies provide a better estimation of thyroid hormone bioavailability to facilitate effective thyroid therapy.
  - **Consider when:**
    - Symptoms of thyroid deficiency are problematic.

- **Optional Cardio Add-on:**
  - Cardiometabolic risk markers hsCRP, triglycerides, total cholesterol, LDL, HDL and VLDL cholesterol for early detection of pro-inflammatory CVD risks and pre-diabetes.
  - **Consider for:**
    - Abdominal obesity, and symptoms of insulin resistance / metabolic syndrome.

**CardioMetabolic Profile**

This profile, entirely in dried blood spot collected after an overnight fast, allows early detection of major indicators associated with metabolic / insulin resistance syndrome. As a screening profile it can facilitate appropriate treatment to reduce Type 2 diabetes and cardiovascular disease (CVD) risks.

- **Available in Dried Blood Spot**
- **CardioMetabolic Profile includes:**
  - Insulin, hsCRP, HbA1c, TG, CH, HDL, LDL, VLDL

**Consider for:**
Atherosclerosis, CVD, type 2 diabetes, dyslipidemia, hypertension, infertility, insulin resistance, metabolic syndrome, obesity, PCOS, weight issues.
Specialty Profiles

Fertility Profile

The profile provides a thorough evaluation that can identify many problems related to hormone imbalances that are associated with infertility. Dried blood spot samples are collected on days 3 and 21 of the menstrual cycle, and saliva samples are collected only on day 21. LH and FSH are tested on day 3, while on day 21 estradiol, progesterone, testosterone, DHEA-S, SHBG, and the thyroid hormones are tested in dried blood spot and diurnal cortisol is tested in saliva.

✓ Fertility Profile includes:
  - Saliva: Cx4
  - Blood Spot: E2, total; Pg; T, total; SHBG; DS; TSH; fT3; fT4; TPOab; FSH; LH

Fertility Profile meets the requirement for initial screening for fertility assessment by reproductive endocrinologists. Assessment of ovarian reserve as well as screening for multiple common reasons for infertility including: anovulation, PCOS, hypothyroidism, premature ovarian failure or ovarian insufficiency.

Consider for:
Women who have been trying to get pregnant without success, or who would like to be proactive in their preconception planning by getting a baseline screening.

NEW! Menstrual Cycle Mapping

This profile offers an assessment of sex hormone and LH patterns throughout a menstrual cycle to help health care practitioners get to the root of hormone-related menstrual symptoms, irregular cycles, amenorrhea, or infertility. Dried urine testing provides a simple and convenient way to assess fluctuations in daily hormone levels over an entire month, known as menstrual cycle mapping.

✓ Menstrual Cycle Mapping includes:
  - Dried Urine: E1G, PDG, LH

Consider for:
Consider for women with irregular cycles, cyclic hormone-related symptoms such as pre-menstrual syndrome (PMS) or headaches, infertility, or luteal phase defects to determine the source of their problems.

  ‣ Creatinine is measured in all samples to correct results for urine dilution.

Adrenal Stress Profile

The profile tests the adrenal hormones DHEA-S and diurnal cortisol. When individuals experience continuous stress, not only from emotional stressors (e.g., marital, financial, and occupational) but also from physical stressors (e.g., sleep deprivation, caffeine consumption, pain, extreme exercise), it can lead to changes in adrenal hormone levels, related to disorders ranging from anxiety to infertility.

✓ Adrenal Stress Profile includes:
  - Saliva: DS, Cx4

Consider for:
Individuals under stress with multiple symptoms of adrenal imbalance, including immune dysfunction, fatigue, allergies, and sleep disturbances.
Specialty Profiles

Cortisol Awakening Response

The Cortisol Awakening Response – also called CAR – reveals more detailed clues that help in assessing adrenal hormone/HPA Axis dysfunction. Six cortisol collections in 24 hours is the most common method for assessing CAR. Start saliva collection within five minutes of waking for the day, followed by a second sample at 30 minutes, and a third sample at 60 minutes. The rest of the diurnal rhythm can be assessed at the normal time intervals – noon, evening and night.

