TEST REPORT

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ZRT LABORATORY

 # D2021 01 11 001 B

Ordering Provider:
Getuwell

Samples Received
01/11/2021

Report Date
01/11/2021

Samples Collected
Blood Spot - 01/05/21 07:00

Patient Name: Fitness Metrics
Patient Phone Number: 555 555 5555

Gender	Last Menses	Height	Waist
Female	Unspecified	5 ft 8 in	38 in
DOB	**Menses Status**	**Weight**	**BMI**
6/13/1974 (46 yrs)	Pre-Menopausal - Irregular	200 lb	30.4

TEST NAME	RESULTS | 01/05/21	RANGE
Blood Spot Steroids (LC-MS/MS) & Other Analytes		
Estradiol	51	51-302 pg/mL Premeno-luteal
Progesterone	0.5 L	4.3-25.3 ng/mL Premeno-luteal
Ratio: Pg/E2	10 L	Pg/E2 (bloodspot-optimal 100-500)
Testosterone	31	18-39 ng/dL Premeno-luteal
SHBG	28	15-120 nmol/L
DHEAS	129	17-207 µg/dL
Cortisol	9.2	9.1-19.6 µg/dL (morning), 3.3-8.9 (eve/night)
Blood Spot Thyroids		
Free T4	1.2	0.7-2.5 ng/dL
Free T3	3.1	2.4-4.2 pg/mL
TSH	1.2	0.5-3.0 µU/mL
TPOab	9	0-150 IU/mL (70-150 borderline)
Blood Spot CardioMetabolic Markers		
Insulin	7.4	1-15 µIU/mL (optimal 2-6)
hsCRP	0.9	<3 mg/L
Hemoglobin A1c	5.7	<6%
Triglycerides	160 H	<150 mg/dL
Cholesterol	210 H	<200 mg/dL

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Laboratory Director

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TEST NAME	RESULTS | 01/05/21	RANGE
Blood Spot CardioMetabolic Markers		
HDL	43	40 mg/dL or higher
LDL Cholesterol	135 H	<130 mg/dL (optimal <100)
VLDL	32 H	<30 mg/dL
Blood Spot		
LH	7.9	0.5-12.8 U/L Premenopausal-luteal
Vitamin D, 25-OH, D2	<4	<4 if not supplementing (< 10 nmol/L)
Vitamin D, 25-OH, D3	33	20-80 ng/ml (50-200 nmol/L)
Vitamin D, 25-OH, Total	33	20-80 ng/ml (50-200 nmol/L)

<dl *= Less than the detectable limit of the lab.* ***N/A*** *= Not applicable; 1 or more values used in this calculation is less than the detectable limit.* ***H*** *= High.* ***L*** *= Low.*

Therapies

100mcg oral Levothyroxine (T4) (Pharmaceutical) (1 Days Last Used)

