THE INSTITUTE OF NUTRITIONAL ENDOCRINOLOGY®

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Blood Chemistry

Steroid Hormones Testing

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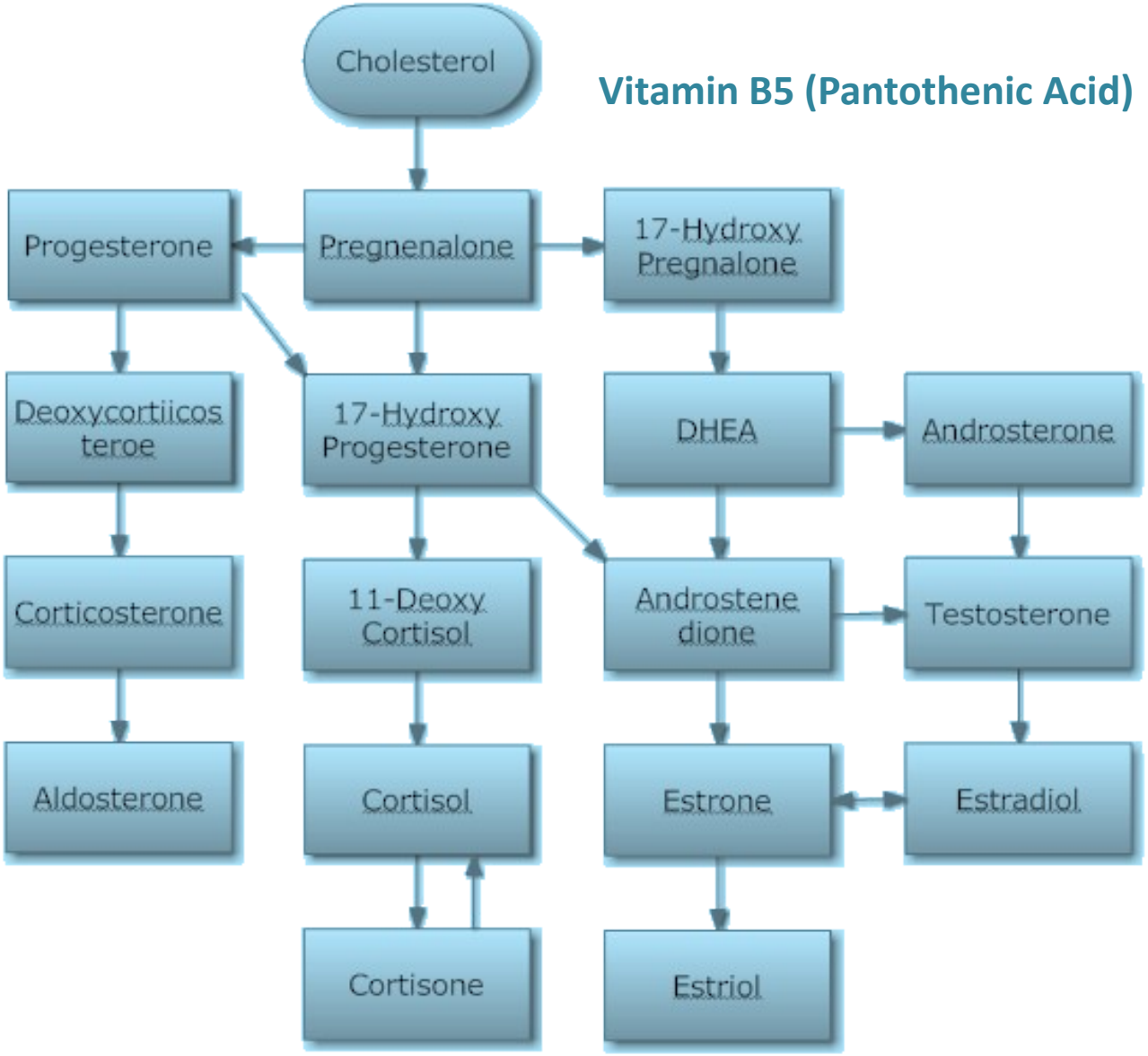
Steroid Hormones



Steroid Hormones To Measure in Blood

- ✓ Pregnenalone
- ✓ Progesterone
- ✓ Estrogen
  - ➢ Estrone
  - ➢ Estradiol
  - ➢ Estriol
- ✓ Testosterone
- ✓ DHEA-S
- ✓ Cortisol

Reproductive Hormones

- ✓ Female
  - ✓ Estrogen
  - ✓ Progesterone
- ✓ Male - Androgens
  - ✓ Testosterone
  - ✓ DHEA

Pregnenalone Ranges (ODX)

Female

	U.S. Units	Standard International Units
Standard Range	10.00 - 230.00 ng/dl	10.00 - 230.00 ng/dl
Optimal Range	130.00 - 230.00 ng/dl	130.00 - 230.00 ng/dl

The standard range above may differ from the range presented on your lab report because the standard reference range for pregnenolone varies from lab to lab. The ranges used in ODX Application are from Quest Diagnostics here in the United States.