✓ Cortisol Awakening Response Profile includes:
  Saliva: DS, Cx6

Comprehensive Thyroid Profile

This profile combines ZRT’s innovative Metals & Nutrients - Urine Profile with thyroid testing in dried blood spot for a more comprehensive thyroid assessment.

✓ Comprehensive Thyroid Profile includes:
  Dried Urine: Iodine, Selenium, Bromine, Lithium, Arsenic, Cadmium, Mercury
  Blood Spot: T4, Tgbn, TSH, fT3, fT4, TPOab

Comprehensive Metals & Nutrients Profile

We are all exposed to different amounts of essential and toxic elements depending on where we live, our diet and supplementation routine, and environmental pollution of the air we breathe. Essential elements are only conducive to optimal health when they are within optimal ranges – levels that are too low or too high can have detrimental effects on health – and exposure to toxic heavy metals has multiple adverse health effects. The comprehensive profile allows a complete assessment of the most important elements implicated in health-related effects, as it includes a measure of both short and long term exposure to all 4 of the most toxic environmental heavy metals, as well as highlighting nutritional element deficiencies earlier than a typical serum test.

✓ Comprehensive Metals & Nutrients Profile includes:
  Dried Urine: Iodine, Selenium, Bromine, Lithium, Arsenic, Cadmium, Mercury
  Blood Spot: Mercury, Cadmium, Lead, Zinc, Copper, Selenium, Magnesium

Comprehensive Metals & Nutrients Profile assesses an individual’s levels of the essential nutrients iodine, selenium, zinc, copper, magnesium, lithium, and bromine, and their exposure to the toxic elements arsenic, cadmium, lead, and mercury.

Consider for:
Smokers; patients with exposure to toxic heavy metals through hobbies, work, or dentistry; people who live or have lived in older homes or areas where metals (e.g., lead) may be present in drinking water; and patients whose health issues could be a result of nutritional deficiencies or imbalances in essential elements.

› Creatinine is measured in all samples to correct results for urine dilution.

Specialty Profiles | Heavy Metals & Nutrients

Comprehensive Thyroid Profile allows doctors to see if an individual has too little, or too much, iodine and selenium, and / or exposure to the iodine / selenium antagonists bromine, arsenic, and mercury; full assessment of thyroid health, including screening for hypo or hyperthyroidism, determines Free T4 and Free T3 levels, testing for autoimmune thyroid disease, and monitoring thyroid replacement dosages.

Consider for:
Patients with thyroid dysfunction coupled with concerns about toxic element exposure and iodine/selenium deficiency’s impact on T4 to T3 conversion.
Iodine Panel in Dried Urine

Iodine deficiency is estimated to occur to some degree in nearly 10% of the U.S. population, often because people cut down on iodine-containing salt to help keep blood pressure low. Iodine is an essential nutrient because it is a component of thyroid hormones, so deficiency can reduce thyroid hormone synthesis leading to hypothyroidism. Conversely, too much iodine consumption can also cause thyroid problems. Iodine testing allows for determination of iodine status based on CDC and WHO guidelines for thyroid as well as extra-thyroidal sufficiency.

- Iodine Panel includes:
  - Dried Urine: Iodine

Metals & Nutrients - Urine Profile

We are all, to varying degrees exposed to the elements iodine, bromine, lithium, selenium, arsenic, mercury, and cadmium. Iodine is an essential component of T3 and T4, so its deficiency has a serious impact on thyroid hormone synthesis, while bromine in excess competes with iodine in the thyroid, but small amounts are thought to play an essential role in the body. Selenium is a component of the selenoproteins, including the deiodinases that convert inactive T4 to active T3, and glutathione peroxidase, an important antioxidant which prevents free radical damage to tissues. Arsenic and mercury reduce selenium’s bioavailability and disrupt thyroid health. Arsenic, mercury, and cadmium represent 3 of the 4 most toxic heavy metals according to the CDC. Lithium is important for brain health in trace amounts but is toxic when used in excessive amounts pharmacologically.

