DISCLAIMER:
This data applies to the highly sensitive and specific assay methods developed, validated, and performed solely at Esoterix,Inc.

ESOTERIX INC
Laboratory Services

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EXPECTED VALUES *& S.I. Unit Conversion Tables*

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INTRODUCTION

It is essential that a clinical laboratory establish reference ranges appropriate for its own methods. The practice of using normal values obtained from the literature, or from other laboratories may often be misleading. Confusion over test results often occurs because significant variations exist in individual patient values and normal ranges reported by different clinical laboratories. This variability is likely the result of dissimilar standard preparations, assay reagents, sample purification procedures or other methodological factors.

As a specialized laboratory, Esoterix has long recognized the need for comprehensive normal values for hormone tests. In response to this need, we have maintained an active program to determine hormone levels in healthy individuals at all ages and over a broad range of physiologic conditions. The value of this information is readily apparent to physicians who because of the nature of endocrine disease, tend to rely heavily on laboratory resultsfor diagnosis.

Diagnostic problems in pediatric endocrinology are further complicated by dramatic changes in hormone levels which occur during the neonatal and prepubertal periods, at adrenarche, and during pubertal development. Comprehensive normal values are indispensable to the assessment of hormonal dysfunction in children. Since the founding of Endocrine Sciences in 1972, Esoterix has maintained a continuous program to obtain normal ranges in children. Through collaborative studies conducted with pediatricians, hospitals and university research centers, we have obtained comprehensive pediatric normals for the majority of our tests.

The information we have accumulated over the past several years is summarized in this section to facilitate the interpretation of endocrine test results on pediatric patients. We would like to express our gratitude to the many clinicians and researchers who have participated in our program by generously contributing their time and patient samples.

The difficult nature of certain studies has made it impossible to collect all of the data through our own program,necessitating that we obtain some values from research publications. This was done only after extensive review and careful examination to insure that methods demonstrated adequate specificity and that values were comparable to those determined at Esoterix.In the future, it will be necessary to collect data in a few areas where we were previously unsuccessful. Also, as new tests become available, we will need to establish normal values for them as well. We cordially invite interested physicians to join us in this continuing project.

Acid Labile Subunit (ALS)

BLOOD ASSAYS

500012

	Range (mg/L)
INFANTS	
0 – 2 Months:	0.2 – 5.1
3 – 6 Months:	0.7 – 5.6
7 – 12 Months:	0.7 – 7.9
PREPUBERTAL	
1 – 2 Years:	0.9 – 9.3
3 – 4 Years:	1.9 – 10
5 – 7 Years:	2.3 – 11
8 – 10 Years:	4.2 – 13
PUBERTAL	
11 – 13 Years:	5.6 – 16
14 – 18 Years:	5.6 – 16
ADULTS	
19 – 25 Years:	7.0 – 16
26 – 35 Years:	7.0 – 16
36 – 45 Years:	7.0 – 16
46 – 55 Years:	7.0 – 16
56 – 65 Years:	7.0 – 16

Aldosterone

BLOOD ASSAYS

500014

Ad Lib Sodium Intake	SUPINE (ng/dL)	UPRIGHT (ng/dL)
PREMATURE INFANTS		
26 – 28 Weeks, Day 4:	5 – 635	not applicable
31 – 35 Weeks, Day 4:	19 – 141	not applicable
FULL-TERM INFANTS		
3 Days:	7 – 184	not applicable
7 Days:	5 – 175	not applicable
1 – 11 Months:	5 – 90	not applicable
CHILDREN		
12 – 23 Months:	7 – 54	not applicable
24 Months – 9 Years:	3 – 35	5 – 80
10 – 14 Years:	2 – 22	4 – 48
ADULTS		
	3 – 16	7 – 30

Values are based on early morning samples from subjects on ad lib sodium intake. Diurnal variations and values in pediatric patients on different sodium diets are currently unavailable.

Adrenocorticotropic Hormone (ACTH)

BLOOD ASSAYS

500011

RANGE

CHILDREN:

ACTH levels in infants after one day, prepubertal and pubertal children are not significantly different from adults.

ADULTS

8:00 a.m.:	10 – 60 pg/mL
4:00 p.m.:	5 – 37 pg/mL

Albumin

BLOOD ASSAYS

500223

RANGE

3.2 – 5.2 g/dL

Aldosterone, Urine (Includes Creatinine)

URINE ASSAYS

500018

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
Ad Lib Sodium Intake		
NEWBORN		
1 – 3 Days:	0.5 – 5	20 – 140
PREPUBERTAL CHILDREN		
4 – 10 Years:	1 – 8	4 – 22
Normal Sodium Intake		
ADULTS	3 – 19	1.5 – 20

Aldosterone excretion rates in infants and children on high and low sodium intake are not available. Aldosterone excretion rates in newborns correlate highly with potassium:sodium ratios but not with sodium intake.

Alpha Subunit

URINE ASSAYS

500016

	RANGE (ng/mL)
ADULT	
Males:	
< 50 Years	0.05 – 0.53
>/= 50 Years	0.09 – 0.76
Females:	
Premenopausal	0.04 – 0.38
Postmenopausal	0.09 – 1.23

Androstanediol Glucuronide

BLOOD ASSAYS

500026

	RANGE (ng/dL)
PREPUBERTAL CHILDREN	
0-10 Years:	< 5 – 42
ADULTS	
Males:	190 – 900
Females*:	35 – 200

*Occasionally, normal females with no evidence of hirsutism may have levels well above the normal range.

Androstenedione

BLOOD ASSAYS

500030

	RANGE (ng/dL)
REMATURE INFANTS	
26 – 28 Weeks, Day 4:	92 – 892
31 – 35 Weeks, Day 4:	80 – 446
FULL–TERM INFANTS	
1 – 7 Days:	20 – 290
Levels decrease rapidly to a range of 18 – 80 ng/dL after one week.	
1 – 11 Months:	6 – 68
Androstenedione gradually decreases during the first six months to prepubertal levels.	
PREPUBERTAL CHILDREN	
1 – 10 Years:	8 – 50

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	8 – 50	24	1	< 9.2	8 – 50	24
2	9.8 – 14.5	31 – 65	45	2	9.2 – 13.7	42 – 100	65
3	10.7 – 15.4	50 – 100	67	3	10.0 – 14.4	80 – 190	123
4	11.8 – 16.2	48 – 140	82	4	10.7 – 15.6	77 – 225	131
5	12.8 – 17.3	65 – 210	105	5	11.8 – 18.6	80 – 240	160

	RANGE (ng/dL)	RANGE (ng/dL)
ADULTS	MALE	FEMALE (entire cycle)
18 – 40 Years:	75 – 205	60 – 245
Postmenopausal:		30 – 120

Angiotensin Converting Enzyme (ACE)

BLOOD ASSAYS

500034

	RANGE (mU/mL)
CHILDREN AND ADULTS	
0 – 2 Years	5 – 83
3 – 7 Years	8 – 76
8 – 14 Years	6 – 89
>/ = 15 Years	8 – 52

Antidiuretic Hormone (ADH) *RUO*

BLOOD ASSAYS

500035

	RANGE (pg/mL)
ADULTS	0.7 – 3.8

With normal serum osmolality

Anti-Mullerian Hormone (AMH), Serum *RUO*

BLOOD ASSAYS

500043

	RANGE (ng/mL)
MALES	
0 – 13 Days	15.5 – 48.7
14 Days -11 Months	39.1 – 91.1
12 Months – 6 Years	48.0 – 83.2
7 – 8 Years	33.8 – 60.2
Adult	3.0 – 5.4
FEMALES	
0 – 8 Years	0.0 – 7.1
Adult	0.0 – 6.9

*Research Use Only

Bone Specific Alkaline Phosphatase, Serum

BLOOD ASSAYS

500074

	RANGE
ADULTS	
20 – 79 Years:	< 2 – 24 u/L

Calcitonin

BLOOD ASSAYS

500047

	RANGE (pg/mL)
ALL AGES	0 – 12

Catecholamines, Fractionated, Plasma

BLOOD ASSAYS

500052

	NOREPINEPHRINE RANGE (pg/mL)	EPINEPHRINE RANGE (pg/mL)
NEWBORN		
1 – 7 Days:	200 – 420	20 – 130
CHILDREN		
1 – 16 Years:		
Basal:	150 – 400	20 – 115
ADULTS		
20 – 55 Years:		
Basal:	125 – 310	20 – 97
Standing:	167 – 515	20 – 109

Values were obtained from samples collected under optimal,basal conditions whenever possible. Catecholamine levels are elevated by many variables, including the stress of venipuncture and by numerous pharmacological agents.

Catecholamines, Fractionated, Urine

URINE ASSAYS

500062

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
NOREPINEPHRINE		
INFANTS		
< 1 Year:	Not Determined	37 – 195
CHILDREN		
1 – 10 Years:	Not Determined	24 – 140
OLDER CHILDREN AND ADULTS	16 – 125	12 – 110
EPINEPHRINE		
INFANTS		
< 1 Year:	Not Determined	2 – 180
CHILDREN		
1 – 10 Years:	Not Determined	20 – 149
OLDER CHILDREN AND ADULTS	3 – 38	9 – 25

Pediatric values were determined on both random and 8 hour urine collections.