Male

	U.S. Units	Standard International Units
Standard Range	10.00 - 200.00 ng/dl	10.00 - 200.00 ng/dl
Optimal Range	125.00 - 200.00 ng/dl	125.00 - 200.00 ng/dl

The standard range above may differ from the range presented on your lab report because the standard reference range for pregnenolone varies from lab to lab. The ranges used in ODX Application are from Quest Diagnostics here in the United States.

Progesterone Ranges (ODX)

Female

	U.S. Units	Standard International Units
Follicular	0.00 - 1.00 ng/ml	0.00 - 3.18 nmol/L
Luteal	2.60 - 21.50 ng/ml	8.27 - 68.37 nmol/L
Ovulation	0.10 - 12.00 ng/ml	0.32 - 38.16 nmol/L
Post Menopausal	0.00 - 0.50 ng/ml	0.00 - 1.59 nmol/L

Male

	U.S. Units	Standard International Units
Standard Range	0.20 - 1.30 ng/ml	0.64 - 4.13 nmol/L
Optimal Range	0.38 - 0.90 ng/ml	1.21 - 2.86 nmol/L

Estradiol(E2) Ranges (ODX)

Female

	U.S. Units	Standard International Units
Follicular	19.00 - 144.00 pg/ml	69.75 - 528.62 pmol/L
Luteal	56.00 - 214.00 pg/ml	205.58 - 785.59 pmol/L
Ovulation	64.00 - 357.00 pg/ml	234.94 - 1310.55 pmol/L
Post Menopausal	0.00 - 31.00 pg/ml	0.00 - 113.80 pmol/L

Male

	U.S. Units	Standard International Units
Standard Range	0.00 - 39.00 pg/ml	0.00 - 143.17 pmol/L
Optimal Range	24.00 - 39.00 pg/ml	88.10 - 143.17 pmol/L

Estrone(E1) Ranges(Quest)

Adult	
Male	≤68 pg/mL
Female	
Follicular Phase	10-138 pg/mL
Luteal Phase	16-173 pg/mL
Postmenopausal Phase	≤65 pg/mL

Estrone(E1) Ranges(Quest)

Pediatric

Age	Male (pg/mL)	Female (pg/mL)
Pre-pubertal (1-9 years)	<10	≤34
10-11 years	≤12	≤72
12-14 years	≤28	≤75
15-17 years	≤64	≤188

Estriol(E3) Ranges (Quest)

Adult Male	≤0.18 ng/mL
Adult Female (Non-pregnant)	≤0.21 ng/mL
Pregnancy	
First trimester	≤2.50 ng/mL
Second trimester	≤9.60 ng/mL
Third trimester	≤14.60 ng/mL

Testosterone Ranges (ODX)

Female

Total

	U.S. Units	Standard International Units
Standard Range	2.00 - 45.00 ng/dl	0.07 - 1.56 nmol/L
Optimal Range	35.00 - 45.00 ng/dl	1.21 - 1.56 nmol/L

Free

	U.S. Units	Standard International Units
Standard Range	0.10 - 6.40 pg/ml	0.35 - 22.19 pmol/L
Optimal Range	3.25 - 4.60 pg/ml	11.27 - 15.95 pmol/L

Bioavailable

	U.S. Units	Standard International Units
Standard Range	0.50 - 8.50 ng/dl	0.02 - 0.29 nmol/L
Optimal Range	5.50 - 8.50 ng/dl	0.19 - 0.29 nmol/L

Testosterone Ranges (ODX)

Male

Total	U.S. Units	Standard International Units
Standard Range	250.00 - 1100.00 ng/dl	8.67 - 38.14 nmol/L
Optimal Range	700.00 - 1100.00 ng/dl	24.27 - 38.14 nmol/L

Free	U.S. Units	Standard International Units
Standard Range	46.00 - 224.00 pg/ml	159.62 - 777.28 pmol/L
Optimal Range	150.00 - 224.00 pg/ml	520.50 - 777.28 pmol/L

Bioavailable	U.S. Units	Standard International Units
Standard Range	110.00 - 575.00 ng/dl	3.81 - 19.94 nmol/L
Optimal Range	375.00 - 575.00 ng/dl	13.00 - 19.94 nmol/L

Sex Hormone Binding Globulin (SHGB) Ranges (ODX)