- Metals & Nutrients - Urine Profile includes:
  - Iodine, Selenium, Bromine, Lithium, Arsenic, Cadmium, Mercury

Iodine Panel

Allows physicians to see if an individual has too little, or too much, of the essential nutrient iodine.

Consider for:

- Patients with thyroid issues.
  - Creatinine is measured in all samples to correct results for urine dilution.

Metals & Nutrients - Blood Profile

We are all exposed to different amounts of essential and toxic elements depending on where we live, our diet and supplementation routine, and environmental pollution of the air we breathe. Essential elements are only conducive to optimal health when they are within optimal ranges – levels that are too low or too high can have detrimental effects on health – and exposure to toxic heavy metals has multiple adverse health effects. Dried blood spot testing represents red blood cell levels of the nutritional elements magnesium, zinc, and copper, revealing deficiencies earlier than a typical serum test, and is a convenient alternative to whole blood testing for lead.

- Metals & Nutrients - Blood Profile includes:
  - Mercury, Cadmium, Lead, Zinc, Copper, Selenium, Magnesium

Metals & Nutrients - Blood Profile

Assesses an individual’s levels of the essential nutrients zinc, copper, selenium, and magnesium, and their exposure to the toxic heavy metals mercury, cadmium, and lead.

Consider for:

- Smokers; patients with exposure to toxic heavy metals through hobbies, work, or dentistry; people who live or have lived in older homes or areas where metals (e.g., lead) may be present in drinking water; and patients whose health issues could be a result of nutritional deficiencies or imbalances in essential elements.
  - Creatinine is measured in all samples to correct results for urine dilution.
Hormone Metabolites Profiles

Five profiles give a broad range of choices for an assessment of how patients are metabolizing a variety of hormones. They include:

- A wide array of estrogen, progesterone, and androgen metabolites useful for assessment of breast cancer risk
- Glucocorticoid metabolites, diurnal free cortisol, and diurnal free cortisone for adrenal assessment
- Diurnal 6-sulfatoxymelatonin (MT6s) to assess sleep / wake cycle dysfunction
- The xenoestrogen Bisphenol A (BPA)

Sex steroid hormone metabolites results are useful for monitoring hormone therapy patients using patches, pellets or injectables.

---

**Adrenal Profile**

A picture of adrenal hormone metabolism.

Consider for patients with adrenal dysfunction or stress. Useful as a second step of testing for those with adrenal fatigue symptoms, but whose saliva cortisol levels are normal (i.e., may indicate hyperexcretion of cortisol / excessive conversion to cortisone). Useful as a screening test for Addison’s or Cushing’s disease.

---

**Estrogen Essential Profile**

A baseline view of how a patient is metabolizing estrogens.

Consider for anyone with a personal or family history of estrogen-dependent cancer (e.g., breast cancer).

---

**Estrogen Elite Profile**

Estrogen, progesterone, and select androgen metabolites with BPA.

Consider for anyone with a personal or family history of estrogen-dependent cancer (e.g., breast cancer), patients with symptoms of estrogen/progesterone imbalance, men with prostate cancer risk, or patients who want to assess their exposure to BPA.

---

**Basic Profile**

A baseline view of sex steroid hormone metabolite levels plus total cortisol.

Consider as a baseline assessment for hormone replacement therapy.

---

**Advanced Profile**

Our broadest view of sex steroid hormone metabolite levels and cortisol metabolism, with full diurnal melatonin and BPA.

