Optimalwerte Hormone

Suggested optimal values for an average sized person

For tall and large, athletic subjects 10 to 25 % higher plasma values of anabolic hormones such as IGF-, DHEA sulfate, testosterone, dihydrotestosterone, and eventually estradiol and progesterone are probably more appropriate. For smaller and thin persons, the contrary should be true. The same is valid for 24- hour urine, where the urinary hormone levels should positively correlate with the urinary creatinine.(In patients without severe kidney disease)

- for a person of average size and body weight with normal(not exessive) activity and diet

Plasma	Suggested **optimal** value*	Suggested **pathological** value	References (young adults ≤ 30 years)	Possible **deficiency** if pathologigal value →↓↑←±	Possible **cause or consequence** if pathological value
Nutritional					
Ferritine	**120 - 150**	< 70 & > 300	23 -233 ng/ml(M) 12 -263 ng/ml(W)* value of W>40 yrs	Microcytic anemia, slow T_4 to T_3 conversion	
Vitamin B 12	**550**	< 350	200 - 835 pg/ml 140 - 616 pmol /l	Myelinisation defects, Macro-cytic anemia	
Folic acid erythrocytic	**300**	< 200	90 -400 ng/ml 0,2 -0,9 µmol /l	Macrocytic anemia	
Vitamin C	**1-2**	< 0,5	0,2 -2,0 mg /dl 11 -113 µmol /l	scurvy	
Sodium NA+	**142**	<138	136 - 145 mmol /l	(1°) aldosterone	
Potassium K+	**4,2**	>5 < 3,5	3,5 - 5,1 mmol /l	(2°) cortisol defiency Fruit and vegetable intake	(1°) diuretics (2°) aldosterone
Magnesium Mg++ erythrocytic	**5**	< 4,6	3,3 - 5,3 mEq/l 1,65 - 2,65 mmol/l		
Zinc	**120**	< 85	70 - 150 µg/dl		Infections, high conversion of testosterone to estradiol
Cupper	**120**	< 90	70 - 160 µg /dl		
Selenium	**120 -140**	< 90	70 - 150	slow T_4 to T_3 conversion	
Vitamin E	**12 - 20**	< 12	5 - 20 mg / l 11,6 - 46,4 µmol /l	DHEA defiency	
Vitamin A	**950**	< 600	300 - 1300 µg /l 0,7- 2,80 µmol /l	hyperthyroidism	
Vitamin D 25-OH **1- 25 OH**	**35 -40**	< 25	6 - 60 ng /ml 89 - 149 nmol /l		Excess Parathyroid
	35	< 25	15- 50 pg /ml		
Uric acid	**4,5 (M)** **4,0 (W)**	< 25	3,4 - 7,0 mg /dl 202 - 416 µmol/l (M) 2,4 - 5,7 mg/dl (W)		
CRP		↑			atherosclerose
Hematocrite		>			