Female

	U.S. Units	Standard International Units
Standard Range	17.00 - 124.00 nmol/L	17.00 - 124.00 nmol/L
Optimal Range	50.00 - 80.00 nmol/L	50.00 - 80.00 nmol/L

Male

	U.S. Units	Standard International Units
Standard Range	10.00 - 50.00 nmol/L	10.00 - 50.00 nmol/L
Optimal Range	40.00 - 46.00 nmol/L	40.00 - 46.00 nmol/L

Sex Hormone Binding Globulin (SHGB) Imbalances (ODX)

High SHGB Leads to

- Low available testosterone
- Low energy
- Muscle loss
- Low libido
- Decreased bone mass

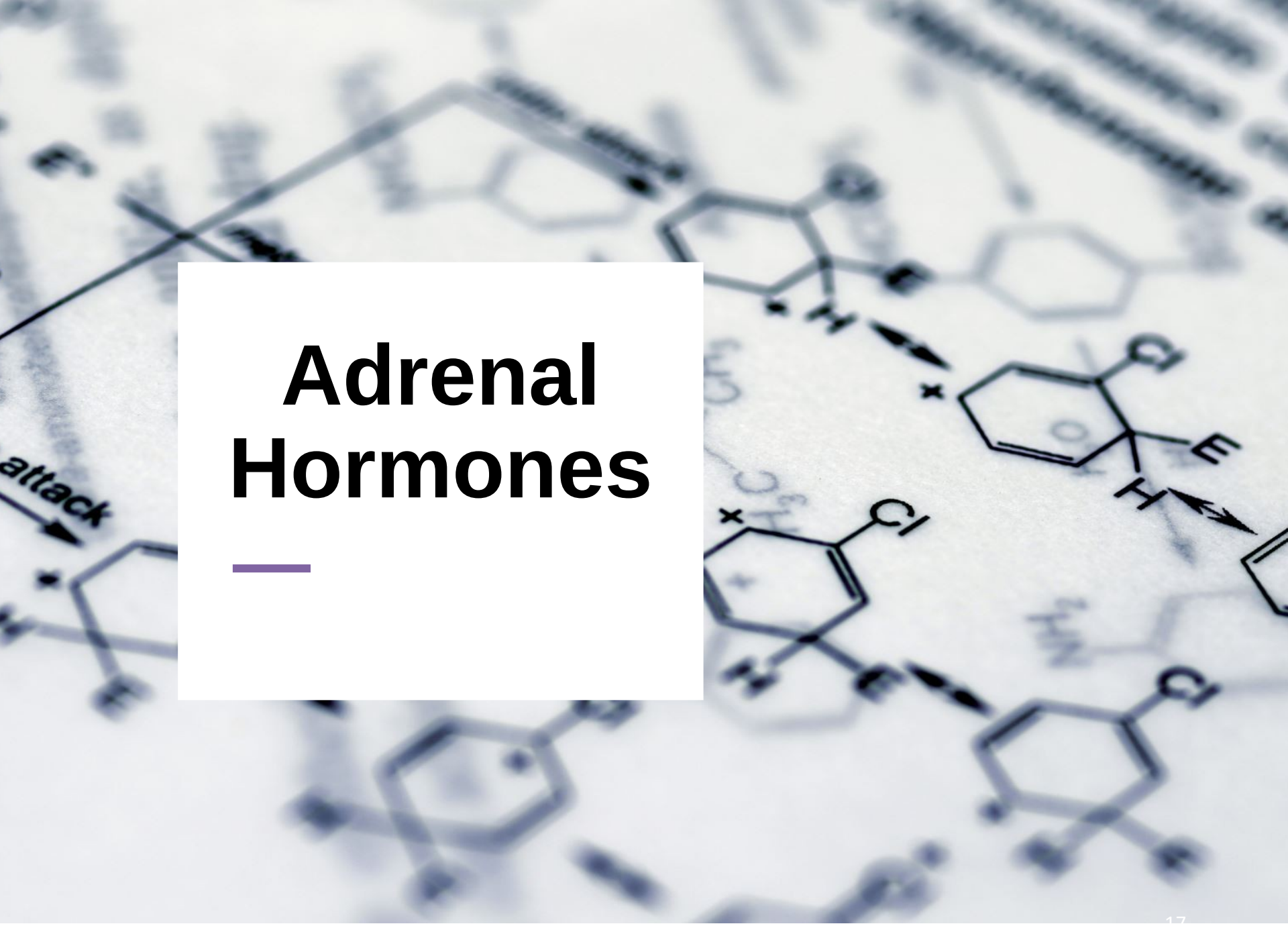
Causes of High SHGB

- Anorexia
- Thyroid supplementation
- Estrogen supplementation

Sex Hormone Binding Globulin (SHGB) Imbalances (ODX)