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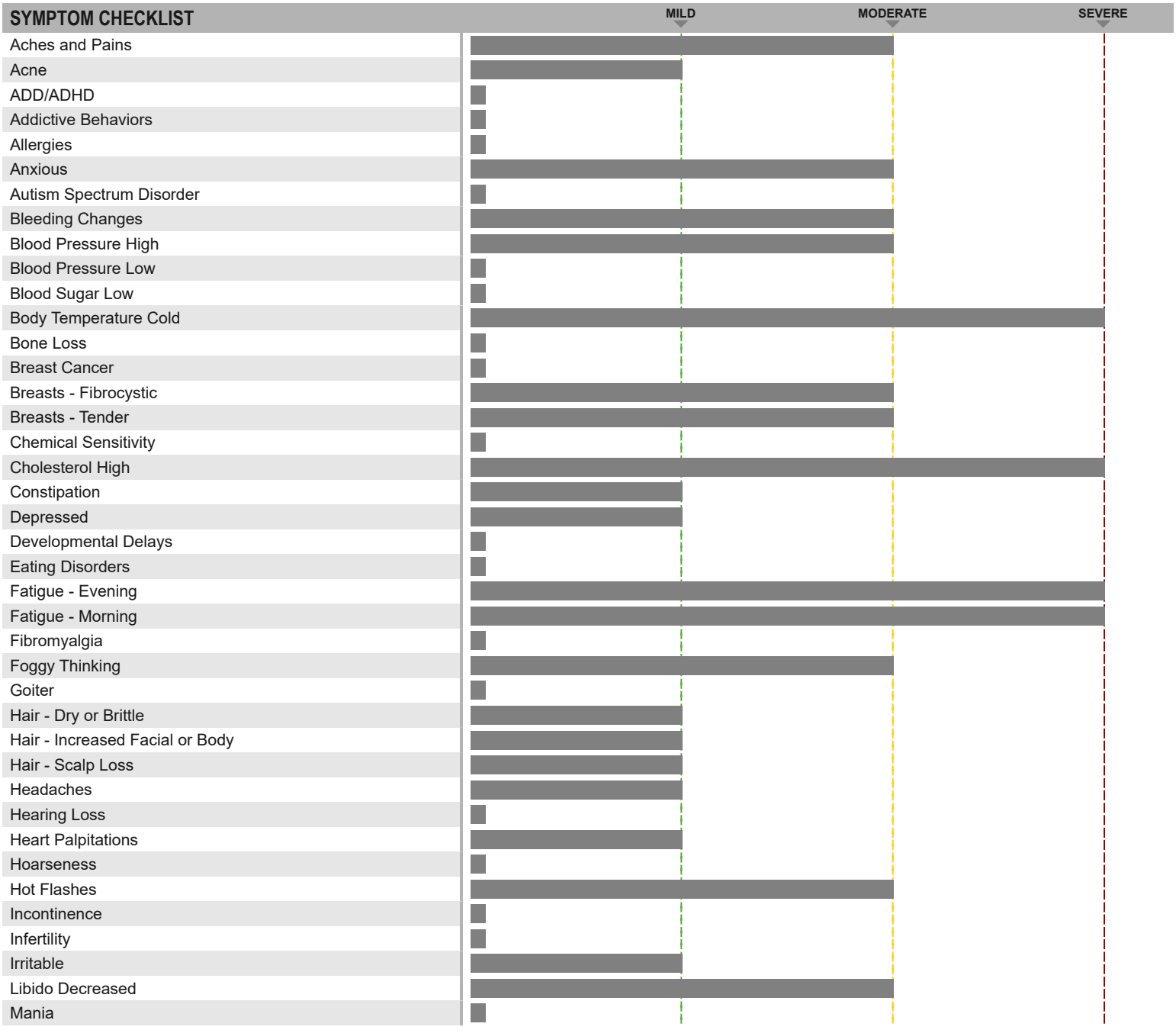
Disclaimer: Symptom Categories below show percent of symptoms self-reported by the patient compared to total available symptoms for each category. For detailed information on category breakdowns, go to www.zrtlab.com/patient-symptoms.

SYMPTOM CATEGORIES	RESULTS | 01/05/21
Estrogen / Progesterone Deficiency	45%
Estrogen Dominance / Progesterone Deficiency	50%
Low Androgens (DHEA/Testosterone)	51%
High Androgens (DHEA/Testosterone)	38%
Low Cortisol	40%
High Cortisol	47%
Hypometabolism	39%
Metabolic Syndrome	80%



