Nordic Laboratories

Hormone Evaluation
Version: 3 6 0 552

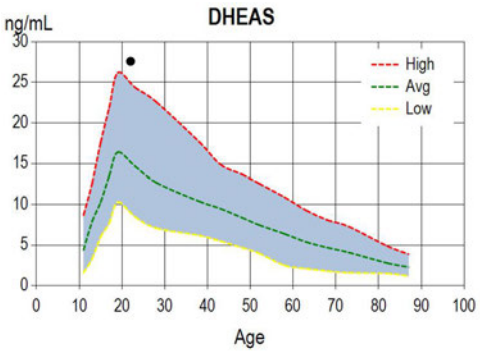
DOB 1991 ***Sex*** Male

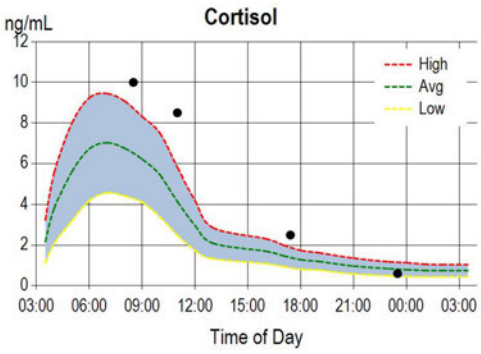
Test Name	Result		Units	Range
DHEAS (saliva)	27.6	H	ng/mL	2-23 (Age Dependent)
Cortisol (saliva)	10.0	H	ng/mL	3.7-9.5 (morning)
Cortisol (saliva)	8.5	H	ng/mL	1.2-3.0 (noon)
Cortisol (saliva)	2.5	H	ng/mL	0.6-1.9 (evening)
Cortisol (saliva)	0.6		ng/mL	0.4-1.0 (night)
Thyroglobulin (blood spot)	27.9		ng/mL	3-40 (optimal 3-10) ng/ml
Total T4 (blood spot)	8.0		ug/dL	5-10.8 ug/dL
Free T4 (blood spot)	2.0		ng/dL	0.7-2.5
Free T3 (blood spot)	2.8		pg/mL	2.5-6.5
TSH (blood spot)	0.4	L	µU/mL	0.5-3.0
TPO (blood spot)*	18		IU/mL	0-150 (70-150 borderline)
Iodine/Cr	31	L	µg/g Cr	100-1100 µg/g Cr (150-300 thyroid optimal)
Bromine/Cr	732	L	µg/g Cr	893.5-5696.3 (5-95% range)
Selenium/Cr	41		µg/g Cr	26.9-174.5
Arsenic/Cr	13		µg/g Cr	3.3-138 (5-95% range)
Creatinine	1.00		mg/mL	0.3-3.0

**For research purposes only.*

Therapies

None Indicated





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Nordic Laboratories - Nygade 6, 3rd floor - 1164 Copenhagen K - Denmark -
Tel. +45 33 75 10 00 - email: info@nordic-labs.com

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DOB 1991 ***Sex*** Male

Lab Comments

DHEAS is higher than the expected age range. DHEAS is highest during the late teens to early twenties (10-20 ng/ml) and drops steadily with age to the lower end of range by age 70-80 (2-9 ng/ml). Mid-life DHEAS levels in both males and females are usually in the range of 5-8 ng/ml. Higher than normal age-range DHEAS levels are common in well trained athletes and individuals supplementing with DHEA or adrenal adaptogens that stimulate adrenal production of DHEA. High DHEAS may be associated with high androgen symptoms (loss of scalp hair, increased facial/body hair, acne).