Catecholamines, Total, Urine (Includes Creatinine)

URINE ASSAYS

500060

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
INFANTS		
< 1 Year:	Not Determined	34 – 286
CHILDREN		
1 – 10 Years:	Not Determined	16 – 255
OLDER CHILDREN AND ADULTS	30 – 118	22 – 115

Chorionic Gonadotrophin,Human (Beta-hCG)

BLOOD ASSAYS

500068

CHILDREN	
Newborn – Puberty:	< 5 mIU/mL
ADULTS	
Males And Non-Pregnant Females:	< 5 mIU/mL
PREGANCY	
First Trimester:	30,000 – 120,000 mIU/mL
Second Trimester:	3500 – 15,000 mIU/mL
Third Trimester:	9000 – 35,000 mIU/mL

Corticosteroid Binding Globulin (CBG)

BLOOD ASSAYS

500076

	RANGE (mg/dL)
NEWBORN	
0 – 3 Weeks:	1.6 – 2.5
INFANTS	
4 Weeks – 11 Months:	2.2 – 8.3
FEMALES	
12 Months – 8 Years	4.3 – 10
MALES	
12 Months – 9 Years	4.3 – 10
OLDER CHILDREN AND ADULTS	2.3 – 3.9
ESTROGEN THERAPY AND PREGNANCY	> 6.0

Corticosterone

BLOOD ASSAYS

500084

	RANGE (ng/dL)	RANGE (ng/dL)
PREMATURE INFANTS		
26 – 28 Weeks, Day 4:	235 – 1108	
31 – 35 Weeks, Day 4:	150 – 1700	
NEWBORN		
1 – 7 Days:	70 – 850	
30 Days – 11 Months:	80 – 1500	
CHILDREN	**8:00 a.m.**	**4:00 p.m.**
1 – 16 Years:	135 – 1860	70 – 620
ADULTS	130 – 820	60 – 220

Cortisol, Free, Urine (Includes Creatinine)

URINE ASSAYS

500102

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
PREPUBERTAL CHILDREN	3 – 9	7 – 25
ADULT MALE	11 – 84	7 – 45
ADULT FEMALE	10 – 34	9 – 32
PREGNANCY	16 – 60	14 – 59

Cortisol, Saliva

BLOOD ASSAYS

500094

	RANGE (ug/dL)
PREPUBERTAL CHILDREN	
8:00 a.m.:	0.17 – 1.2
4:00 p.m.:	0.10 – 0.33
11:00 p.m.:	0.03 – 0.19
ADULTS	
8:00 a.m.:	0.18 – 0.95
4:00 p.m.:	0.10 – 0.28
11:00 p.m.:	0.05 – 0.17
POST DEXAMETHASONE	
8:00 a.m.:	< 0.1 ug/dL

(Following 1 mg dexamethasone at 11:00 p.m.the previous night)

Cortisol, Serum

BLOOD ASSAYS

500092

	RANGE (ug/dL)	
PREMATURE INFANTS		
26 – 28 Weeks, Day 4:	1 – 11	
31 – 35 Weeks, Day 4:	2.5 – 9.1	
FULL–TERM INFANTS		
Day 3:	1.7 – 14	
Day 7:	2.0 – 11	
31 Days – 11 Months:	2.8 – 23	
CHILDREN	**8:00 a.m.**	**4:00 p.m.**
12 Month – 15 Years:	3.0 – 21	
ADULTS	8.0 – 19	4.0 – 11

C-Peptide, Plasma

BLOOD ASSAYS

500104

	RANGE (ng/mL)
CHILDREN	
8:00 a.m. Fasting:	0.4 – 2.2
ADULTS	
8:00 a.m. Fasting:	0.4 – 2.1
2 Hours Post Prandial (Sustacal):	1.2 – 3.4
2 Hours Post Glucose:	2.0 – 4.5

C-Peptide, Urine (Includes Creatinine)

URINE ASSAYS

500108

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
ADULTS		
24-Hour Collection:	65 – 262	55 – 169
Overnight Fasting Collection:		15 – 74
3-Hour Post Prandial Collection:		43 – 254

Dehydroepiandrosterone (DHEA)

BLOOD ASSAYS

500116

	RANGE (ng/dL)	
PREMATURE INFANTS		
26 – 28 Weeks, Day 4:	236 – 3640	
31 – 35 Weeks, Day 4:	80 – 3150	
FULL–TERM INFANTS		
3 Days:	65 – 1250	
8 – 30 Days:	50 – 760	
31 Days – 5 Months:	26 – 385	
6 – 11 Months:	20 – 100	
PREPUBERTAL CHILDREN		
12 Months – 5 Years:	20 – 130	
6 – 7 Years:	20 – 275	Values begin to increase progressively at about six years of age prior to any physical evidence of puberty.
8 – 10 Years:	31 – 345	

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	31 – 345	156	1	< 9.2	31 – 345	156
2	9.8 – 14.5	110 – 495	300	2	9.2 – 13.7	150 – 570	330
3	10.7 – 15.4	170 – 585	390	3	10.0 – 14.4	200 – 600	385
4	11.8 – 16.2	160 – 640	395	4	10.7 – 15.6	200 – 780	430
5	12.8 – 17.3	250 – 900	505	5	11.8 – 18.6	215 – 850	540

ADULTS

20 – 50 Years: 160 – 800

Dehydroepiandrosterone Sulfate (DHEA-S)

BLOOD ASSAYS

500120

	RANGE (ug/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	123 – 882
31 – 35 Weeks, Day 4:	122 – 710
FULL–TERM INFANTS	
3 Days:	88 – 356
1 – 12 Months:	5 – 111 ug/dL by first month, 5 – 48 ug/dL by 6 months.
PREPUBERTAL	
1 – 5 Years:	< 5 – 57
CHILDREN	
6 – 7 Years:	9 – 72
8 – 10 Years:	13 – 115

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ug/dL)	MEAN (ug/dL)	TANNER STAGE	AGE (years)	RANGE (ug/dL)	MEAN (ug/dL)
MALE				FEMALE			
1	< 9.8	13 – 83	36	1	< 9.2	19 – 144	40
2	9.8 – 14.5	42 – 109	93	2	9.2 – 13.7	34 – 129	72
3	10.7 – 15.4	48 – 200	122	3	10.0 – 14.4	32 – 226	88
4	11.8 – 16.2	102 – 385	206	4	10.7 – 15.6	58 – 260	120
5	12.8 – 17.3	120 – 370	230	5	11.8 – 18.6	44 – 248	148

ADULTS	**MALE RANGE(ug/dL)**	**FEMALE RANGE (ug/dL)**
21 – 30 Years:	100 – 460	76 – 255
31 – 40 Years:	88 – 305	48 – 247
41 – 50 Years:	70 – 218	19 – 210
51 – 60 Years:	29 – 220	20 – 157
61 – 70 Years:	26 – 213	10 – 115
71 – 80 Years:	20 – 172	not determined

Deoxycorticosterone (DOC)

BLOOD ASSAYS

500124

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	20 – 105
34 – 36 Weeks, Day 4	28-78
NEWBORN	
	Levels are markedly elevated at birth and decrease rapidly during the first week to the range of 7-49 as found in older infants.
FULL–TERM INFANTS	
1 – 11 Months:	7 – 49
PREPUBERTAL CHILDREN	
2 – 10 Years:	2 – 34
PUBERTAL CHILDREN AND ADULTS	
8:00 a.m.:	2 – 19

Deoxypyridinolines, Urine (Includes Creatinine)

URINE ASSAYS

500127

	RANGE
ADULTS	
Males:	up to 5.4 nmole/mmole creatinine
Females:	
Premenopausal:	up to 7.4 nmole/mmole creatinine
Postmenopausal:	up to 8.5 nmole/mmole creatinine

Results higher than the above ranges indicate an accelerated bone resorption rate.

Desoxycortisol,11-,(Compound S for Metyrapone Test)

BLOOD ASSAYS

500136

	RANGE (ug/dL)
CHILDREN AND ADULTS	
Baseline:	< 1
Post Metyrapone:	
Single Dose Test:	7 – 18
Multiple Dose Test:	10 – 25

Desoxycortisol,11-,(Specific Compound S)

BLOOD ASSAYS

500132

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	110 – 1376
31 – 35 Weeks, Day 4:	48 – 579
FULL–TERM INFANTS	
3 Days:	13 – 147
31 Days – 11 Months:	< 10 – 156
PREPUBERTAL CHILDREN	
8:00 a.m.:	20 – 155
PUBERTAL CHILDREN AND ADULTS	
8:00 a.m.:	12 – 158

Dexamethasone

BLOOD ASSAYS

500140

	RANGE (ng/dL)
ADULTS	
Baseline:	< 30
8:00 a.m.	140 – 295
Following 1 mg Dexamethasone, Previous Evening	
8:00 a.m.	1600 – 2850
Following 8 mg Dexamethasone, (4 x 2 mg Doses) Previous Day	

Dihydrotestosterone (DHT)

BLOOD ASSAYS

500144

	MALE RANGE (ng/dL)	FEMALE RANGE (ng/dL)
PREMATURE INFANTS	10 – 53	2 – 13
FULL–TERM NEWBORNS	5 – 60	< 2 – 15

RANGE (ng/dL)

FULL–TERM NEWBORNS

2 Weeks – 6 Months:

Male: DHT decreases rapidly the first week,then increases to 12–85 ng/dL between 30–60 days. Levels then decrease gradually to prepubertal values by seven months.

Female: Levels decrease during the first month to < 3 ng/dL and remain there until puberty.

PREPUBERTAL CHILDREN < 3

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	< 3		1	< 9.2	< 3	
2	9.8 – 14.5	3 – 17	8	2	9.2 – 13.7	5 – 12	8
3	10.7 – 15.4	8 – 33	19	3	10.0 – 14.4	7 – 19	12
4	11.8 – 16.2	22 – 52	36	4	10.7 – 15.6	4 – 13	7
5	12.8 – 17.3	24 – 65	43	5	11.8 – 18.6	3 – 18	9

RANGE (ng/dL)

ADULTS

Male: 30 – 85

Female: 4 – 22

Estradiol

BLOOD ASSAYS

500152

RANGE

NEWBORN Levels are markedly elevated at birth and fall rapidly during the first week to prepubertal values of < 1.5 ng/dL.

1 – 6 Months:

Male: Levels increase to 1.0 – 3.2 ng/dL between 30 and 60 days, then decline to prepubertal levels of < 1.5 ng/dL by six months.

1 – 11 Months:

Female: Levels increase to 0.5 – 5.0 ng/dL between 30 and 60 days, then decline to prepubertal levels of < 1.5 ng/dL during the first year.

