GENOVA DIAGNOSTICS EUROPE

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Male Hormonal Health™

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

4001 Male Hormonal Health

Methodologies: Siemens Chemiluminescent method, ECLIA, and LCMS/MS.

Blood Tests

		Reference Range
DHEA Sulfate (serum)	<30	80-560 mcg/dL

Age	Ranges*
20 to 29 yrs	280-640 mcg/dL
30 to 39 yrs	120-520 mcg/dL
40 to 49 yrs	95-530 mcg/dL
50 to 59 yrs	70-310 mcg/dL
60 to 69 yrs	42-290 mcg/dL
Over 69 yrs	28-175 mcg/dL

*Manufacturer age based ranges are provided for informational purposes only (Kubasic etal. Clin Chem 1986).

Sex Hormone Binding Globulin, SHBG (serum)	19	10-54 nmol/L

Estradiol (serum)	66

	Reference Range
Male	<= 56 pg/mL

Free Testosterone (serum)	4.2

	Reference Range
Male	
18 to 69 years	46.0-224.0 pg/mL
70 to 89 years	6.0-73.0 pg/mL
Female	
18 to 69 years	0.2-5.0 pg/mL
70 to 89 years	0.3-5.0 pg/mL

Dihydrotesterone, DHT (serum)	8.3	16.0-79.0 ng/dL

Gender	Reference Range
Female	5.0-46.0 ng/dL
Male	16.0-79.0 ng/dL

Lab Results Continued

		Reference Range
Insulin-like Growth Factor 1, IGF-1 (serum)	71	53-331 ng/mL

Age	Reference Range
18 to 19 yrs	108-548 ng/mL
20 to 24 yrs	83-456 ng/mL
25 to 29 yrs	63-373 ng/mL
30 to 39 yrs	53-331 ng/mL
40 to 49 yrs	52-328 ng/mL
50 to 59 yrs	50-317 ng/mL
60 to 69 yrs	41-279 ng/mL
70 to 79 yrs	34-245 ng/mL
>= 80 yrs	34-246 ng/mL

Prostate Specific Antigen, PSA (serum)	1.21	<= 4.00 ng/mL

Commentary

Estradiol Interference

Recently, one of our manufacturers provided documentation that patients receiving treatment with fulvestrant result in false positive increases in the serum estradiol levels. The level of false positive increase is dependent on the dosage of fulvestrant prescribed. The range of % cross reactivity is 0.31 to 0.35 relative to the concentration of fulvestrant. The laboratory can be contacted for further details.

PSA Interpretative Information

The total PSA value from this assay system is standardized against the WHO standard. The test result will be approximately 20% lower when compared to the equimolar-standardized total PSA (Beckman Coulter). Comparison of serial PSA results should be interpreted with this fact in mind. This test was performed using the Siemens chemiluminescent method. Values obtained from different assay methods cannot be used interchangeably. PSA levels, regardless of value, should not be interpreted as absolute evidence of the presence or absence of disease.

The performance characteristics of the assays performed at Genova Diagnostics, Inc. have been verified by Genova Diagnostics, Inc. and cleared by the U.S. Food and Drug Administration.

Testing for the following analyte(s) was performed by Quest Diagnostics, Solstas Lab Federal Drive, 4380 Federal Drive Suite 100, Greensboro, NC 27410.

- DHT
- IGF-1
- PSA

Testing for the following analyte(s) was performed by Quest Diagnostics Nichols Chantilly, 14225 Newbrook Drive, Chantilly, VA 20151.

- Free Testosterone

Commentary is provided to the practitioner for educational purposes, and should not be interpreted as diagnostic or as treatment recommendations. Diagnosis and treatment decisions are the practitioner's responsibility.

Dehydroepiandrosterone-sulfate (DHEA-S) circulates in a higher concentration than any other steroid, is derived from the adrenal gland in response to ACTH, and is the storage form for DHEA. This anabolic hormone serves as a precursor to other androgens such as androstenedione and testosterone, which may, in turn, be enzymatically converted to estrogens in peripheral tissues such as adipose and bone. DHEA-S also plays an important role in thyroid function, immune regulation, maintenance of libido and lean body mass, insulin sensitivity, and balancing the body's stress response. DHEA-S levels peak between the ages of 20 and 30 years, thereafter decreasing markedly, along with downstream androgens and estrogens. Low DHEA-S may be indicative of chronic stress (increased production of cortisol relative to DHEA) or adrenal insufficiency, and has been noted in conditions such as lupus, insulin resistance, osteoporosis, chronic illness, chronic fatigue, depression, neurodegenerative diseases, high-dose glucocorticoid therapy, and breast cancer.

Sex hormone-binding globulin (SHBG) is synthesized primarily in the liver and serves as a protein carrier for Estradiol (E2), testosterone, and dihydrotestosterone (DHT). The biologic effects of these steroid hormones (especially testosterone) are largely determined by the unbound portion. Thus, SHBG exerts a major regulatory effect on bioactivity of these steroids. Since SHBG concentrations determine bioavailability of E2, testosterone, and DHT, normal levels of SHBG are considered protective against conditions associated with excessive androgenic and estrogenic activity such as breast cancer, as well as conditions associated with deficient activity such as osteoporosis. Check individual levels of these hormones for a more thorough evaluation.

Commentary

Estradiol (E2) is the most potent estrogen. E2 may arise from E1 (reversible reaction) or from testosterone in peripheral tissues such as adipose. Estrogens promote vasodilatation and vascular smooth muscle tone, collagen production, brain activity, and also inhibit bone resorption.

Free testosterone represents the fraction of testosterone that is not bound to sex hormone binding globulin (SHBG), therefore bioavailable. High levels of Free Testosterone are commonly due to supplementation with testosterone, androstenedione, or DHEA, especially in women. A lower concentration of SHBG (such as occurs with hyperinsulinemia or hypothyroidism) will lead to higher levels of Free Testosterone. Other possible causes of elevated Free Testosterone include polycystic ovarian syndrome (PCOS), adrenal tumors, testicular tumors, Cushing's disease and/or congenital adrenal hyperplasia (CAH). Low Free Testosterone is usually due to age-related decline or hypogonadal function. A higher concentration of SHBG (such as occurs with hyperthyroidism or oral estrogen replacement) can also lead to lower levels of Free Testosterone. Men may benefit from testosterone replacement, whereas women may do well with DHEA or androstenedione.

Low levels of DHT indicate general androgen deficiency or poor 5α-reductase activity. Low levels of testosterone, DHEA and androstenedione can be causative factors of reduced DHT levels. This may result in diminished sex drive and poor muscle tone.

Human growth hormone (hGH) from the pituitary promotes healthy aging via its growth-stimulating and healing effects on a variety of systems, including musculoskeletal, neurological, immune, and endocrine. Because of the pulsatile secretion of hGH, indirect serologic assessment of hGH is best accomplished by measuring insulin like growth factor-1 (IGF-1, or somatomedin C), which is released from the liver and other tissues in response to growth hormone and which mediates many of hGH's actions. Greater than 95% of total IGF-1 is bound to IGF binding proteins that limit its bioavailability. Normal levels of IGF-1 suggest sufficient hGH production. This is a positive finding, as lower levels of IGF-1 have been associated with symptoms such as fatigue, decreased psychological well-being and diminished ability for growth and repair. Levels are generally increased with measures like exercise (especially anaerobic), sleep, reduced-carbohydrate diets, 'secretagogues' (e.g., L-arginine), and/or recombinant hGH administration.