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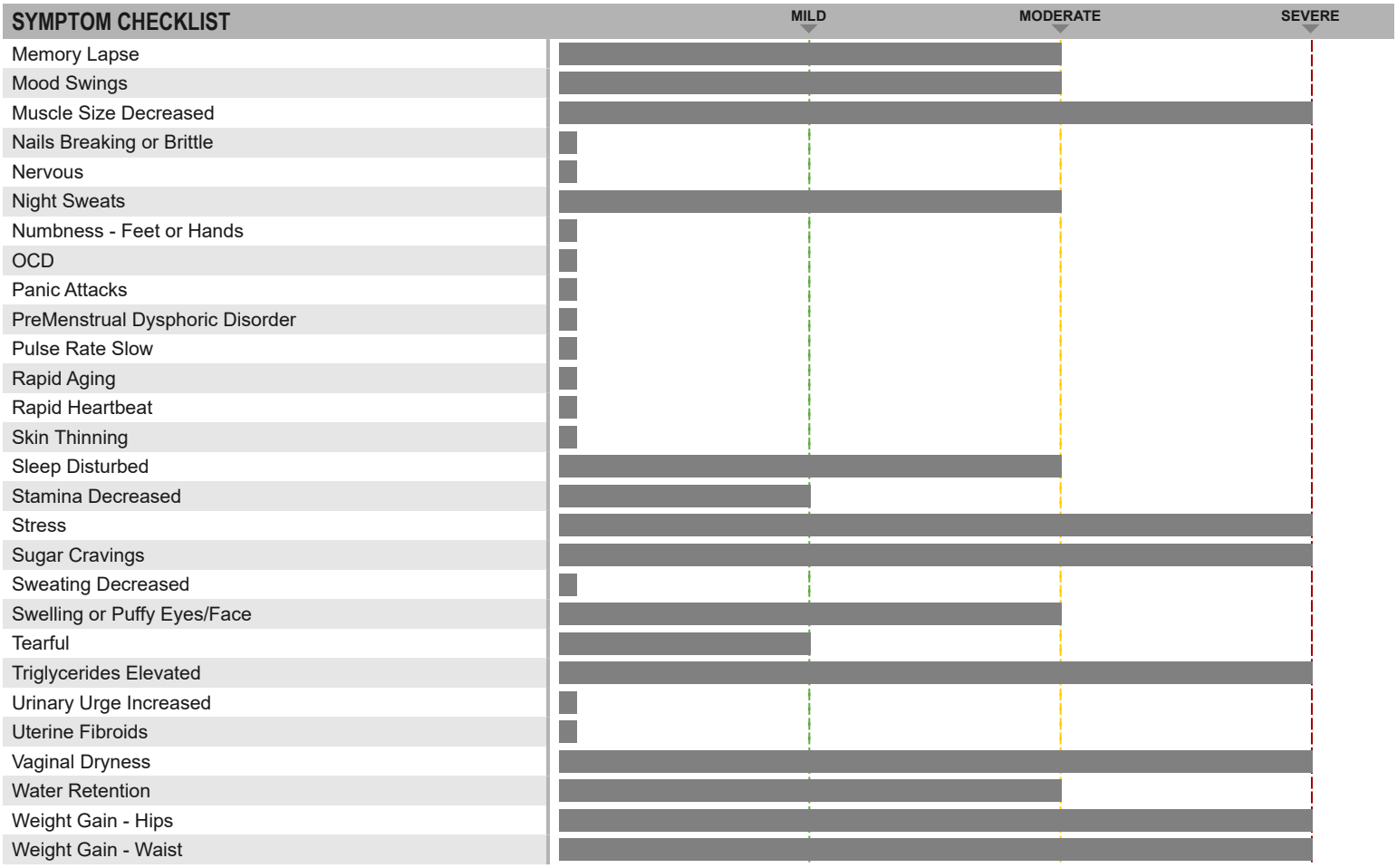

Lab Comments

Estradiol is within expected range for a premenopausal woman, however, symptoms of estrogen imbalance (deficiency and excess) are self-reported as problematic. This usually is caused by estradiol fluctuating from low to high without adequate progesterone to counterbalance and stabilize the estradiol. Estradiol often fluctuates erratically as women approach menopause, and can begin in the mid thirties, but usually does not occur until the mid forties. Problems of estrogen imbalance can also be caused by excessive stressors and release of stress hormones such as cortisol and catecholamines. Stress hormones such as norepinephrine can trigger vasomotor symptoms (hot flashes and night sweats) even when estradiol is within normal or high range (note that stress is self-reported as moderate/severe). Stress reduction, gentle exercise, calming herbs, and natural progesterone have been shown to help with symptoms of estrogen imbalance.