PREPUBERTAL CHILDREN

1 – 10 Years: < 1.5 ng/dL

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	0.5 – 1.1	0.8	1	< 9.2	0.5 – 2.0	0.8
2	9.8 – 14.5	0.5 – 1.6	1.1	2	9.2 – 13.7	1.0 – 2.4	1.6
3	10.7 – 15.4	0.5 – 2.5	1.6	3	10.0 – 14.4	0.7 – 6.0	2.5
4	11.8 – 16.2	1.0 – 3.6	2.2	4	10.7 – 15.6	2.1 – 8.5	4.7
5	12.8 – 17.3	1.0 – 3.6	2.1	5	11.8 – 18.6	3.4 – 17	11

ADULTS

Male: 0.8 – 3.5 ng/dL

Female:

Follicular: 3 – 10 ng/dL

Luteal: 7 – 30 ng/dL

Postmenopausal: < 1.5 ng/dL

Estrogens, Total

BLOOD ASSAYS

500148

RANGE

FULL–TERM INFANTS

Newborn: Markedly elevated at birth and fall rapidly during the first week to < 2.5 by seven days.

30 Days – 11 Months:

Male: Levels increase to 1.0 – 4.0 between 30 – 60 days then decline to < 2.5 by 12 months

Female: Levels increase to 1.0 – 6.0 between 30 – 60 days then decline to < 2.5 by 12 months

PREPUBERTAL CHILDREN

1 – 10 Years: < 2.5 ng/dL

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	1.0 – 3.8	2.0	1	< 9.2	1.0 – 4.6	2.3
2	9.8 – 14.5	1.7 – 4.5	3.0	2	9.2 – 13.7	2.2 – 6.3	4.1
3	10.7 – 15.4	2.2 – 5.5	4.1	3	10.0 – 14.4	2.4 – 11	6.1
4	11.8 – 16.2	2.7 – 8.0	5.3	4	10.7 – 15.6	4 – 18	9.1
5	12.8 – 17.3	2.5 – 8.0	5.0	5	11.8 – 18.6	6 – 28	17

ADULTS

Male: 2 – 8 ng/dL

Female:

Follicular: 6 – 20 ng/dL

Luteal: 16 – 40 ng/dL

Postmenopausal: < 5 ng/dL

* Esoterix' assay is specific for estrone and estradiol,and does not measure estriol.

Estrone

BLOOD ASSAYS

500172

RANGE

NEWBORN Values are strikingly elevated at birth,then decrease rapidly during the first week to prepubertal levels of < 1.5.

PREPUBERTAL CHILDREN

1 – 10 Years: < 1.5 ng/dL

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	0.5 – 1.7	1.1	1	< 9.2	0.4 – 2.9	1.3
2	9.8 – 14.5	1.0 – 2.5	1.6	2	9.2 – 13.7	1.0 – 3.3	2.1
3	10.7 – 15.4	1.5 – 2.5	2.1	3	10.0 – 14.4	1.5 – 4.3	3.0
4	11.8 – 16.2	1.5 – 4.5	3.3	4	10.7 – 15.6	1.6 – 7.7	3.6
5	12.8 – 17.3	2.0 – 4.5	3.2	5	11.8 – 18.6	2.9 – 10.5	6.1

ADULTS

Male: 1.0 – 5.0 ng/dL

Female:

Follicular: 3.0 – 10 ng/dL

Luteal: 9.0 – 16 ng/dL

Postmenopausal: < 4.0 ng/dL

Ferritin, Serum

BLOOD ASSAYS

500180

	RANGE
ADULT	
Male:	24 – 336 ng/mL
Female:	11 – 307 ng/mL

Folic Acid

BLOOD ASSAYS

500706

RANGE

3 – 21 ng/mL

Follicle Stimulating Hormone (FSH) ICMA

BLOOD ASSAYS

500192 *(Expressed in terms of W.H.O. International Standard, Human Pituitary FSH 83/575)*

RANGE (mIU/mL)

INFANTS

4 Weeks – 11 Months:

Male: 0.16 – 4.1
Levels are for infants from 4 weeks of age to one year. FSH in males declines to prepubertal levels by the end of the first year.

Female: 0.24 – 14.2
Levels are for infants from 4 weeks of age to one year. FSH declines more slowly than in males to reach prepubertal levels by the end of the second year.

PREPUBERTAL CHILDREN	MALE	FEMALE
12 Months – 8 Years:	0.26 – 3.0	1.0 – 4.2

PUBERTY

TANNER STAGE	AGE (years)	RANGE (mIU/mL)	MEAN (mIU/mL)	TANNER STAGE	AGE (years)	RANGE (mIU/mL)	MEAN (mIU/mL)
MALE				FEMALE			
1	< 9.8	0.26 – 3.0	0.98	1	< 9.2	1.0 – 4.2	2.1
2	9.8 – 14.5	1.8 – 3.2	2.5	2	9.2 – 13.7	1.0 – 10.8	4.0
3	10.7 – 15.4	1.2 – 5.8	2.9	3	10.0 – 14.4	1.5 – 12.8	5.1
4	11.8 – 16.2	2.0 – 9.2	4.4	4	10.7 – 15.6	1.5 – 11.7	6.4
5	12.8 – 17.3	2.6 – 11.0	6.1	5	11.8 – 18.6	1.0 – 9.2	4.9

ADULT

Males 20 – 50 Years: 2.0 – 9.2

Females 18 – 34 Years:
Follicular & Luteal: 1.8 – 11.2
Mid–cycle: 6 – 35

Post Menopausal: 30 – 120

Fructosamine

BLOOD ASSAYS

500608

RANGE

< 285 umol/L

Gastrin

BLOOD ASSAYS

500200

	RANGE (pg/mL)
NEWBORN	
1 – 7 Days:	20 – 300

Following an 8 – 12 hour overnight fast:

CHILDREN	0 – 125
ADULTS	0 – 100

Glucagon, Plasma

BLOOD ASSAYS

500204

	RANGE
CHILDREN AND ADULTS	
Fasting:	50 – 150 pg/mL

Glutamic Acid Decarboxylase (GAD-65) Autoantibodies

BLOOD ASSAYS

500236

	RANGE
ALL AGES	< 0.5 U/mL

Growth Hormone Antibodies

BLOOD ASSAYS

500214

	RANGE
ALL AGES	Negative

Growth Hormone Binding Protein (GHBP)

BLOOD ASSAYS

500209

	RANGE (pmol/L)
CHILDREN	
Under 2 Years:	<125 – 762
3 – 10 Years:	267 – 1638
10 – 15 Years:	431 – 1892
ADULTS	
20 – 50 Years:	686 – 2019
LARON DWARFISM	< 125

Growth Hormone, ICMA

BLOOD ASSAYS

500213

	RANGE
ALL AGES	0 – 6 ng/mL

NOTE: GH is secreted episodically. An individual may have levels ranging from undetectable to elevated over the course of a day.

RESPONSE TESTING (CHILDREN AND ADULTS):
GH response to provocative stimuli among normal individuals is highly variable. Response values greater than 6 ng/mL using two-site assays have historically been considered to reflect normal GH secretory function,while values below 6 ng/mL have been considered to indicate some degree of GH deficiency. However, it should be noted that this limit is arbitrarily derived. A significant percentage of normal controls exhibit response values well below this 6 ng/mL limit. The clinical research literature should be consulted for a more recent detailed review of the interpretation of GH response data.

Growth Hormone, RIA

BLOOD ASSAYS

500212

	RANGE (ng/mL)
NEWBORN	
1 Day:	5 – 53
2 – 7 Days:	5 – 27
31 Days – 11 Months:	2 – 10

Following an 8 – 12 hour overnight fast:

CHILDREN	0 – 6
ADULTS	0 – 6

RESPONSE TESTING (CHILDREN AND ADULTS):
The assessment of GH secretory capacity is complicated because of the episodic nature of GH release from the pituitary. Basal GH levels can exhibit considerable variability throughout a 24-hour period, thus limiting their clinical utility. Alternatively, measurement of GH response to various stimuli has commonly been used to improve the diagnostic assessment of GH secretion.GH response to provocative stimuli among normal individuals, however, is highly variable. Response values greater than 10 ng/mL have historically been considered to reflect normal GH secretory function,while values below 10 ng/mL have been considered to indicate some degree of GH deficiency. However, it should be noted that this limit is arbitrarily derived. A significant percentage of normal controls exhibit response values well below this 10 ng/mL limit. The clinical research literature should be consulted for a more recent detailed review of the interpretation of GH response data.

Growth Hormone, Urine (Includes Creatinine)

URINE ASSAYS

500211

	RANGE (ng/g creatinine)
Overnight Collection	
PREPUBERTAL CHILDREN	
1 – 8 Years	7.5 – 42
PUBERTAL CHILDREN	
9 – 18 Years	6.7 – 39
ADULTS	
19 – 43 Years	0.2 – 14.8
24 hr Collection	
PREPUBERTAL CHILDREN	
1 – 8 Years	10.2 – 30.1
PUBERTAL CHILDREN	
9 – 18 Years	9.3 – 29
ADULTS	
19 – 43 Years	0.2 – 13

Hemoglobin A1c

BLOOD ASSAYS

502080

	RANGE
ADULTS	4.2% – 5.9%

Homovanillic Acid (HVA), Urine (Includes Creatinine)

URINE ASSAYS

500218

	RANGE (mg/24 hours)	RANGE (mg/g creatinine)
CHILDREN		
Birth – 1 Year:	Not Determined	5 – 21
1 – 2 Years:	Not Determined	9 – 16
2 – 8 Years:	Not Determined	3 – 16
8 – 15 Years:	Not Determined	4 – 15
ADULTS	0.7 – 7.8	1.1 – 6.3

Hydroxycorticosteroids, 17, Urine (Includes Creatinine)

URINE ASSAYS

500216

Glenn–Nelson Procedure

	RANGE (mg/24 hours)	RANGE (mg/g creatinine)
PREPUBERTAL CHILDREN		
1 – 4 Years:	0.2 – 2.5	1.7 – 6.4
5 – 9 Years:	0.5 – 2.5	2.2 – 6.0
PUBERTAL CHILDREN AND ADULTS		
Male:	3 – 10	2.4 – 4.3
Female:	2 – 6	1.6 – 3.6

Hydroxycorticosterone, 18

BLOOD ASSAYS

500088

	18–OH–Corticosterone RANGE (ng/dL)	18–OH–Corticosterone/ Aldosterone Ratio RANGE (ng/dL)
PREMATURE INFANTS		
26 – 28 Weeks, Day 4:	10 – 670	1.0 – 4.5
31 – 35 Weeks, Day 4:	57 – 410	1.1 – 5.2
FULL–TERM INFANTS		
3 Days:	31 – 546	2.6 – 5.3
31 Days – 11 Months:	5 – 220	2.3 – 6.0
CHILDREN		
12 – 23 Months:	18 – 155	1.7 – 5.0
24 Months – 9 Years:	6 – 85	2.4 – 10.5
10 – 14 Years:	10 – 72	2.0 – 8.3
ADULTS		
	9 – 58	1.7 – 8.8
8:00 a.m.Supine	4 – 21	
8:00 a.m. Upright	5 – 46	

Samples were collected without regard to posture from subjects on *ad lib* sodium intake. For additional information on the effects of posture and sodium intake, contact the laboratory.

