Lab Dept:	**Chemistry**
Test Name:	**TESTOSTERONE, TOTAL AND FREE**

General Information

Lab Order Codes:	FTES
Synonyms:	N/A
CPT Codes:	84402 – Testosterone, free 84270 – Sex hormone binding globulin 84403 – Testosterone, total
Test Includes:	Total testosterone (ng/mL), Free Testosterone (pg/mL),% free testosterone, and sex hormone binding globulin (SHBG)(nmol/L)

Logistics

Test Indications:	Most circulating testosterone is bound to a specific carrier protein usually called sex hormone binding hormone (SHBG) or testosterone-binding globulin (TeBG). A small portion of total testosterone exists in the free or unbound state available for entry into the cells of target organs. Free testosterone is probably the physiologically active component of testosterone. The serum free testosterone assay was developed because the measurement total testosterone does not always give an accurate picture of the amount of testosterone available to target organ cells. A number of conditions or medications are known to increase or decrease the TeBG concentration, which may cause total testosterone concentration to change but without necessarily influencing the free testosterone concentration, many of the influences known to alter thyroxine-binding proteins also influence TeBG in a similar way. Thus, estrogens increase the concentration of TeBG and androgens tend to decrease it.
Lab Testing Sections:	Chemistry - Sendouts
Referred to:	Esoterix, Inc. (ESL Test: 500290)
Phone Numbers:	MIN Lab: 612-813-6280 STP Lab: 651-220-6550
Test Availability:	Daily, 24 hours
Turnaround Time:	4 – 7 days, test set up Monday - Friday
Special Instructions:	N/A

Specimen

Specimen Type:	Blood
Container:	Red top tube
Draw Volume:	6 mL (Minimum: 3 mL) blood
Processed Volume:	2 mL (Minimum: 1 mL) serum **Note:** Submission of the minimum volume does not permit repeat analysis.
Collection:	Routine venipuncture
Special Processing:	Lab Staff: Centrifuge specimen within 1 hour of collection. Remove serum aliquot into a screw-capped round bottom plastic vial. Store and ship frozen in a plastic vial. Forward promptly.
Patient Preparation:	None
Sample Rejection:	Specimen not separated within 1 hour of draw; mislabeled or unlabeled specimens

Interpretive

Reference Range:	**Total Testosterone:**

Premature Infants:		
Age	**Males**	**Females**
26 - 28 weeks, day 4	59 - 125 ng/dL	5 - 16 ng/dL
31 - 35 weeks, day 4	37 - 198 ng/dL	5 - 22 ng/dL

Infants: Full Term Newborns:	
Males*	**Females****
75 - 400 ng/dL	20 - 64 ng/dL
Infants: 1-7 months	
*Males: Levels decrease rapidly the first week to 20 - 50 ng/dL, then increase to 60 - 400 ng/dL between 20 - 60 days. Levels then decline to prepubertal range by 7 months.	
**Females: Levels decrease during the first month to <10 ng/dL and remain there until puberty.	

Prepubertal Children:	
Males (1 – 10 years):	<2.5 – 10 ng/dL
Females (1 – 9 years):	<2.5 – 10 ng/dL

Puberty:				
Tanner Stage	**Males ng/dL**	**Age (years)**	**Females ng/dL**	**Age (years)**
1	<2.5 – 10	<9.8	< 2.5 – 10	<9.2
2	18 – 150	9.8 – 14.5	7 – 28	9.2 – 13.7
3	100 - 320	10.7 – 15.4	15 – 35	10.0 – 14.4
4	200 – 620	11.8 – 16.2	13 – 32	10.7 – 15.6
5	350 - 970	12.8 – 17.3	20 - 38	11.8 – 18.6

Adult:	**Male**	**Female**
20 – 50 years:	350 – 1030 ng/dL	Premenopausal: 10 – 55 ng/dL Postmenopausal: 7 – 40 ng/dL
Free Testosterone:		
Males	**% Free**	**pg/dL**
Full Term Infants Males		
1 – 15 days	0.9 – 1.7	1.5 – 31
1 – 3 months	0.4 – 0.8	3.3 – 18
3 – 5 months	0.4 – 1.1	0.7 – 14
5 – 7 months	0.4 – 1.0	0.4 – 4.8
Prepubertal Children Males		
1 – 10 years	0.4 – 0.9	0.15 – 0.6
Puberty Males	Comprehensive values are currently unavailable	
Adults Males	1.5 – 3.2	52 - 280
Females	**% Free**	**pg/dL**
Full Term Infants Females		
1 – 15 days	0.8 – 1.5	0.5 – 2.5
1 – 3 months	0.4 – 1.1	0.1 – 1.3
3 – 5 months	0.5 – 1.0	0.3 – 1.1
5 – 7 months	0.5 – 0.8	0.2 – 0.6
Prepubertal Children Females		
1 – 10 years	0.4 – 0.9	0.15 – 0.6

Puberty Females	Comprehensive values are currently unavailable.	
Adults Females	0.8 – 1.4	1.1 – 6.3
Sex Hormone Binding Globulin		
Age	**Males (nmol/L)**	**Females (nmol/L)**
1 month - 2 years:	60 – 252	60 – 252
2 - 8 years:	72 – 220	72 - 220
9 - 18 years:	16 – 100	36 - 125
>18 years:	20 – 60	40 - 120

Critical Values: N/A

Limitations: N/A

Methodology: Binding Capacity/HPLC Tandem Mass Spectrophotometer

References: Esoterix Inc. “Expected Value and S.I. Unit Conversion Table”, 5th Edition

Esoterix Laboratories April 2012

Updates: 4/17/12: Reference range updates.