Progesterone (blood spot) is lower than observed range for a premenopausal woman during luteal phase of the menstrual cycle. The ratio of progesterone/estradiol is low, consistent with symptoms of estrogen imbalance (dominance and deficiency). Although estradiol is within expected range for a premenopausal woman, symptoms of estrogen deficiency (e.g. hot flashes), are not likely caused by estrogen deficiency per se, but more likely caused by erratic fluctuations in the estrogen level (common at perimenopause) without adequate progesterone. Excessive stress may also precipitate vasomotor symptoms (hot flashes and night sweats). Consider creating a more balanced progesterone/estradiol ratio (ideal ratio 100-500) with progesterone supplementation (assuming no contraindications).

Testosterone (blood spot) is within the high end of the reference range, however, symptoms characteristic of testosterone deficiency (e.g. vaginal dryness, low libido) persist. This could be due to other hormonal imbalances that block the actions of testosterone at the cellular/androgen receptor level. Excessive estrogens, progestogens (including natural progesterone), and cortisol interfer with the actions of testosterone. Estrogens and excessive glucocorticoids down-regulate androgen receptors, and progesterone competitively competes with testosterone for binding to 5-alpha reductase, which transforms testosterone to the more potent 5-alpha-dihydroxytestosterone (DHT). If any of these hormones are out of balance either from endogenous production or through hormone therapy, consider means to bring them within physiological range. Testosterone in capillary and venous blood represents total, and not bioavailable, testosterone. If testosterone binding proteins such as SHBG (Sex Hormone Binding Globulin) are elevated (caused by excessive estrogen), this could limit tissue access to testosterone (lower bioavailability).

SHBG is within range, but on the low end of the normal range. SHBG is an indirect index of estrogen interaction with the liver. As the estrogen levels increase there is a proportional increase in SHBG by the liver, which is released into the bloodstream. The ability of estrogens to increase

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hepatic production of SHBG is also dependent on normal levels of thyroid hormone (T3) and insulin. When T3 is low, due to hypothyroidism, or insulin is high, due to insulin resistance, SHBG synthesis by the liver is impaired. Thus, hypothyroidism (low thyroid) and insulin resistance lead to low SHBG and potential for estrogen dominance (more bioavailable estrogens). When SHBG is low/low-normal range it is worthwhile to evaluate thyroid hormones and insulin.

DHEAS (blood spot) is within range.

Morning cortisol (blood spot) is low-normal, suggesting adrenal fatigue. Self-reported symptoms are also consistent with adrenal fatigue. A daily output of cortisol is essential to maintain normal metabolic activity, help regulate steady state glucose levels (important for brain function and energy production), and optimize immune function. Low cortisol production is consistent with symptoms of fatigue, allergies (immune dysfunction), chemical sensitivity, cold body temp, and sugar craving. Adrenal insufficiency is most commonly caused by stressors which include: psychological stress (emotional), sleep deprivation, poor diet (low protein-particularly problematic in vegetarians), nutrient deficiencies (particularly low vitamins C and B5), physical insults (surgery, injury), diseases (cancer, diabetes), chemical exposure (environmental pollutants, excessive medications), low levels of cortisol precursors (pregnenolone and progesterone) and pathogenic infections (bacteria, viruses and fungi). For additional information about strategies for supporting adrenal health and reducing stressors, the following books are worth reading: "Adrenal Fatigue ", by James L. Wilson, N.D., D.C., PhD, "The Cortisol Connection", by Shawn Talbott, Ph.D., "The End of Stress As We Know It" by Bruce McEwen, and "Awakening Athena" by Kenna Stephenson, MD.

LH is within expected range.

Vitamin D is considered sufficient, but perhaps not optimal. Vitamin D deficiency has been closely associated with a wide range of conditions and diseases, which include cardiovascular disease, stroke, osteoporosis, osteomalacia, cancer, and autoimmune diseases such as multiple sclerosis, rheumatoid arthritis, and diabetes (types 1 and 2) (for review see: Holick MF. NEJM 357: 266-281, 2007). Lack of adequate sunlight resulting from geographical location (northern climates), excessive clothing, working indoors during daylight hours, purposely avoiding sunlight with clothing and sunscreens, and aging of the skin contribute to low vitamin D levels. Vitamin D3 may be increased by eating foods high in D3 (fish), exposing the skin to sunshine without sunscreen during mid-day for 15-20min (latitudes below Boston, MA), use of a UVB light, and/or supplementation with Vitamin D3.