Hydroxyindoleacetic Acid, 5- (5-HIAA), Urine (Includes Creatinine)

URINE ASSAYS

500215

	RANGE(mg/24 hour)
ADULTS	< 16.0

Hydroxypregnenolone, 17-

BLOOD ASSAYS

500262

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	375 – 3559
31 – 35 Weeks, Day 4:	64 – 2380
FULL–TERM INFANTS	
3 Days:	10 – 829
1 – 5 Months:	36 – 763
6c11 Months:	42 – 540
PREPUBERTAL CHILDREN	
12 – 23 Months:	14 – 207
24 Months – 5 Years:	10 – 103
6 – 9 Years:	10 – 186
PUBERTAL AGE GROUPS	44 – 235
ADULTS	53 – 357

Hydroxyprogesterone, 17a-,(17-OHP)

BLOOD ASSAYS

500270

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	124 – 841
31 – 35 Weeks, Day 4:	26 – 568
FULL–TERM INFANTS	
3 Days:	7 – 77
Male 1 – 11 Months:	Levels increase after the first week to peak values ranging from 40 – 200 ng/dl between 30 and 60 days. Values then decline to prepubertal range before one year.
Female 1 – 11 Months :	13 – 106
PREPUBERTAL CHILDREN	
1 – 10 Years:	3 – 90

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	3 – 90	38	1	< 9.2	3 – 82	31
2	9.8 – 14.5	5 – 115	51	2	9.2 – 13.7	11 – 98	49
3	10.7 – 15.4	10 – 138	57	3	10.0 – 14.4	11 – 155	70
4	11.8 – 16.2	29 – 180	80	4	10.7 – 15.6	10 – 1300	290
5	12.8 – 17.3	24 – 175	97	5	11.8 – 18.6	20 – 265	108

ADULTS	MALE RANGE (ng/dL)	FEMALE RANGE (ng/dL)
	27 – 199	Follicular: 15 – 70 Luteal: 35 – 290

ICA-512 Autoantibodies *RUO*

BLOOD ASSAYS

500255

	RANGE
ALL AGES	< 1.0 U/mL

*Research Use Only

IGF Binding Protein-1 (IGFBP-1)

BLOOD ASSAYS

500283

	RANGE (ng/mL)
PREPUBERTAL CHILDREN	
Fasting:	30 – 1000
Random:	10 – 500
PUBERTAL CHILDREN	
Fasting:	20 – 200
Random:	20 – 100
ADULTS	
Fasting:	10 – 150
Random:	0 – 40

IGF Binding Protein-2 (IGFBP-2)

BLOOD ASSAYS

500284

	RANGE (ng/mL)
0 – 11 Months:	348 – 922
12 – 23 Months:	280 – 750
24 Months – 5 Years:	275 – 700
6 – 9 Years:	255 – 540
10 – 14 Years:	200 – 470
15 – 24 Years:	215 – 518
25 – 44 Years:	220 – 570
45 – 64 Years:	225 – 710
65 – 74 Years:	225 – 850
75 – 85 Years:	300 – 1038

IGF Binding Protein-3 (IGFBP-3)

BLOOD ASSAYS

500281

	RANGE (mg/L)	MEAN (mg/L)
PREMATURE INFANTS		
0 Days – 1 Month:	0.3 – 1.4	0.9
2 – 3 Months:	0.9 – 2.3	1.6
4 – 5 Months:	0.4 – 2.2	1.5
6 –11 Months:	1.0 – 2.3	1.5
FULL-TERM INFANTS		
0 Days – 1 Month:	0.4 – 1.7	0.9
2 – 3 Months:	0.5 – 2.1	1.3
4 – 5 Months:	0.6 – 2.4	1.4
6 –11 Months:	0.5 – 2.4	1.4
CHILDREN		
12 Months – 4 Years:	0.8 – 3.0	2.1
5 – 6 Years:	1.5 – 3.4	2.4
7 – 8 Years:	2.1 – 4.2	3.0
9 – 11 Years:	2.0 – 4.8	3.3
12 – 13 Years:	2.1 – 6.2	3.8
14 – 15 Years:	2.2 – 5.9	4.2
16 – 18 Years:	2.5 – 4.8	3.8
ADULTS		
19 – 30 Years:	2.0 – 4.2	3.0
31 – 70 Years:	1.9 – 3.6	2.7

IGF-I

BLOOD ASSAYS

500282

	TERM RANGE (ng/mL)	PRE–TERM* RANGE (ng/mL)
NEWBORNS AND INFANTS		
Birth:	15 – 109	21 – 93
1 Day – 2 Months:	15 – 109	23 – 163
3 – 4 Months:	7 – 124	23 – 171
5 – 6 Months:	7 – 93	15 – 132
7 – 11 Months:	15 – 101	15 – 179

* Values from preterm infants were determined at these ages from expected term gestation

	MALE	FEMALE
CHILDREN AND YOUNG ADULTS		
1 – 2 Years:	30 – 122	56 – 144
3 – 4 Years:	54 – 178	74 – 202
5 – 6 Years:	60 – 228	82 – 262
7 – 8 Years:	113 – 261	112 – 276
9 – 10 Years:	123 – 275	140 – 308
11 – 12 Years:	139 – 395	132 – 376
13 – 14 Years:	152 – 540	192 – 640
15 – 16 Years:	257 – 601	217 – 589
17 – 18 Years:	236 – 524	176 – 452
19 – 20 Years:	281 – 510	217 – 475
ADULTS		
21 – 30 Years:	155 – 432	87 – 368
31 – 40 Years:	132 – 333	106 – 368
41 – 50 Years:	121 – 237	118 – 298
51 – 60 Years:	68 – 245	53 – 287
61 – 70 Years:	60 – 220	75 – 263
71 – 80 Years:	36 – 215	54 – 205

IGF-II

BLOOD ASSAYS

500228

	RANGE (ng/mL)
PREPUBERTAL	334 – 642
PUBERTAL	245 – 737
ADULTS	288 – 736

Insulin

BLOOD ASSAYS

500220

	RANGE (uU/mL)
Following a 4 –12 hour fast:	
0 – 8 Years	0 – 13
PUBERTAL CHILDREN AND ADULTS	0 – 17
ADULTS	
2 Hours Post Meal (Sustacal):	7.6 – 26
2 Hours Post Glucose (75 gm):	15 – 53

Insulin Antibodies

BLOOD ASSAYS

500225

	BINDING CAPACITY (uU/mL)
CHILDREN:	
4 – 19 Years:	< 5.0
ADULTS:	
20 – 40 Years:	< 5.0
TYPE I DIABETES	5 – 420

Insulin, Free and Total

BLOOD ASSAYS

500226

RANGE

NON–DIABETIC

In the absence of insulin–binding antibodies, the free and total insulin assays are equivalent. However, this assay is intended for use in diabetics with insulin autoantibody present. Measurement is performed on acid–treated samples and, therefore, the sensitivity and absolute values by this method may differ from our direct insulin RIA.

Following a 4 – 12 hour fast:

INFANTS AND PREPUBERTAL CHILDREN	0 -13 uU/mL
PUBERTAL CHILDREN AND ADULTS	0 -17 uU/mL

INSULIN DEPENDENT DIABETIC PATIENTS

Total insulin levels are dependent on the binding capacity of circulating antibodies and the patient's insulin dose. Values range from about 50 uU/mL to more than 1000 uU/mL. Free insulin levels vary depending on the capacity and affinity of circulating insulin–binding antibodies and the dose of insulin given to the patient. Values range from non–diabetic levels up to about 100 uU/mL.

Iron

BLOOD ASSAYS

500648

	RANGE (ug/dL)
0 – 29 Days:	100 – 250
1 – 11 Months:	40 – 100
1 – 17 Years:	50 – 120
Males >/= 18 Years:	45 – 182
Females >/= 18 Years:	28 – 170

Ketosteroids, 17-,(17-KS), Urine (Includes Creatinine)

URINE ASSAYS

500230

	RANGE (mg/24 hours)	RANGE (mg/g creatinine)
CHILDREN		
1 – 4 Years	< 1.0 – 2.0	Not Determined
5 – 9 Years:	< 1.0 – 3.2	Not Determined
10 – 12 Years:	1.0 – 5.0	Not Determined
13 – 14 Years:	1.0 – 5.5	Not Determined
15 – 16 Years:		
Male:	3.0 – 13	Not Determined
Female:	2.5 – 8.0	Not Determined
ADULTS		
Male:	10 – 25	6 .7 – 12
Female:	6 – 14	5.6 – 10

Lactic Acid (Lactate) Dehydrogenase (LDH)

BLOOD ASSAYS

500642

	RANGE (IU/L)
0 – 4 Days:	290 – 775
4 – 9 Days:	545 – 2000
10 Days – 23 Months:	180 – 430
24 Months – 11 Years:	110 – 295
12 – 59 Years:	100 – 290
60 – 90 Years:	110 – 210
>/= 91 Years:	99 – 284

Leptin

BLOOD ASSAYS

500237

	RANGE (ng/mL) MALE	RANGE (ng/mL) FEMALE
ADULTS (BMI = 22)		
	0.7 – 5.3	3.3 – 18.3

Range is 5th – 95th percentile.