Low SHGB Leads to

- Metabolic Syndrome
- High cholesterol
- High Glucose
- Hi fasting insulin
- High Triglycerides
- High uric acid
- Low HDL
- Low DHEA-S
- Increased cardiovascular risk and calcification
- Sleep apnea



Adrenal Hormones

DHEA-S Ranges (ODX)

Female

	U.S. Units	Standard International Units
Standard Range	18.00 - 391.00 µg/dl	0.49 - 10.56 µmol/L
Optimal Range	275.00 - 391.00 µg/dl	7.42 - 10.56 µmol/L

Male

	U.S. Units	Standard International Units
Standard Range	85.00 - 690.00 µg/dL	2.31 - 18.73 umol/L
Optimal Range	350.00 - 690.00 µg/dL	9.50 - 18.73 umol/L

Cortisol(ODX)

AM

	U.S. Units	Standard International Units
Standard Range	4.00 - 22.00 µg/dL	110.35 - 606.94 nmol/L
Optimal Range	10.00 - 15.00 µg/dL	275.88 - 413.82 nmol/L

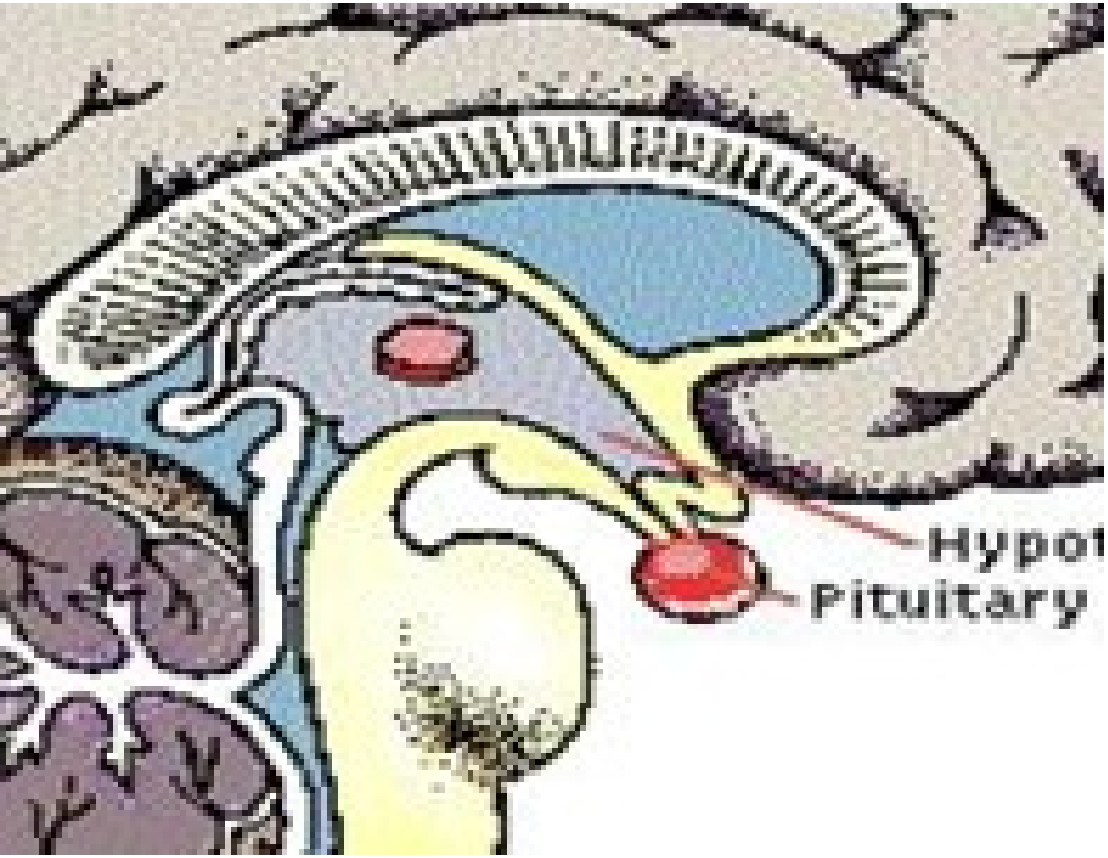
PM

	U.S. Units	Standard International Units
Standard Range	3.00 - 17.00 µg/dL	82.76 - 469.00 nmol/L
Optimal Range	4.00 - 10.00 µg/dL	110.35 - 275.88 nmol/L

Cortisol:DHEA-S Ratio (ODX)