Consider as a comprehensive assessment for patients at risk of breast cancer, patients with symptoms of estrogen / progesterone imbalance, men with prostate problems, and patients who want to assess exposure to BPA. Also beneficial for patients struggling with weight or insulin resistance, who have signs of adrenal dysfunction, or who have sleep problems affecting health.
<table>
<thead>
<tr>
<th>Urine Metabolites Profile Options</th>
<th>Adrenal</th>
<th>Estrogen Essential</th>
<th>Estrogen Elite</th>
<th>Basic</th>
<th>Advanced</th>
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<td><strong>ESTROGENS</strong></td>
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<td>Allopregnanolone (APglone)</td>
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<td>Deoxycorticosterone (DOC)</td>
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<td><strong>ANDROGENS</strong></td>
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<td>Androstenedione (A)</td>
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<td><strong>GLUCOCORTICOIDS</strong></td>
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<td>Total Cortisone (E(GC))</td>
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<tr>
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<td>Melatonin x4 (MT6s x4)</td>
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</table>

> Abbreviations in parentheses as they appear on test requisitions and test reports
Enzyme Abbreviations

- Androgens
  - (5α-R) 5α-Reductase
  - (5β-R) 5β-Reductase
  - (11β-OH) 11β-Hydroxylase
  - (17α-OH) 17α-Hydroxylase
  - (21-OH) 21-Hydroxylase
  - (3α-HSD) 3α-Hydroxysteroid dehydrogenase
  - (3β-HSD) 3β-Hydroxysteroid dehydrogenase

- Estrogens
  - (11β-HSD) 11β-Hydroxysteroid dehydrogenase
  - (17α-HSD) 17α-Hydroxysteroid dehydrogenase
  - (17β-HSD) 17β-Hydroxysteroid dehydrogenase
  - (20α-HSD) 20α-Hydroxysteroid dehydrogenase

- Glucocorticoids
  - (11β-HSD) 11β-Hydroxysteroid dehydrogenase
  - (17α-HSD) 17α-Hydroxysteroid dehydrogenase
  - (17β-HSD) 17β-Hydroxysteroid dehydrogenase

- Mineralocorticoids
  - (11β-HSD) 11β-Hydroxysteroid dehydrogenase
  - (17α-HSD) 17α-Hydroxysteroid dehydrogenase
  - (17β-HSD) 17β-Hydroxysteroid dehydrogenase

- Progestogens
  - (5α-R) 5α-Reductase
  - (5β-R) 5β-Reductase
  - (11β-OH) 11β-Hydroxylase
  - (17α-OH) 17α-Hydroxylase

- (21-OH) 21-Hydroxylase
  - (3α-HSD) 3α-Hydroxysteroid dehydrogenase
  - (3β-HSD) 3β-Hydroxysteroid dehydrogenase

(CYP) Cytochrome p450 (gcc, 1A1, 1B1 & 3A4)
(COMT) Catechol-O-Methyl-Transferase

Boxed metabolites are reported by ZRT.
PAYMENT OPTIONS

Bill Provider (Domestic and Canada)

- Provider distributes kits to patients
- Provider is billed twice monthly for any report that has been completed
- Automatic payment methods are available for provider convenience (required in Canada)
- Patient insurance billing is the responsibility of the provider (except Medicare, see below)
- Return shipping included

Patient Pay (Domestic Only)

- Provider distributes kits to patients
- Patient is responsible for payment to ZRT Laboratory
- We will courtesy bill a select group of insurances as a non-contracted provider at ZRT RETAIL price
- Return shipping included

International

- Provider distributes kits to patients
- Provider is billed twice monthly for any report that has been completed (Patient Pay not available)
- Automatic payment required with this option
- International shipping charges apply for outbound orders
- Patient is responsible for return shipping costs

Insurance Billing

ZRT Laboratory will courtesy bill the following insurance companies: Original Medicare Part B, Medicare Advantage Plans, TRICARE, Cigna, Humana and Regence Blue Cross Blue Shield as a non-contracted provider at the ZRT retail price. Please note we do not file secondary insurance. We recommend patients check with their insurance companies regarding coverage prior to testing.