NOTE: Leptin values are gender–dependent and highly correlated with the Body Mass Index (BMI). This reference range is provided only for an average BMI value. Contact Esoterix to obtain reference ranges correlated with other BMI's. To obtain appropriate data, please furnish patient's age and sex, plus height and weight, or BMI.

Luteinizing Hormone (LH),ICMA

BLOOD ASSAYS

500234

RANGE (mIU/mL)

(Expressed In Terms of W.H.O. 2ND International Standard, Human Pituitary LH 80/552)

INFANTS

2 Weeks – 11 Months: Values begin to increase about two weeks after birth to a range of 0.02 – 7.0 mIU/mL within the first three months, then decline to prepubertal values by the end of the first year.

PREPUBERTAL CHILDREN

12 Months – 8 Years: 0.02 – 0.3

PUBERTY

TANNER STAGE	AGE (years)	RANGE (mIU/mL)	MEAN (mIU/mL)	TANNER STAGE	AGE (years)	RANGE (mIU/mL)	MEAN (mIU/mL)
MALE				FEMALE			
1	< 9.8	0.02 – 0.3	0.09	1	< 9.2	0.02 – 0.18	0.06
2	9.8 – 14.5	0.2 – 4.9	1.8	2	9.2 – 13.7	0.02 – 4.7	0.72
3	10.7 – 15.4	0.2 – 5.0	1.9	3	10.0 – 14.4	0.10 – 12.0	2.3
4 – 5	11.8 – 17.3	0.4 – 7.0	2.6	4 – 5	10.7 – 18.6	0.4 – 11.7	3.3

ADULTS

Male: 1.5 – 9.0 mIU/mL

Female:

Follicular: 2.0 – 9.0 mIU/mL

Mid–cycle: 18.0 – 49.0 mIU/mL

Luteal: 2.0 – 11.0 mIU/mL

Postmenopausal: 20.0 – 70.0 mIU/mL

Macroprolactin

BLOOD ASSAYS

500375

RANGE

< 50%

Magnesium

BLOOD ASSAYS

500652

	RANGE (mg/dL)
0 – 4 Months:	1.5 – 2.2
5 Months – 5 Years:	1.7 – 2.3
6 – 11 Years:	1.7 – 2.1
12 – 19 Years:	1.7 – 2.2
20 – 59 Years:	1.6 – 2.6
60 – 90 Years:	1.6 – 2.4
>/= 91 Years:	1.7 – 2.3

Melanocyte Stimulating Hormone (MSH) *RUO*

BLOOD ASSAYS

500361

	RANGE
ALL AGES	6 – 42 pg/mL

*Research Use Only

Metanephrines, Fractionated Urine

URINE ASSAYS

500240

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
NORMETANEPHRINE		
CHILDREN		
< 1 Year:	Not Determined	180 – 1900
1 – 2 Years:	Not Determined	250 – 830
2 – 8 Years:	Not Determined	150 – 735
8 – 15 Years:	Not Determined	95 – 705
ADULTS:	110 – 720	109 – 596
METANEPHRINE		
CHILDREN		
< 1 Year:	Not Determined	150 – 310
1 – 2 Years:	Not Determined	60 – 250
2 – 8 Years:	Not Determined	55 – 460
8 – 15 Years:	Not Determined	70 – 380
ADULTS	35 – 278	22 – 205

Pediatric values were determined on both random and overnight urine collections.

Metanephrines, Total, Urine (Includes Creatinine)

URINE ASSAYS

500242

	RANGE (ug/24 hours)	RANGE (ug/g creatinine)
CHILDREN		
Birth – 1 Year:	Not Determined	410 – 2000
1 – 2 Years:	Not Determined	300 – 1200
2 – 8 Years:	Not Determined	200 – 900
8 – 15 Years:	Not Determined	140 – 830
ADULTS	300 – 900	180 – 700

Pediatric values were determined on both random and overnight collections.

Microalbumin, Urine (Includes Creatinine)

URINE ASSAYS

502440

	RANGE (mg/24 hours)	RANGE (mg/g creatinine)
ADULTS		
Overnight Collection:		< 15
24 Hour Collection:	< 25	< 20

N-Telopeptides, Urine (Includes Creatinine)

URINE ASSAYS

500247

	RANGE (nmoles BCE/mmole creatinine)
ADULTS	
Males and Premenopausal Females:	10 – 65
Postmenopausal Females:	25 – 110
Post Therapy:	Three to six months following effective therapy, N-Telopeptide values should decline to ≤ 35 nmoles BCE/mmole creatinine or decrease by ≥ 40% of base line value

BCE = Bone Collagen Equivalents

NOTE: Individuals exhibit significant daily variation in N-Telopeptide excretion. Post-menopausal values also vary over a wide range depending upon the stage of menopause and the rate of bone resorption. Results are most useful when compared to a baseline value.

Osmolality, Serum

BLOOD ASSAYS

500709

RANGE

275 – 295 mOsm/kg H_2O

Osmolality, Urine

URINE ASSAYS

500711

	RANGE mOsm/kg H_2O
NEONATES	75 – 300
CHILDREN AND ADULTS	250 – 900

Osteocalcin

BLOOD ASSAYS

500245

	RANGE (ng/mL)
0 – 11 Months:	5 – 25
PREPUBERTAL CHILDREN	
12 Months – 7 Years:	5 – 60
PUBERTAL CHILDREN	
8 – 9 Years:	30 – 103
10 – 11 Years:	37 – 154
12 – 15 Years:	42 – 225
ADULTS	2 – 22

Parathyroid Hormone, Intact (IPTH) (Includes Calcium)

BLOOD ASSAYS

500246

	RANGE
CHILDREN AND ADULTS	<10 – 65 pg/mL

Parathyroid Hormone, Mid-Region (MPTH) (Includes Calcium)

BLOOD ASSAYS

500250

	RANGE
NEWBORN	PTH levels increase up to 2.5 times the adult normal range in the first few days of life, then fall to within the adult normal range by about six months.
CHILDREN AND ADULTS	10 – 80 EQ/mL With normal calcium

Phosphorus

BLOOD ASSAYS

500638

	RANGE (mg/dL)
CORD	3.7 – 8.1
Premature Up To 1 Week After Birth:	5.4 – 10.9
0 – 9 Days	4.5 – 9.0
10 – 29 Days	4.5 – 6.7
30 – 1 Year	4.5 – 6.7
2 – 11 Years	4.5 – 5.5
12 – 60 Years	2.7 – 4.5
Males >/= 61 Years	2.3 – 3.7
Femles >/= 61 Years	2.8– 4.1

Phosphorus, 24-hour urine

URINE ASSAYS

500384

RANGE
0.4 – 1.3 g/24 hrs

Pregnanetriol, Urine (Includes Creatinine)

URINE ASSAYS

500256

	RANGE (mg/g creatinine)
INFANTS	Not determined
CHILDREN	0.1 – 0.9
ADULTS	0.1 – 1.6

Pregnenolone

BLOOD ASSAYS

500258

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	260 – 2104
NEONATES	
1 – 7 Days:	150 – 2000

Levels decrease after birth, and are within the prepubertal range by three months.

PREPUBERTAL CHILDREN	20 – 140
PUBERTAL AND ADULTS	< 20 – 150

Progesterone

BLOOD ASSAYS

500266

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 28 Weeks, Day 4:	18 – 640
31 – 35 Weeks, Day 4:	84 – 1360
FULL–TERM INFANTS	
1 – 7 Days:	Progesterone levels are markedly elevated in the neonate but fall rapidly to reach prepubertal levels of 7 – 52 by seven days where they remain until puberty.
PREPUBERTAL CHILDREN	
1 – 10 Years:	7 – 52

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	< 10 – 33	22	1	< 9.2	< 10 – 33	22
2	9.8 – 14.5	< 10 – 33	22	2	9.2 – 13.7	< 10 – 55	32
3	10.7 – 15.4	< 10 – 48	26	3	10.0 – 14.4	10 – 450	37
4	11.8 – 16.2	10 – 108	36	4	10.7 – 15.6	10 – 1300	290
5	12.8 – 17.3	21 – 82	39	5	11.8 – 18.6	10 – 950	160

ADULTS

Male:	13 – 97 ng/dL
Female:	
Follicular:	15 – 70 ng/dL
Luteal:	200 – 2500 ng/dL

Proinsulin, Plasma

BLOOD ASSAYS

500272

	PROINSULIN RANGE (pM/L)	PROINSULIN/INSULIN* (Molar Ratio As %) RANGE
NORMAL CHILDREN		
Fasting:	1.8 – 10	6.4 – 16
NORMAL ADULTS		
Fasting:	1.7 – 12	3.4 – 21

* Ratio calculated using actual insulin value, not the sum of insulin and proinsulin in the denominator.

Prolactin

BLOOD ASSAYS

500274

	RANGE (ng/mL)
NEWBORN	
1 – 7 Days:	30 – 495
1 – 8 Weeks:	Values decline during the first two months of life to those observed in adult males 3-18 and females 3-24.
CHILDREN AND ADULTS	
Male:	3 – 18
Female:	3 – 24

Prostate Specific Antigen (PSA)

BLOOD ASSAYS

500277

RANGE

< 4.0 ng/mL

Renin, Plasma (Plasma Renin Activity)

BLOOD ASSAYS

500278

	RANGE (ng/dL/hr)
PREMATURE	
1 – 7 Days:	1100 – 16,700
FULLTERM	
1 – 7 Days:	200 – 3500

Plasma renin activity in newborns is elevated and highly variable. Premature infants generally exhibit substantially higher values ranging from 1100 – 16,700 ng/dL/hr.