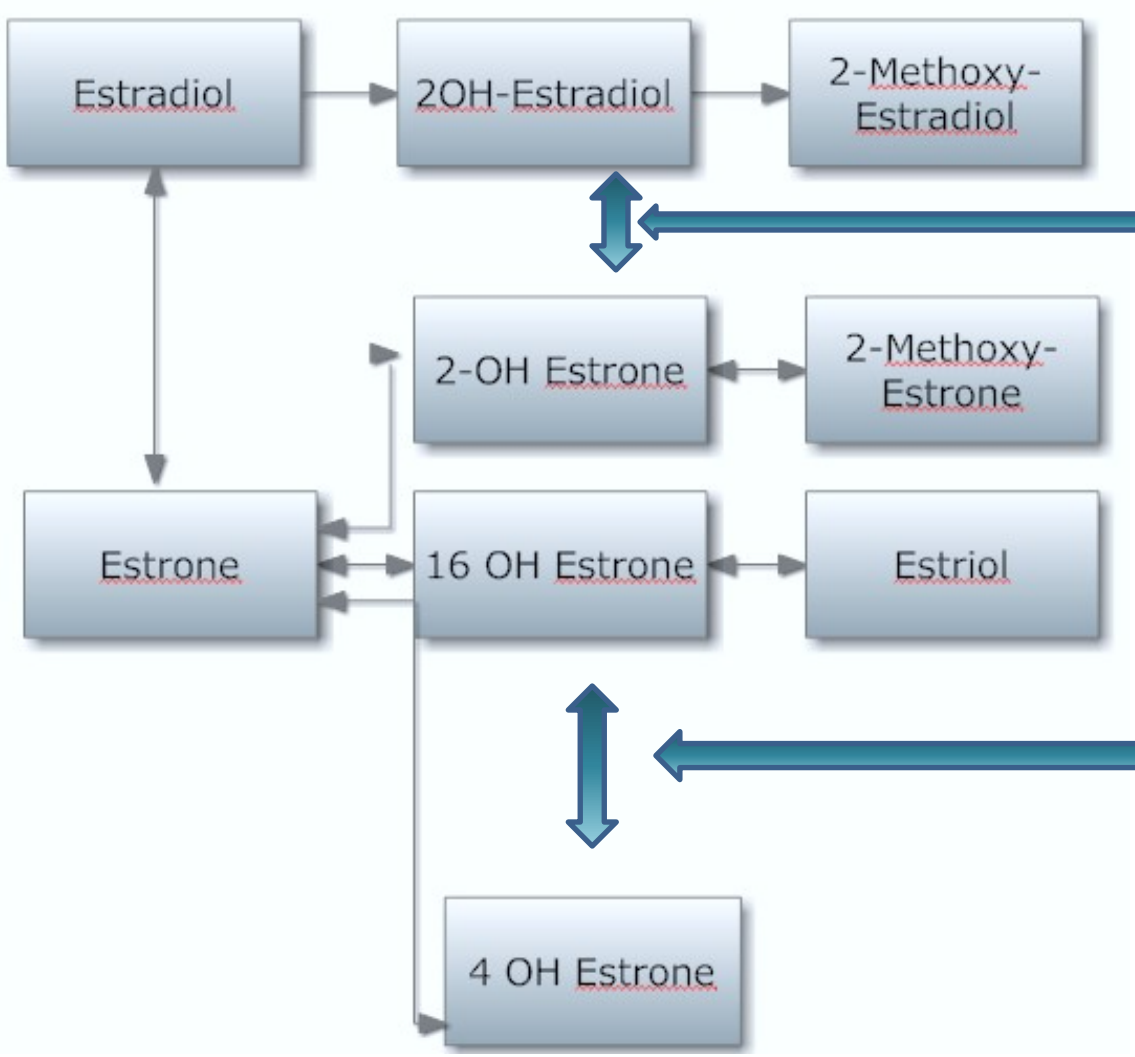
	U.S. Units	Standard International Units
Standard Range	0.00 - 0.09 ratio	0.00 - 0.09 ratio
Optimal Range	0.00 - 0.09 ratio	0.00 - 0.09 ratio

Hypothalamic and Pituitary Hormones Related to Steroids



- ✓ Gonadotropin-releasing hormone **(GnRH)**
- ✓ Follicle Stimulating Hormone (FSH)
- ✓ Luteinizing Hormone(LH)
- ✓ Corticotropin-releasing hormone **(CRH)**
- ✓ Adrenocorticotrophic hormone(**ACTH**)