Medicare

Prepayment is required for saliva testing or for any test ordered by providers outside the scope of their practices (ND, DC, LAC, etc.) or who are not enrolled with Medicare, as it is not covered. All providers must order Medicare Kits separately from standard test kits to satisfy Medicare Regulations. ZRT Laboratory will courtesy bill Medicare for all payment options.
ZRT’s test reports are the most comprehensive results available anywhere.

Our reports combine patients’ test levels with self-reported symptoms that are then interpreted in a set of individualized comments — all giving health care providers unparalleled insight into patient conditions. Key features of the ZRT report include:

- **Results**
  - Results for each test are shown on a color-coded slider.
    - **Red:** Outside the Range
    - **Yellow:** High/Low Normal
    - **Green:** Within Range
  - ZRT is one of the few labs able to show historical test results, if available. These results are displayed directly next to the current results, so it’s easy to see changes over time.

- **Ranges**
  - ZRT reports the normal / expected range of each marker tested. **Note:** If applicable, optimal ranges are provided.
  - Reference ranges are observed ranges based on collected laboratory data. Unlike other labs, patients do not need to stop hormone supplementation to use ZRT’s testing because we have ranges adjusted for age, menstrual status and supplementation types. This is the ideal method for tracking the effectiveness of hormone treatments.
  - Providers can opt to show all reference ranges for the tests included on a separate page of the report.

- **Therapies**
  - ZRT reports display patient-provided supplementation information (hormone, dose, delivery, timing).
### Graphs

- Graphs show reported levels by age or time to assist interpretation.
- For hormones that vary by time of day like cortisol and melatonin, the graph shows the range as it changes over the course of a day and the test results are plotted on the graph according to the actual time of day the sample was collected. Ranges within the graphs are color-coded to show the degree of variation from the center of the normal range.
- For hormones that vary in level with age, reports include graphs based on our database of testers not using hormone supplementation, showing the variation in levels with age. The test result is marked on each graph to indicate where the result falls in relation to the observed range for the tester’s actual age.

### Symptoms

- 68 symptoms self-reported by patient.
- Symptoms rated mild, moderate or severe.
- Patient symptoms are summarized into 8 hormone imbalance conditions and scored with red, yellow or green bars to indicate severity.
- Please refer to the Symptom Guide for details about symptom categories.

### Comments

- Individualized comments synthesize age, menstrual status, lab results, symptoms and current treatments.
- Relevant literature is cited within the comments.
- Self-reported symptoms do not influence lab results, but are included in the individualized comments as they relate back to lab results.
- ZRT providers can choose to include their professional comments in addition to, or in lieu of, the lab comments.

---

**Test results are generally available 3-5 business days after samples are received at the lab.**
**General Information**

**Mailing Address**
ZRT Laboratory  
8605 SW Creekside Place  
Beaverton, OR 97008

**Contact Info**
Telephone: 503.466.2445  
Toll-free: 1.866.600.1636  
Fax: 503.466.1636  
Email: info@zrtlab.com  
Website: www.zrtlab.com

**CPT Codes**
The American Medical Association’s Current Procedural Terminology (CPT®) codes in ZRT Laboratory’s Test Directory are provided for informational purposes only. CPT codes are provided only as a guide to assist providers with billing. ZRT recommends that clients confirm CPT codes with their Medicare administrative contractor, as requirements may differ. CPT coding is the sole responsibility of the billing party. ZRT assumes no responsibility for billing errors due to reliance on the published CPT codes.

**Health Insurance Portability & Accountability Act (HIPAA)**
ZRT Laboratory is committed to complying with privacy and security standards outlined in the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health Act. Notice of Privacy Practices may be found at www.zrtlab.com.

**Clinical Research & Study Testing**
Please contact us to inquire about research testing at 1.866.600.1636.
ZRT Laboratory is a CLIA certified diagnostic laboratory that supports health care professionals in health management through accurate, convenient and innovative lab testing.