CHILDREN*	
31 Days – 11 Months:	235 – 3700
12 Months – 2 Years:	171 – 1115
3 – 4 Years:	100 – 650
5 – 9 Years:	50 – 585
10 – 14 Years:	50 – 330

	SUPINE RANGE (ng/dL/hr)	UPRIGHT RANGE (ng/dL/hr)
ADULTS**	20 – 160	70 – 330

* Normal Sodium Diet, Supine Posture
** Normal Sodium Diet

NOTE: Normal studies of plasma renin activity in young children and adolescents are incomplete.

Sex Hormone Binding Globulin (SHBG),Binding Capacity Assay

BLOOD ASSAYS

500298

	RANGE (ug/dL)	RANGE (ug/dL)
INFANTS		
1 Month – 2 Years:	1.5 – 6.3	
PREPUBERTAL CHILDREN		
2 – 8 Years:	1.8 – 5.5	
	MALE	**FEMALE**
PUBERTAL AGES	0.4 – 2.5	0.9 – 3.2
ADULTS	0.5 – 1.5	1.0 – 3.0

Sex Hormone Binding Globulin (SHBG),IRMA

BLOOD ASSAYS

500299

	RANGE (nmol/L)
INFANTS	
1 Month – 2 Years:	60 – 252
PREPUBERTAL CHILDREN	
1 – 8 Years:	72 – 220
PUBERTAL AGES	
Males:	16 – 100
Females:	36 – 125
ADULTS	
Males:	20 – 60
Females:	
Premenopausal	40 – 120
Postmenopausal	28 – 112

Testosterone, Bioavailable

BLOOD ASSAYS

500288

	RANGE(ng/dL)
INFANTS AND PREPUBERTAL CHILDREN	
1 – 9 Years:	< 0.2 – 1.3 ng/dL

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	< 0.2 – 3.4		1	< 9.2	< 0.2 – 3.4	
2	9.8 – 14.5	2 – 58	12	2	9.2 – 13.7	0.8 – 4.7	3.6
3	10.7 – 15.4	12 – 70	30	3	10.0 – 14.4	1.1 – 9.6	4.7
4 – 5	11.8 – 17.3	84 – 350	210	4 – 5	10.7 – 18.6	2.3 – 13.9	6.1

ADULTS	**RANGE (ng/dL)**
Male:	
20 – 39 Yrs:	128 – 430
40 – 49 yrs	95 – 350
50 – 69 yrs	95 – 285
70 – 79 yrs	60 – 240
Female:	1.1 – 14.3

NOTE: For additional information on interpretation of Bioavailable Testosterone levels, contact the laboratory.

Testosterone, Free

BLOOD ASSAYS

500290

	MALE RANGE (pg/mL)	FEMALE RANGE (pg/mL)
FULL–TERM INFANTS		
1 – 15 Days:	1.5 – 31	0.5 – 2.5
1 – 2 Months:	3.3 – 18	0.1 – 1.3
3 – 4 Months:	0.7 – 14	0.3 – 1.1
5 – 6 Months:	0.4 – 4.8	0.2 – 0.6
PREPUBERTAL CHILDREN		
1 – 10 Years:	0.15 – 0.6	Same as males
PUBERTY	Comprehensive values for free testosterone by dialysis for both males and females throughout puberty are currently unavailable.	
ADULTS	52 – 280	1.1 – 6.3

% FREE TESTOSTERONE

	MALE RANGE (%)	FEMALE RANGE (%)
FULL–TERM INFANTS		
1 – 15 Days:	0.9 – 1.7	0.8 – 1.5
1 – 2 Months:	0.4 – 0.8	0.4 – 1.1
3 – 4 Months:	0.4 – 1.1	0.5 – 1.0
5 – 6 Months:	0.4 – 1.0	0.5 – 0.8
PREPUBERTAL CHILDREN		
1 – 10 Years:	0.4 – 0.9	Same as males
PUBERTY	Comprehensive values for free testosterone by dialysis for both males and females throughout puberty are currently unavailable.	
ADULTS	1.5 – 3.2	0.8 – 1.4

Testosterone, Total

BLOOD ASSAYS

500286

	MALE RANGE (ng/dL)	FEMALE RANGE (ng/dL)
PREMATURE INFANTS		
26 – 28 Weeks, Day 4:	59 – 125	5 – 16
31 – 35 Weeks, Day 4:	37 – 198	5 – 22
	RANGE (ng/dL)	
FULL–TERM INFANTS		
Newborns 1 – 7 Months:	75 – 400	20 – 64

Male: Levels decrease rapidly the first week to 20 – 50 ng/dL,then increase to 60 – 400 ng/dL (Mean = 190) between 20 – 60 days. Levels then decline to prepubertal range of < 3 – 10 by seven months.

Female: Levels decrease during the first month to <10 ng/dL and remain there until puberty.

PREPUBERTAL CHILDREN

1 – 10 Years: < 3 – 10

PUBERTY

TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)	TANNER STAGE	AGE (years)	RANGE (ng/dL)	MEAN (ng/dL)
MALE				FEMALE			
1	< 9.8	< 3 – 10	4.9	1	< 9.2	< 3 – 10	4.9
2	9.8 – 14.5	18 – 150	42	2	9.2 – 13.7	7 – 28	18
3	10.7 – 15.4	100 – 320	190	3	10.0 – 14.4	15 – 35	25
4	11.8 – 16.2	200 – 620	372	4	10.7 – 15.6	13 – 32	22
5	12.8 – 17.3	350 – 970	546	5	11.8 – 18.6	20 – 38	28

ADULTS 20 – 50 Years	**RANGE (ng/dL)**
Male:	350 – 1030
Female:	
Premenopausal:	10 – 55
Postmenopausal:	7 – 40

Thyroglobulin (w/Anti-thyroglobulin Screen), Comprehensive

BLOOD ASSAYS

500316

	RANGE (ng/mL)	MEAN (ng/mL)
THYROGLOBULIN ICMA		
PREPUBERTAL CHILDREN	2.9 – 56	17
PUBERTAL CHILDREN AND ADULTS	1.3 – 37	8.5
THYROGLOBULIN RIA		
INFANTS		
1 – 12 Months	12 –113	42
PREPUBERTAL CHILDREN	5 – 72	29
PUBERTAL CHILDREN AND ADULTS	< 3 – 39	16

Thyroglobulin Antibodies (Anti-Tg)

BLOOD ASSAYS

500038

	RANGE (IU/mL)
ALL AGES	0 – 100

Thyroid Peroxidase Antibodies (Anti-TPO)

BLOOD ASSAYS

500042

	RANGE (IU/mL)
ALL AGES	0 – 20

Thyroid Stimulating Hormone (TSH),ICMA

BLOOD ASSAYS

500305

	RANGE (uU/mL)
PREMATURE INFANTS	
26 – 32 Weeks, 3 – 4 Days:	0.8 – 6.9
FULL TERM INFANTS	
4 Days:	1.3 – 16
Newborns:	TSH surges within the first 15 – 60 minutes of life reaching peak levels between 25 – 60 at about 30 minutes. Values then decline rapidly and after one week are within the dult normal range.
1 – 11 Months:	0.9 – 7.7
PREPUBERTAL CHILDREN	0.6 – 5.5
PUBERTAL CHILDREN AND ADULTS	0.5 – 4.8

Thyroxine (T-4)

BLOOD ASSAYS

500310

	RANGE (ug/dL)
PREMATURE INFANTS	
26 – 30 Weeks, 3 – 4 Days:	2.6 – 14.0
FULL–TERM INFANTS	
1 – 3 Days:	8.2 – 19.9
1 Week:	6.0 – 15.9
1 – 11 Months:	6.1 – 14.9
PREPUBERTAL CHILDREN	
12 Months – 2 Years:	6.8 – 13.5
3 – 9 Years:	5.5 – 12.8
PUBERTAL CHILDREN	
11 – 17 Years:	4.9 – 13.0
ADULTS	4.2 – 13.0

Thyroxine Binding Globulin (TBG)

BLOOD ASSAYS

500318

	RANGE (mg/dL)	T-4/TBG RATIO
PREMATURE INFANTS		
26 – 30 Weeks, 3 – 4 Days:	1.2 – 3.8	2.2 – 3.7
INFANTS		
31 Days – 23 Months:	2.1 – 6.0	2.1 – 4.3
PREPUBERTAL CHILDREN		
2 – 9 Years:	2.0 – 5.3	1.7 – 4.0
PUBERTAL CHILDREN AND ADULTS	1.8 – 4.2	1.8 – 4.5
TBG DEFICIENCY	0.1 – 0.9	4 – 42

Thyroxine, Free

BLOOD ASSAYS

500314

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 30 Weeks, 3 – 4 Days:	0.4 – 2.8
FULL–TERM INFANTS	
3 Days:	2.0 – 4.9
1 – 11 Months:	0.9 – 2.6
PREPUBERTAL CHILDREN	0.8 – 2.2
PUBERTAL CHILDREN AND ADULTS	0.8 – 2.3

Transferrin Saturation (Iron, Unsaturated Iron Binding Capacity), Serum

BLOOD ASSAYS

500745

	RANGE (% SATURATION)
MALES	20 – 50
FEMALES	15 – 50

Triiodothyronine (T-3)

BLOOD ASSAYS

500322

	RANGE (ng/dL)
PREMATURE INFANTS	
26 – 30 Weeks, 3 – 4 Days:	24 – 132
FULL–TERM INFANTS	
1 – 3 Days:	89 – 405
1 Week:	91 – 300
1 – 11 Months:	85 – 250
PREPUBERTAL CHILDREN	119 – 218
PUBERTAL CHILDREN	
11 – 17 Years:	80 – 185
ADULTS	55 – 170

Triiodothyronine, Free Only

BLOOD ASSAYS

500323

	RANGE (pg/mL)
ADULTS	2.3 – 4.2

Triiodothyronine, Reverse *RUO*

BLOOD ASSAYS

500326

	RANGE (ng/dL)
NEWBORNS	90 – 250

Reverse T–3 levels are elevated at birth and during the first few days of life. Values then decrease rapidly and are within the adult range by one week.