Estrogen Metabolism



Protective
- Cruciferous
- Soy

Toxic
- Barbecue
- Toxins

Estrogen Role

- ✓ Estrone (E1) – most prominent after menopause
- ✓ Estradiol (E2)
- ✓ Estriol (E3)

Estrone (E1)

- ✓ Involved in maturation of reproductive organs
- ✓ Ideal ratio of 1 to 2 with estradiol
- ✓ Only form of estrogen naturally present in any quantity in after menopause
- ✓ Pre-menopausal testosterone can also be converted into excessive estrone
- ✓ More proliferative than other estrogens

Estradiol (E2)

- ✓ Responsible for breast enlargement, body shape and fat deposition
- ✓ Maturation of egg follicle
- ✓ Involved in thickening of uterine lining
- ✓ Restrains bone loss
- ✓ Protects breast tissue when balanced with progesterone and testosterone
- ✓ Promotes soft supple skin, a full head of shiny hair

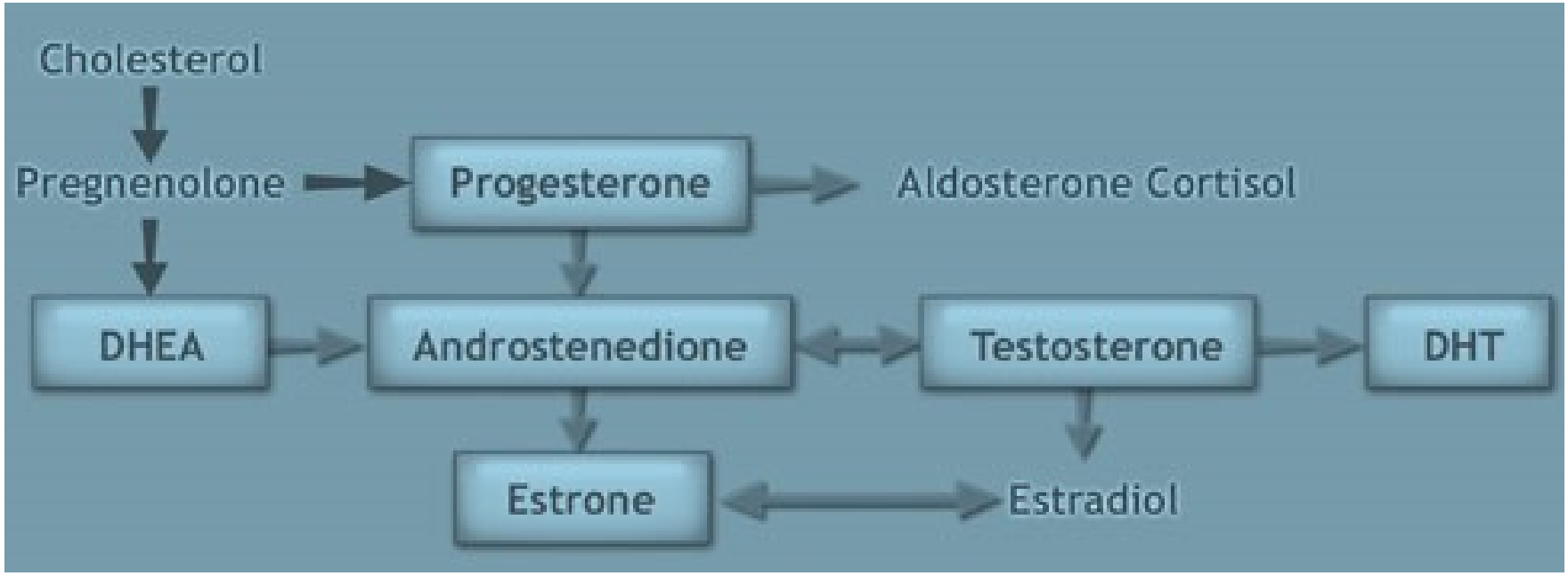
Estriol (E3)

- ✓ Highest in 3rd trimester of pregnancy
- ✓ Highly protective of the DNA blueprint
- ✓ Protective against cancer of the breasts and uterus
- ✓ Induces a more mature state of the breast glandular cells
- ✓ Makes breast tissue less susceptible to damage by radiation and chemicals
- ✓ Protects vaginal tissue in menopause
- ✓ Can help with incontenence