Salivary cortisol is higher than the expected range throughout most of the day, suggesting some form of adrenal stressor which include psychological stressors (emotional), physical insults (surgery, injury, diseases), chemical exposure (environmental pollutants, excessive medications), hypoglycemia (low blood sugar), and pathogenic infections (bacterial, viral, fungal). Acute situational stressors (e.g., anxiety over unresolved situations, travel, work-related problems, wedding, holiday season, etc.) can also result in a transient increase in cortisol levels, which is a normal response to the stressor. Cortisol usually returns to normal once the stressor is removed. However, if the stressor persists the adrenal glands either continue to meet the demands of the stressor with high cortisol output, or become exhausted, wherein cortisol levels fall to normal or more commonly drop to a low level. The adrenal glands usually recover after a stressor with adequate rest but will continue to respond to the stressor with higher than normal cortisol output. If high adrenal cortisol output persists over a prolonged period of time (months/years), excessive breakdown of normal tissues (muscle wasting, thinning of skin, bone loss) and immune suppression can result. Chronic high cortisol, particularly if it is elevated throughout the day or high at night, is associated most commonly with symptoms of sleep disturbances, vasomotor symptoms (hot flashes and night sweats despite normal or high estrogen levels), fatigue, depression, weight gain in the waist, bone loss, and anxiety. High cortisol can impair the actions of other hormones such as insulin and thyroid, causing symptoms of their deficiency even though the levels of these hormones may be within normal range (i.e., insulin resistance and thyroid deficiency). For additional information about strategies for supporting adrenal health and reducing stress(ors, the following books are worth reading: "Adrenal Fatigue", by James L. Wilson, N.D., D.C., Ph.D.; "The Cortisol Connection", by Shawn Talbott, Ph.D.; "The End of Stress As We Know It" by Bruce McEwen; "Awakening Athena" by Kenna Stephenson, MD; "Thyroid Power", by Richard Shames, MD.

Thyroglobulin is within normal range, but higher than the range considered optimal, suggesting less than optimal consumption of iodine over the past several weeks, or blockage of iodine uptake or utilization by goitrogens found in common foods (e.g. cruciferous vegetables, soy), industrial contaminants (e.g. perchlorate, polybrominated and polychlorinated biphenyls), and cigarette smoke (thiocyanogens). Blood thyroglobulin is considered a good marker of the average iodine level over previous weeks. Excluding thyroid cancer, wherein thyroglobulin is usually very high, a high thyroglobulin ranging from >10-50 ng/ml suggests low iodine, inhibition of iodine uptake into the thyroid gland, or inhibition thyroglobulin iodination by thyroid peroxidase. Thyroglobulin is a tyrosine-rich protein produced exclusively in the follicular cells of the thyroid gland. Its synthesis is directed by TSH released from the hypothalamus in response to low circulating levels of T3 and T4. Following transport of iodine into the thyroid gland the iodide is converted by thyroid peroxidase and H202 to iodine, which then covalently binds to tyrosine residues on thyroglobulin. The iodinated thyroglobulin is stored in the colloidal lumen of the thyroid gland before it is eventually converted to thyroid hormones, T3 and T4. Poorly iodinated thyroglobulin is more likely to diffuse out of the lumen directly into the bloodstream instead of being stored for future thyroid hormone synthesis. A small amount of thyroglobulin is normally present in the bloodstream, but levels exceeding 10 ng/ml indicate low iodine levels in the bloodstream or normal iodine levels but poor uptake and utilization for thyroid hormone synthesis. Goitrogens present in many foods (e.g. thiocyanates and nitrates present in cruciferous vegetables and isoflavones such as genistein found in soybeans) and in some environmental chemicals (e.g. perchlorates, bisphenols) and medicines can inhibit the uptake or organification of iodine into thyroglobulin. If iodine levels in urine are low and thyroglobulin is elevated this would indicate an iodine deficiency that should be treated with iodine prophylaxis.

Total T4 is within observed range. While total T4 is a good marker of the thyroid glands ability to synthesize thyroid hormones (assuming no thyroid hormone therapy), it is not refective of the bioavailable fraction of T4 available to target tissues throughout the body. Free T4 and free T3 are a better estimation of the bioavailable thyroid hormones. If symptoms of thyroid deficiency are problematic and other thyroid hormone markers are out of balance (e.g. low free T4, low free T3, high TSH, and/or high thyroglobulin), consider thyroid hormone therapy.

Free T4 is within normal range. If symptoms of thyroid deficiency are problematic it would be worthwhile to consider thyroid therapy.

TSH is slightly lower than observed range. This usually is associated with a higher level of T4 and/or T3, which can result from thyroid therapy or hyperthyrodism. In the absence of elevated T4 or T3 this could indicate an impaired hypothalamic/pituitary feedback response. The American Association of Clinical Endocrinologists have recommended a change in the TSH range to 0.3 to 3.0 - www.aace.com. Low TSH and hyperthyroidism are associated with symptoms of goiter, eye changes, pretibial myxedema, nervousness, anxiety, heart palpitations or tachycardia, insomnia, tremor, frequent bowel movements, weight loss, excessive sweating, heat intolerance, oligomenorrhea/amenorrhea, increased appetite, tremors, bone loss and/or increased blood pressure. If these symptoms are associated with thyroid therapy, dose reduction should be considered.