CHILDREN AND ADULTS 10 – 50

TSH Receptor Antibody (TR Ab)

BLOOD ASSAYS

500308

	RANGE
TSH Binding Inhibition Index	
ALL AGES	0 – 14

Vanillylmandelic Acid (VMA), Urine (Includes Creatinine)

BLOOD ASSAYS

500330

	RANGE (mg/24 hours)	RANGE (mg/g creatinine)
CHILDREN		
Birth – 1 Year:	Not Determined	3 – 17
1 – 2 Years:	Not Determined	4 – 12
2 – 8 Years:	Not Determined	2 – 11
8 – 15 Years:	Not Determined	2 – 11
ADULTS	0.7 – 6.8	1.5 – 7.0

Pediatric values were determined on both random and 8 hour urine collections.

Vitamin B-12

BLOOD ASSAYS

500334

RANGE

200 – 980 pg/mL

Vitamin D, 1,25-Dihydroxy

BLOOD ASSAYS

500342

	RANGE (pg/mL)
NEWBORNS	
0 – 30 Days	8 – 72
INFANTS AND CHILDREN	
31 Days – 17 Years	15 – 90
ADULTS	
> 18 Years	21 – 65

Vitamin D, 25-Hydroxy

BLOOD ASSAYS

500338

	RANGE (ng/mL)
NEWBORNS	5 – 42
CHILDREN AND ADULTS	10 – 55

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   As used herein, Tanner stages in males encompass development of both pubic hair and genitalia. In females, each stage encompasses both pubic hair and breast development. While this expands the chronological age range for each stage of pubertal development, it results in a better correlation with hormonal values.

4. Day of cycle not determined for pubertal females.

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30. Follicular and luteal phases only; does not include midcycle peak.

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
ACTH (Corticotropin)	pmol/L	4.5000	pg/mL
Antidiuretic Hormone (ADH)	pmol/L	1.0840	pg/mL
Albumin	g/L	0.1000	g/dL
Aldosterone, Serum	pmol/L	0.0360	ng/dL
Aldosterone, Urine	nmol/d	0.3604	ug/24 h
Aldosterone/Creatinine	nmol/mmol	3.1859	ug/g
Androstanediol	pmol/L	0.0292	ng/dL
Androstanediol Glucuronide	pmol/L	0.0469	ng/dL
Androstenedione	pmol/L	0.0286	ng/dL
Androsterone, Urine	umol/d	0.2905	mg/24 h
Androsterone/Creatinine	umol/mmol	2.5680	mg/g
Angiotensin I	pmol/L	1.2960	pg/mL
Angiotensin II	pmol/L	1.0460	pg/mL
Angiotensin III	pmol/L	0.9310	pg/mL
Angiotensin I Converting Enzyme	U/L	1.0000	mU/mL
Atrial Natriuretic Peptide (ANP)	pmol/L	3.0800	pg/mL
C-Peptide	nmol/L	3.0210	ng/mL
C-Peptide, Urine	nmol/L	3.0210	ng/mL
C-Peptide/Creatinine	nmol/mmol	26.7109	ug/g
Calcitonin	pmol/L	3.4180	pg/mL
Calcium	mmol/L	4.0080	mg/dL
Calcium, Urine	mmol/d	40.0800	mg/24 h

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Catecholamines, Urine	nmol/d	0.1762	ug/24 h
Catecholamines/Creatinine	nmol/mmol	1.5572	ug/g
Corticosterone	pmol/L	0.0347	ng/dL
18-Hydroxycorticosterone	pmol/L	0.0362	ng/dL
Cortisol, Serum	nmol/L	0.0363	ug/dL
Cortisol, Urine	nmol/d	0.3625	ug/24 h
Cortisol/Creatinine	nmol/mmol	3.2045	ug/g
Cortisone	pmol/L	0.0361	ng/dL
Creatinine, Urine	umol/d	0.1131	mg/24 h
Cyclic Amp, Urine	umol/L	1.0000	nmol/mL
Cyclic Amp/Creatinine	nmol/mmol	0.0088	umol/g
Dehydroepiandrosterone (DHEA)	pmol/L	0.0288	ng/dL
Dehydroepiandrosterone-Sulfate (DHEA-S)	nmol/L	0.0368	ug/dL
Deoxycorticosterone (DOC)	pmol/L	0.0331	ng/dL
18-Hydroxydeoxycorticosterone (18-OH-DOC)	pmol/L	0.0347	ng/dL
11-Desoxycortisol (Compound S)	pmol/L	0.0346	ng/dL
Dexamethasone	pmol/L	0.0393	ng/dL
Dihydrotestosterone (DHT)	pmol/L	0.0290	ng/dL
Dopamine, Plasma	pmol/L	0.1530	pg/mL
Dopamine, Urine	nmol/d	0.1530	ug/24 h

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Dopamine/Creatinine	nmol/mmol	1.3528	ug/g
Endorphin, Beta	pmol/L	4.0000	pg/mL
Epinephrine, Plasma	pmol/L	0.1831	pg/mL
Ephinephrine, Urine	nmol/d	0.1831	ug/24 h
Epinephrine/Creatinine	nmol/mmol	1.6186	ug/g
Estradiol	pmol/L	0.0272	ng/dL
Estriol	pmol/L	0.0288	ng/dL
Estrogens, Serum	pmol/L	0.0271	ng/dL
Estrone	pmol/L	0.0270	ng/dL
Estrone Sulfate	pmol/L	0.0350	ng/dL
Folic Acid	pmol/L	0.0441	ng/dL
Follicle Stimulating Hormone (FSH)	IU/L	1.0000	mIU/mL
Follicle Stimulating Hormone, Urine	IU/d	1.0000	IU/24 h
FSH/Creatinine	IU/mmol	8.8420	IU/g
Gastrin	ng/L	1.0000	pg/mL
Glucagon	ng/L	1.0000	pg/mL
Growth Hormone	ug/L	1.0000	ng/mL
Human Chorionic Gonadotropin (HCG)	IU/L	1.0000	mIU/mL
HCG, Urine	IU/d	1.0000	IU/24 h
HCG/Creatinine	IU/mmol	8.8420	IU/g
5-Hydroxyindoleacetic Acid (5-HIAA), Urine	nmol/d	0.1912	ug/24 h

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
5-HIAA/Creatinine	nmol/mmol	1.6906	ug/g
Homovanillic Acid (HVA), Urine	nmol/d	0.1822	ug/24 h
HVA/Creatinine	nmol/mmol	1.6110	ug/g
17-Hydroxycorticosteroids, Urine	nmol/d	0.3625	ug/24 h
17-Hydroxycorticosteroids/Creatinine	nmol/mmol	3.2045	ug/g
IGF-I (Somatomedin C)	nmol/L	7.6490	ng/mL
IGF-II	nmol/L	7.5000	ng/mL
Inhibin	U/L	0.0010	U/mL
Insulin	pmol/L	0.1394	uU/mL
17-Ketosteroids, Urine	umol/d	0.2884	mg/24 h
17-Ketosteroids/Creatinine	umol/mmol	2.5495	mg/g
Luteinizing Hormone (LH)	IU/L	1.0000	mIU/mL
Luteinizing Hormone, Urine	IU/d	1.0000	IU/24 h
LH/Creatinine	IU/mmol	8.8420	IU/g
Metanephrine, Urine	nmol/d	0.1972	ug/24 h
Metanephrine/Creatinine	nmol/mmol	1.7432	ug/g
Metanephrines,Total,Urine	nmol/d	0.1902	ug/24 h
Metanephrines,Total/Creatinine	nmol/mmol	1.6814	ug/g
Methoxytyramine, Urine	nmol/d	0.1672	ug/24 h
Methoxytyramine/Creatinine	nmol/mmol	1.4786	ug/g
Norepinephrine, Plasma	pmol/L	0.1692	pg/mL
Norepinephrine, Urine	nmol/d	0.1692	ug/24 h
Norepinephrine/Creatinine	nmol/mmol	1.4957	ug/g

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Normetanephrine, Urine	nmol/d	0.1832	ug/24 h
Normetanephrine/Creatinine	nmol/mmol	1.6195	ug/g
Osteocalcin	nmol/L	6.5000	ng/mL
Parathyroid Hormone	pmol/L	9.5000	pg/mL
Prednisolone	pmol/L	0.0361	ng/dL
Prednisone	pmol/L	0.0358	pmol/L
Pregnanediol, Urine	umol/d	0.3205	mg/24 h
Pregnanediol/Creatinine	ng/dLumol	2.8332	mg/g/mmol
Pregnanetriol, Urine	umol/d	0.3365	mg/24 h
Pregnanetriol/Creatinine	umol/mmol	2.9747	mg/g
Pregnenolone	pmol/L	0.0317	ng/dL
17-Hydroxypregnenolone	pmol/L	0.0333	ng/dL
Progesterone	pmol/L	0.0315	ng/dL
17-Hydroxyprogesterone	pmol/L	0.0331	ng/dL
20-Hydroxyprogesterone	pmol/L	0.0317	ng/dL
Prolactin	ug/L	1.0000	ng/mL
Renin (Plasma Renin Activity)	ng/L/s	3.6000	ng/mL/h
Reverse T-3	pmol/L	0.0651	ng/dL
Secretin	pmol/L	3.0550	pg/mL
Sex Hormone Binding Globulin (SHBG)	nmol/L	0.0288	ug/dL