Thyroid hormones (free T4, free T3, and TSH) and thyroid peroxidase antibodies (TPO) are within normal ranges; however, symptoms of thyroid deficiency persist (feeling cold, evening fatigue, low libido, low stamina, brittle nails). This suggests that although T3 is within normal level, it is not functioning normally at the tissue level (i.e., functional thyroid deficiency). Stress is listed as moderate/severe on the requisition form. This often is associated with high cortisol or catecholamines (norepinephrine), which can desensitize target tissues to the actions of T3. Poor response of target tissues to normal circulating levels of T3 may also be caused by heavy metals (particularly mercury), and/or other steroid hormone imbalances (high estradiol, low progesterone, low testosterone). If steroid imbalances are detected by saliva or blood testing, they should be corrected before attempting thyroid therapy. Full evaluation of adrenal cortisol production throughout the day should be performed before attempting thyroid therapy since normal cortisol levels are required for normal thyroid function. Thyroid therapy in individuals with low cortisol levels could result in exacerbation of thyroid deficiency symptoms.

Fasting insulin is within normal range, however, this does not rule out insulin resistance and predisposition to diabetes if fasting glucose is elevated and symptoms/signs of insulin resistance are problematic (e.g. obesity, excessive weight gain in the waist, elevated triglycerides and HbA1C, blood sugar dysregulation, etc.).

High Sensitivity C-Reactive Protein (hs-CRP) is within normal range (< 3 mg/L). Elevated hs-CRP is a marker of inflammation and contributor to pro-inflammatory and pro-thrombotic elements of cardiovascular disease risk.

Hemoglobin A1c (HbA1c) is higher than optimal and suggests and increased risk of developing diabetes. HbA1c is a measure of red blood cell hemoglobin glycation and reflects the average blood glucose for the previous 3 months. The American Diabetic Association recommends the following HbA1c levels: normal <5.7%, prediabetes 5.7%-6.4%, and diabetic >6.5%. People with diabetes have higher HbA1c values because their bodies have difficulty managing their blood sugar levels (hyperglycemia). With persistently higher levels of HbA1c, there is increased risk of developing problems such as eye disease, kidney disease, nerve damage, heart disease, and stroke.
Therapeutic considerations: Decreasing simple carbohydrates, increasing exercise, and optimizing BMI. Even small changes like a 5 min walk after meals can have profound changes in blood sugar control. Supplements like chromium, gymnema, and fiber may be helpful.

Triglycerides are elevated. Triglycerides are a type of fat in the bloodstream that is taken up by tissues and used as a primary energy source. Triglycerides are derived from fats consumed in food and synthesized in the body from carbohydrates (sugars). Triglycerides are stored by tissues and released into the bloodstream in response to hormonal signals. Elevated triglycerides (hypertriglyceridemia) above 200 mg/dL are associated with increased risk for heart disease and stroke. Hypertriglyceridemia above 150 mg/dL signals insulin resistance/metabolic syndrome and is often found in untreated type 2 diabetes. Calorie restriction, lowering simple carbohydrates in the diet, and exercise are natural ways to lower triglycerides and reduce risk for cardiovascular disease and diabetes.

Cholesterol is within a range (200-240 mg/dL) considered by most health educators as moderate risk for cardiovascular disease. Cholesterol should be evaluated in parallel with other lipid risk factors, which include triglycerides, LDL and HDL cholesterol. The current NCEP-ATP III recommendations for LDL cholesterol are <100 optimal, 100-129 near optimal, and 130 and above becomes the high range. The ADA and American College of Cardiology Foundation's consensus statement recommended a cutoff of 100 mg/dL for LDL in patients at high risk who

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have 2 or more additional risk factors for CVD. For additional information see http://en.wikipedia.org/wiki/Cholesterol

HDL cholesterol is within the ranges most health experts consider as low risk for cardiovascular disease. However, HDL-cholesterol should be evaluated in parallel with LDL and triglycerides, which also are risk factors.

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