Ureum (BUN) SHBG, transcortin, albumin,...	**25 Between reference values (& not borderline high)**	> 35 ↑↑> upper reference	15 - 45 mg/dl		High values→ blood concentration, dehydration→ levels to hormone bound to proteins may appear artificially high; high binding proteins may be caused by oral estrogen intake
Cholesterol	**160 - 170**	> 180	118 -180 mg/dl (≤30 yrs) < 220 mg / dl if no coronary pathology	Hypothyroidism ; estrogen (W), testoserone (M), GH, DHEA deficiecies	Acceptable increase to 300 mg/ dl in pregnancy
ENDOCRINE					
GH stimulated by GHRH, insulin, L-Dopa, clondine, activity, ...	**> 25**	< 10	> 10 ng / ml > 465 pmol / l	GH-IGF-1 deficiency	
Somatomedin C	**300- 350 (M)**	< 220			
(IGF-1)	**220 - 300 (W)**	< 180			
IGF- BP- 3	**3,000**	> 3,700			
TSH	**1**	> 2	0,2 - 0,4 μu /ml		
Free T_3	**3**	< 2,3	1,8 - 3,7 ng/l	hypothyrodism	
Free T_4	**1,5**	< 1,1	0,8 - 1,8 ng/dl		
ATG	**0**	> 50	0 -50 U/ml	Hashimoto's	
ATPO (or AMI)	**0**	> 50	0 - 50 U/ ml	thyroiditis	
TSI (or TBII)	**0**	>5	0 -10 mU / ml		hyperthyroidism
Thyroglobulin	**< 15***	> 25	0 -25 ng / ml		Goiter; * dessicated thyroid therapy→ ↑ thyroglobulin >30
Calcitonin	**8**	< 4	0- 15 pg / ml	osteoporosis	
Calcium	**5**	< 4,7 or >5,3	4,6 - 5,4 mg/dl 1,15 - 1,35 mmol/l		
Phosphorus	**3,5 - 4,0**	< 3	2,7 - 4,5 mg /dl 11,0 - 32,3 mmol /l		
Parthormone	**25**	< 15 or >50	10 - 55 pg /ml	Hypo-parathyroidism	Hyper-parathyroidism
ACTH	**40**	< 20 or >80	20 - 110 pg /ml	Hypothalamic or pituitary hypercorticism	Cushing's disease
ACTH-test cortisol	**> + 100 %**	< + 75 %	200 - 500	Low adrenal reserve	
Cortisol (total) (8h)	**180**	< 135	100 - 250 ng/ml 276 - 690 nmol/l		100 - 350 ng/ml in pregnancy
Transcortin (CBG)	**25 -30**	> 40	20 -50 mg /l		
Free cortisol	**20**	< 14	10 -30 ng /ml 27, 6- 82,8 nmol /l		
Cortisol(total) (16 - 20 h)	**70**	< 50	30 - 100 ng /ml 83 - 276 nmol/ l		30 - 200 ng/ml in pregnancy
Free cortisol- afternoon	**13**	< 6	2 - 20 ng /ml 5,5 - 82,8 nmol /l		
DHEA-Sulfate	**400 (M)**	< 250	200 - 610 μg /dl(M)	DHEA deficiency	

	250 -300(W)	< 200	80 - 480 µg /dl(W)		
Albumin	**4,5**	<3,5 or >6	3,7 - 5,3 g/dl	DHEA deficiency, nephrotic syndrome	DHEA deficiency
Androstenedione	**1,6**	< 1,3	1-2 ng/ ml(W)	DHEA & /or androstenedione deiciency	
Aldosterone (standing or afteractivity)	**170**	< 100	40 - 300 pg/ ml 4,4 -24,2 pmol/l	Hypo-aldosteronism	Hypo-aldosteronism secondary to hypocorticism or oral estrogen intake
Glucose	**80 - 90**	70 < or > 95	70 - 110 mg /dl 3,9 -6,05 mmol/l	Hypocorticism	Diabetes
Insulin	**5**	< 4 or > 10	4 - 25 µU /ml	Diabetes type 1	Diabetes type 2
Hemoglobulin A1c	**4,5**	< 4 or > 5,5	4 - 6 %	Diabetes	Diabetes
LH	**4 (M)** **4 (W)**	2 < or >8 >15	2 - 12 mlU /ml(M) 0,5-20 mlU/ml(W)	Primary testosterone, DHT & progesterone deficiencies	24 -105 at ovulation; Secondary testosterone, DHT& progesterone deficiencies; synthetic ;progestogen intake testosterone overtreatment
FSH	**3 (M)** **5 (W)**	>7 (M) > 12 (W)	1 -8 mlU /ml (M) 2-13 mlU /ml (W)	Estradiol & testosterone deficiencies	5 - 22 at ovulation
Prolactin	**10**				Prolactinome; hyper-prolactinemia secondary to hyperthyroidism or stress; may inhibit gonadal function & hormone secretions
Estradiol (**W:**21*st day of menstrual cycle)	**20 - 25 (M)** **150 (W)**	<35 <10	10 - 35 (M) 100 - 210 pg/ml(W)	Estrogen deficiency	Hypo-progesteronism
Estrone (**W:**21st day of cycle)	**35 (M)** **80**	< 50	10 - 60 pg/ml (M) 40 - 200 pg /ml(W)		oral estradiol intake
Progesterone (**W:**21st day of cycle)	**15**	< 11	5 - 20 ng/ ml (W)	lack of ovulation; Progesterone deficiency; (hypothyroidism, estrogen deficiency)	
SHBG	**25 - 30 (M)** **65(W)**	>35 (M) < 55or >75 (W)	20 -55 pmol/ l(M) 41 -79 pmol/l (W)	Etrogen&thyroid deficienciesa; androgen &GH excess	Oral estrogen intake, hyperthyroidism; androgen, GH & cortisol deficiencies
Testosterone	**6500 -7000(M)** **350 (W)**	< 6000(M) < 200 (W)	8000 - 10.000 pg/ml 10,4 -34,7 nmol/l W: 150 -400 (follicular phase), 200 -600 (luteal)	Testosterone deficiency; synthetic progestogen intake	Testosterone overtreatment
Free testosterone	**280(m)** **8 (w)**	< 200 (M) < 5 (W)	50 - 280pg/ml 173 -970 pmol /l 1,9 - 15 pg /ml (W)	Testosterone deficiency; oral estrogen intake (w/excess SHBG)	Testosterone overtreatment