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
(Binding Capacity)			
Somatostatin-14	pmol/L	1.6380	pg/mL
Somatostatin-28	pmol/L	3.2760	pg/mL
Testosterone	pmol/L	0.0288	ng/dL
Free Testosterone	pmol/L	0.2884	pg/mL
Testosterone, Urine	nmol/d	0.2884	ug/24 h
Testosterone/Creatinine	nmol/mmol	2.5495	ug/g
Thyroglobulin	ug/L	1.0000	ng/mL
Thyroid Stimulating Hormone (TSH)	mU/L	1.0000	uU/mL
Thyroxine (T-4)	nmol/L	0.0777	ug/dL
Thyroxine Binding Globulin	mg/L	0.1000	mg/dL
Thyrotropin Releasing Hormone (TRH)	pmol/L	0.3620	pg/mL
Triiodothryonine (T-3)	pmol/L	0.0651	ng/dL
Vanillylmandelic Acid (VMA), Urine	nmol/d	0.1982	ug/24 h
VMA/Creatinine	nmol/mmol	1.7525	ug/g
Vitamin B-12	pmol/L	0.1355	ng/dL
25-Hydroxy-Vitamin D	nmol/L	0.4006	ng/mL
1,25-Dihydroxy-Vitamin D	pmol/L	0.4166	pg/mL

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
ACTH (Corticotropin)	pg/mL	0.2222	pmol/L
Antidiuretic Hormone (ADH)	pg/mL	0.9225	pmol/L
Albumin	g/dL	10.0000	g/L
Aldosterone, Serum	ng/dL	27.7469	pmol/L
Aldosterone, Urine	ug/24 h	2.7747	nmol/d
Aldosterone/Creatinine	ug/g	0.3139	nmol/mmol
Androstanediol	ng/dL	34.1997	pmol/L
Androstanediol Glucuronide	ng/dL	21.3447	pmol/L
Androstenedione	ng/dL	34.9162	pmol/L
Androsterone, Urine	mg/24 h	3.4423	umol/d
Androsterone/Creatinine	mg/g	0.3894	umol/mmol
Angiotensin I	pg/mL	0.7716	pmol/L
Angiotensin II	pg/mL	0.9560	pmol/L
Angiotensin III	pg/mL	1.0741	pmol/L
Angiotensin I Converting Enzyme	mU/mL	1.0000	U/L
Atrial Natriuretic Peptide (ANP)	pg/mL	0.3247	pmol/L
C-Peptide	ng/mL	0.3310	nmol/L
C-Peptide, Urine	ng/mL	0.3310	nmol/L
C-Peptide/Creatinine	ug/g	0.0374	nmol/mmol
Calcitonin	pg/mL	0.2926	pmol/L
Calcium	mg/dL	0.2495	mmol/L
Calcium, Urine	mg/24 h	0.0250	mmol/d

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Catecholamines, Urine	ug/24 h	5.6770	nmol/d
Catecholamines/Creatinine	ug/g	0.6422	nmol/mmol
Corticosterone	ng/dL	28.8600	pmol/L
18-Hydroxycorticosterone	ng/dL	27.5938	pmol/L
Cortisol, Serum	ug/dL	27.5862	nmol/L
Cortisol, Urine	ug/24 h	2.7586	nmol/d
Cortisol/Creatinine	ug/g	0.3121	nmol/mmol
Cortisone	ng/dL	27.7393	pmol/L
Creatinine, Urine	mg/24 h	8.8420	umol/d
Cyclic Amp, Urine	nmol/mL	1.0000	umol/L
Cyclic Amp/Creatinine	umol/g	113.1000	nmol/mmol
Dehydroepiandrosterone (DHEA)	ng/dL	34.6741	pmol/L
Dehydroepiandrosterone-Sulfate (DHEA-S)	ug/dL	27.2109	nmol/L
Deoxycorticosterone (DOC)	ng/dL	30.2572	pmol/L
18-Hydroxydeoxycorticosterone (18-OH-DOC)	ng/dL	28.8600	pmol/L
11-Desoxycortisol (Compound S)	ng/dL	28.8684	pmol/L
Dexamethasone	ng/dL	25.4777	pmol/L
Dihydrotestosterone (DHT)	ng/dL	34.4353	pmol/L
Dopamine, Plasma	pg/mL	6.5359	pmol/L
Dopamine, Urine	ug/24 h	6.5359	nmol/d
Dopamine/Creatinine	ug/g	0.7392	nmol/mmol

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Endorphin, Beta	pg/mL	0.2500	pmol/L
Epinephrine, Plasma	pg/mL	5.4615	pmol/L
Ephinephrine, Urine	ug/24 h	5.4615	nmol/d
Epinephrine/Creatinine	ug/g	0.6178	nmol/mmol
Estradiol	ng/dL	36.7107	pmol/L
Estriol	ng/dL	34.6741	pmol/L
Estrogens, Serum	ng/dL	36.8450	pmol/L
Estrone	ng/dL	36.9822	pmol/L
Estrone Sulfate	ng/dL	28.6123	pmol/L
Folic Acid	ng/dL	22.6552	pmol/L
Follicle Stimulating Hormone (FSH)	mIU/mL	1.0000	IU/L
Follicle Stimulating Hormone, Urine	IU/24 h	1.0000	IU/d
FSH/Creatinine	IU/g	0.1131	IU/mmol
Gastrin	pg/mL	1.0000	ng/L
Glucagon	pg/mL	1.0000	ng/L
Growth Hormone	ng/mL	1.0000	ug/L
Human Chorionic Gonadotropin (HCG)	mIU/mL	1.0000 I	U/L
HCG, Urine	IU/24 h	1.0000	IU/d
HCG/Creatinine	IU/g	0.1131	IU/mmol
5-Hydroxyindoleacetic Acid (5-HIAA), Urine	ug/24 h	5.2301	nmol/d

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Homovanillic Acid (HVA), Urine	ug/24 h	5.4885	nmol/d
HVA/Creatinine	ug/g	0.6207	nmol/mmol
17-Hydroxycorticosteroids, Urine	ug/24 h	2.7586	nmol/d
17-Hydroxycorticosteroids/Creatinine	ug/g	0.3121	nmol/mmol
IGF-I (Somatomedin C)	ng/mL	0.1307	nmol/L
IGF-II	ng/mL	0.1333	nmol/L
IGF-II	ng/mL	0.1333	nmol/L
Inhibin	U/mL	1000.0	U/L
Insulin	uU/mL	7.1750	pmol/L
17-Ketosteroids, Urine	mg/24 h	3.4674	umol/d
17-Ketosteroids/Creatinine	mg/g	0.3922	umol/mmol
Luteinizing Hormone (LH)	mIU/mL	1.0000	IU/L
Luteinizing Hormone, Urine	IU/24 h	1.0000	IU/d
LH/Creatinine	IU/g	0.1131	IU/mmol
Metanephrine, Urine	ug/24 h	5.0710	nmol/d
Metanephrine/Creatinine	ug/g	0.5736	nmol/mmol
Metanephrines,Total, Urine	ug/24 h	5.2576	nmol/d
Metanephrines,Total/Creatinine	ug/g	0.5948	nmol/mmol
Methoxytyramine, Urine	ug/24 h	5.9809	nmol/d
Methoxytyramine/Creatinine	ug/g	0.6764	nmol/mmol
Norepinephrine, Plasma	pg/mL	5.9100	pmol/L
Norepinephrine, Urine	ug/24 h	5.9100	nmol/d
Norepinephrine/Creatinine	ug/g	0.6686	nmol/mmol

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
Normetanephrine, Urine	ug/24 h	5.4585	nmol/d
Normetanephrine/Creatinine	ug/g	0.6175	nmol/mmol
Osteocalcin	ng/mL	0.1538	nmol/L
Parathyroid Hormone	pg/mL	0.1053	pmol/L
Prednisolone	ng/dL	27.7393	pmol/L
Prednisone	ng/dL	27.9018	pmol/L
Pregnanediol, Urine	mg/24 h	3.1201	umol/d
Pregnanediol/Creatinine	mg/g	0.3530	umol/mmol
Pregnanetriol, Urine	mg/24 h	2.9718	umol/d
Pregnanetriol/Creatinine	mg/g	0.3362	umol/mmol
Pregnenolone	ng/dL	31.5956	pmol/L
17-Hydroxypregnenolone	ng/dL	30.0752	pmol/L
Progesterone	ng/dL	31.7965	pmol/L
17-Hydroxyprogesterone	ng/dL	30.2572	pmol/L
20-Hydroxyprogesterone	ng/dL	31.5956	pmol/L
Prolactin	ng/mL	1.0000	ug/L
Renin (Plasma Renin Activity)	ng/mL/h	0.2778	ng/L/s
Reverse T-3	ng/dL	15.3610	pmol/L
Secretin	pg/mL	0.3273	pmol/L
Sex Hormone Binding Globulin (SHBG)	ug/dL	34.6741	nmol/L

HORMONE	WHEN YOU KNOW	MULTIPLY BY	TO FIND
(Binding Capacity)			
Somatostatin-14	pg/mL	0.6105	pmol/L
Somatostatin-28	pg/mL	0.3053	pmol/L
Testosterone	ng/dL	34.6741	pmol/L
Free Testosterone	pg/mL	3.4674	pmol/L
Testosterone, Urine	ug/24 h	3.4674	nmol/d
Testosterone/Creatinine	ug/g	0.3922	nmol/mmol
Thyroglobulin	ng/mL	1.0000	ug/L
Thyroid Stimulating Hormone (TSH)	uU/mL	1.0000	mU/L
Thyroxine (T-4)	ug/dL	12.8717	nmol/L
Thyroxine Binding Globulin	mg/dL	10.0000	mg/L
Thyrotropin Releasing Hormone (TRH)	pg/mL	2.7624	pmol/L
Triiodothryonine (T-3)	ng/dL	15.3610	pmol/L
Vanillylmandelic Acid (VMA), Urine	ug/24 h	5.0454	nmol/d
VMA/Creatinine	ug/g	0.5706	nmol/mmol
Vitamin B-12	ng/dL	7.3779	pmol/L
25-Hydroxy-Vitamin D	ng/mL	2.4963	nmol/L
1,25-Dihydroxy-Vitamin D	pg/ml	2.4004	pmol/L