Thyroid peroxidase (TPO) antibodies are low indicating that Hashimoto's autoimmune thyroiditis is unlikely.

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Urinary iodine/creatinine falls into the reference range that is considered moderately deficient (21 ug/L or 21 ug/g creatinine based on 1 g creatinine/L) on the day you tested. It is important to recognize that your iodine test results represent an average of your urinary iodine for a single day, and levels may fluctuate somewhat from day to day. The results indicate that your dietary iodine consumption over the last several days was likely inadequate, and if your daily diet is representative of the day you tested, then you are likely to be mildly low in iodine and would likely benefit from increasing your iodine consumption via diet or supplementation. Iodine is an essential component of thyroid hormones, T3 and T4, and when levels drop below about 50 ug/g creatinine the thyroid gland is unable to synthesize adequate thyroid hormones. When levels of iodine have been low over a prolonged period of time this usually results in lower blood levels of total T4 and higher blood levels of thyroglobulin and TSH. If total T4 is low and TSH and thyroglobulin are high in blood this is likely caused by prolonged deficiency in iodine; consider thyroid hormone and/or iodine therapy. With thyroid hormone replacement therapy low iodine levels may persist in the presence of normal blood levels of T4, T3, and TSH. While iodine is essential for thyroid hormone synthesis, it also has other extra-thyroidal benefits at higher levels commonly seen in individuals consuming high-iodine containing foods (Zava TT, Thyroid Research, 2011).
According to the Center for Disease Control (CDC) and other agencies that have studied the relationship of urinary iodine levels to iodine deficiency diseases (IDD) in large population groups, cutoffs for degrees of iodine deficiency, sufficiency, and excess in ug/L urine (very similar when expressed as ug/g creatinine) are: < 20 = severe iodine deficiency; 20-49 = moderate iodine deficiency; 50-99 = mild iodine deficiency; 100-300 = no iodine deficiency; > 300 = iodine excess (Zimmerman MB, Endocrine Reviews 2009, 30(4): 376-408).
Thyroid hormone production is optimal when dietary iodine consumption is within the 150-300 ug range, which results in urinary iodine levels of about 100-250 ug/l or ug/g creatinine range (note: this is based on 80-90% of dietary iodine excreted in urine and average urine volume and g of creatinine daily is approximately 1 liter and 1 g, respectively). In the US the Institute of Medicine (IOM) considers daily iodine consumption > 1100 ug as excessive for adults and likely to lead to a higher incidence of underlying thyroid problems, particularly in those individuals with preexisting conditions (e.g. subclinical or overt hypothyroidism, hyperthyroidism, Hashimoto's thyroiditis, autonomous thyroid nodules, goiter). In Japan, where the average daily dietary intake is much higher (about 1-3 mg with average about 1.2 mg)(Zava TT, Thyroid Research, 2011) the Japanese Health Ministry has set the upper tolerable limit of daily iodine consumption higher at 3 mg (3000 ug). This results in median urinary iodine levels in the range of about 2000-3000 ug/L (ug/g creatinine). With the average intake in Japan of about 1.2 mg iodine, this would result in a median urinary iodine of about 1100 ug/L (ug/g creatinine, assuming 1 g creatine/L), which is the limit of tolerance set by the IOM. Iodine is highest in seafoods (fish, seaweed); lower amounts are found in milk products and eggs. Vegetarians who do not eat sea vegetables or take iodine supplements are more likely to suffer from iodine deficiency and associated iodine deficiency disorders (e.g. thyroid problems). If symptoms/signs of thyroid dysfunction (hypometabolism) are problematic evaluation of thyroid hormones should be considered. For an excellent and brief NIH-sponsored Medline review on iodine dosage recommendations and potential side effects of iodine supplementation please view: www.nlm.nih.gov/medlineplus/druginfo/natural/35.html

Elements other than iodine that are considered agonists (selenium) or antagonists (bromine, arsenic) of thyroid hormone synthesis and function are within normal ranges.

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