Progesterone

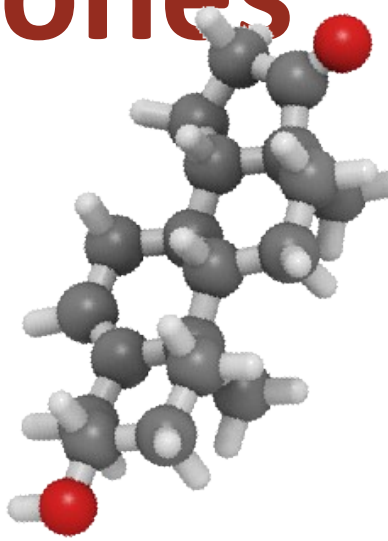
- ✓ Produced by corpus luteum and brain
- ✓ Direct descendant of pregnenalone
- ✓ Precursor of cortisol in two steps
- ✓ Maintains corpus luteum in pregnancy
- ✓ Disrupted by anti-progestins in the environment
- ✓ Depleted by nutrient deficiencies (B6, diet, soy, fiber)
- ✓ Progesterone resistance often overlooked

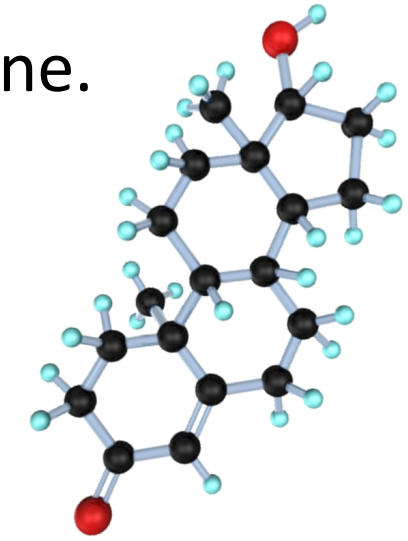
Male Hormone Flowchart



Androgens: Male Hormones

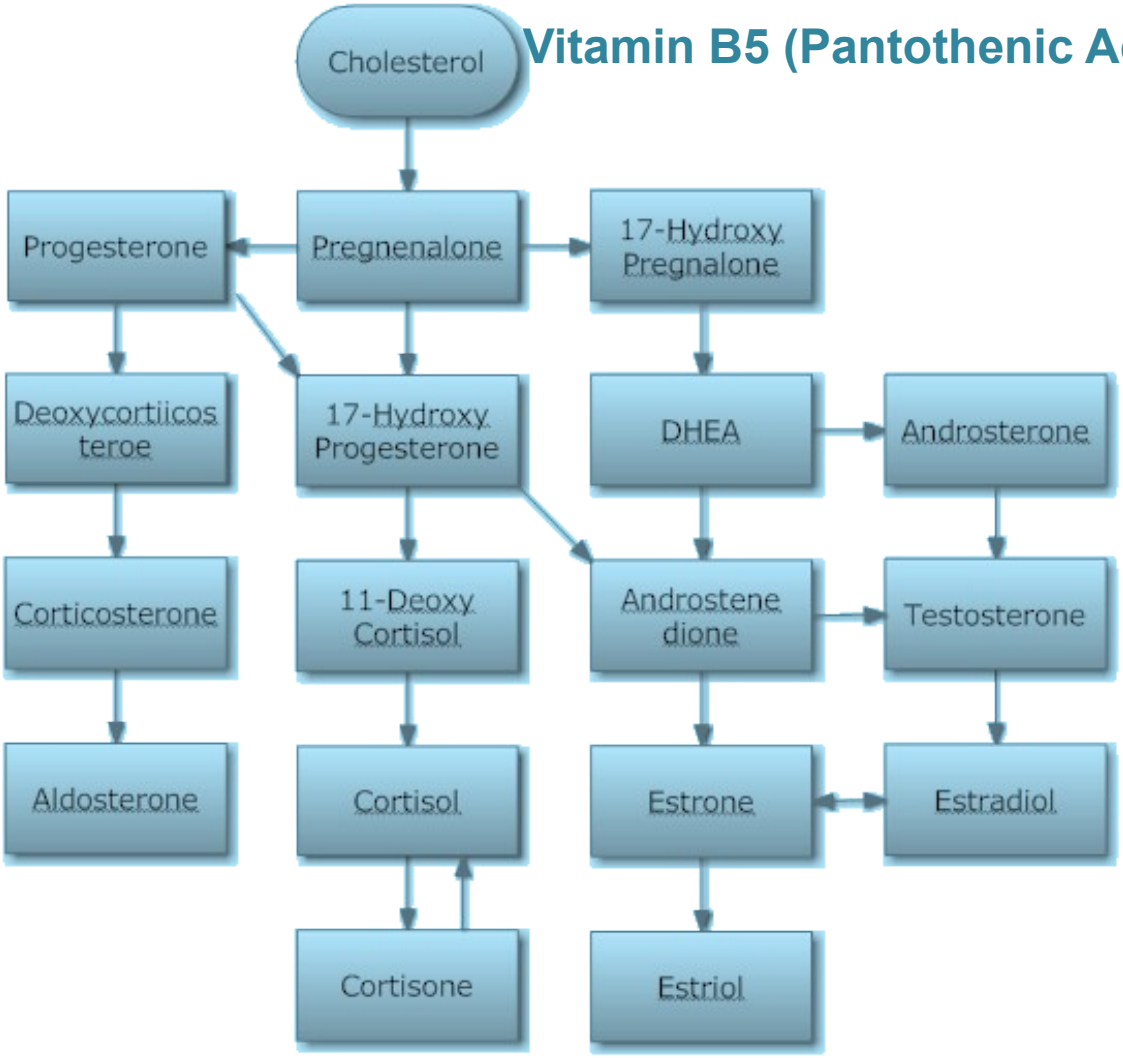
- **DHEA:** precursor for both male and female hormones. Anti-stress hormone produced by adrenal glands.
- **Androstenedione:** a weak male hormone and precursor of male and female hormones.
- **Testosterone:** main testicular androgen – precursor to highly potent dihydrotestosterone.
- **Dihydrotestosterone (DHT):** made from testosterone in testes, prostate, adrenal and skin. Responsible for male sex-specific characteristics.





Steroid Hormones

Vitamin B5 (Pantothenic Acid)



Hormone Testing Summary

Key (how to read the results):

Sex Hormones

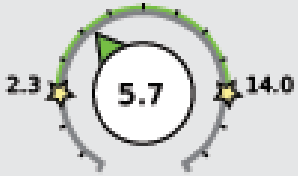
See Pages 2 and 3 for a thorough breakdown of sex hormone metabolites

Estradiol(E2)

Progesterone

(Serum Equivalent, ng/mL)

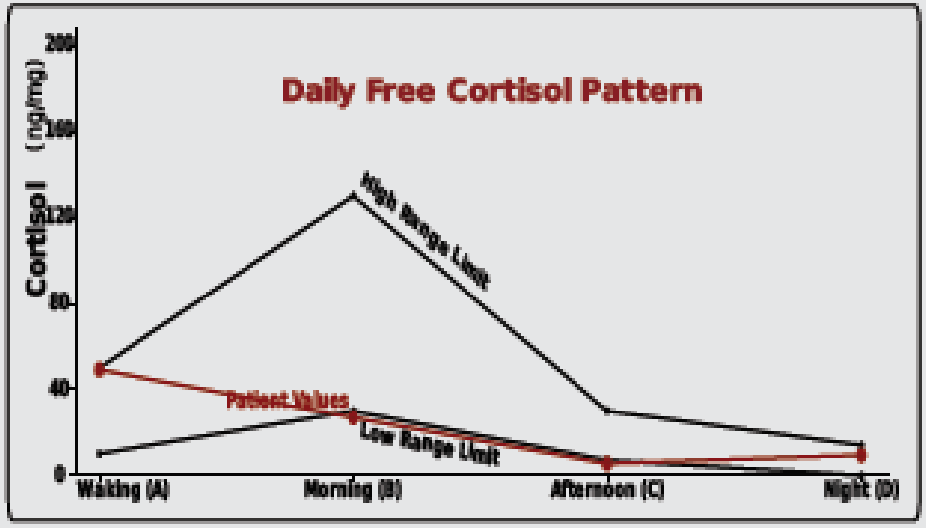
Progesterone Serum Equivalent is a calculated value based on urine pregnanediol.



Testosterone

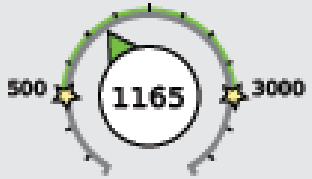
Adrenal Hormones

See pages 4 and 5 for a more complete breakdown of adrenal hormones



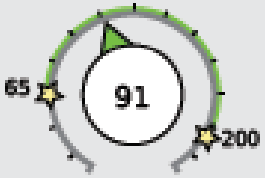
Total DHEA Production

Age	Range
20-39	1300-3000
40-60	750-2000
>60	500-1200



Total DHEA Production

(DHEAS + Etiocholanolone + Androsterone)



24hr Free Cortisol

(A+B+C+D)

cortisol metabolism

Metabolized Cortisol (THF+THE)

(Total Cortisol Production)

Free cortisol best reflects tissue levels. Metabolized cortisol best reflects total cortisol production.

The following videos (which can also be found on the website under the listed names along with others) may aid your understanding:

DUTCH Complete Overview | Estrogen Tutorial | Female Androgen Tutorial | Cortisol Tutorial

PLEASE BE SURE TO READ BELOW FOR ANY SPECIFIC LAB COMMENTS. More detailed comments can be found on page 8.