			6 - 52 pmol /l		
Dihydrotestosterone	**650 - 700(M)** **250(W)**	< 500 (M) < 150 (W)	300 -1000pg/ml (M) 150 -350 pg/ml(W)	Testosterone deficiency;oral estrogen intake	Ândrogen male pattern baldness; transdermal
Androstandiol glucuronide pregnenolone	**15 - 17 (M)** **3 (W)** **150**	< 13 (M) < 100	3,4 -22 ng/ml(M) 0,5 - 5,4 ng /ml (W) 20 - 220 pg /ml	Total adrenal cortex deficiency	testosterone treatment

24-HOUR URINE					
MUSCLE MASS					
creatinine	**1,6 (M)** **1,1 (W)**		1,04 -2,19g/24 h(M) 0,80 -1,40 /24h(W)	Incomplete or < 24 h urine colection?	Urine collection > 24h ?
DIET					
volume 24 St.Urine	**1500 ml**	< 900	600 - 2500 ml/ 24h		
sodium Na+	**160**	< 130	100 - 220 mmol /l	Low salt intake; excess sweating; salt retention by excess aldosterone	Hogh salt intake;; excess salt loss by aldosterone &/or cortisol deficiencies
potassium K+	**50**	< 35	25 -75 mmol/ l	Insufficient fruit &/or vegetable intake or potassium retention	High fruit &/or vegetable intake or potassium loss
calcium	**5,5**	< 4,0	3,0 -8,0 mmol /24 h 120 - 325 mg /24 h	Low total calorie (food) intake;low calcium rich (seafood, milk products) intake	High food intake; milk products intake (w/ excess urinary calciujm loss); tablets of calcium
magnesium			2,3 -8,4 mmol/24 h	Low green vegetable intake	High green vegetable intake; excess loss (coffee intake),(hypopara -thyroidism(?))
phosphorus	**30**	< 25	22 -ö42 mmol /24 h	Low adrenal & sex steroid production	
iron				low red meat intake (the day of collection	
ENDOCRINE TESTS- Urine					
GH	**> 7**	< 5	> 20	deficiency	Acromegaly; excess urine loss
6-sulfatoxy-melatonin				melatonin deficiency	
T_3	**1700-1900**	< 1350	1530-2300 pmol/24h 1,0 - 1,5 µg /24 h	Hypothyroidism	Hyperthyroidism
T_4	**2500**	< 1925	1925-3000 pmol/24h 1,5 -2,0 µg /24 h	Hypothyroidism	In slow T_4 to T_3 conversion: hyperthyroidism
Cortisol	**40 - 70**	< 20or > 100	10 -100 µg /24 h	hypocorticism	Cortisol treatment (with urine loss of cortisol):Cushings disease or

					syndrome; high stress
17- OH- steroids	**12 (M)** **6,5 (W)**	< 8 < 4,5	5,7 - 16,2mg/24h(M) 3,7 - 8,5 mh/24 h(W)	hypocorticism, (Hypothyroidism, testosterone or estrogen deficiency)	high stress or physical overactivity; cortisol treatment (with urine loss of cortisol); Cushings disease or syndrome
17- ketosteroids	**11 (M)** **6,5 (W)**	< 8 < 5	4,7 -13,3 mg/24h(M) 2,9 -8,9 mg /24h(W)	DHEA (& testosterone) deficiency	Adrenogenital syndrome (W)
Aldosterone	**13** **> 20 if sodium <**	< 8 if normal sodium < 15 if excessive sodium	5 -20 µg /24 h	Aldosterone deficiency	Higher levels are necessary if poor salt intake; hypocorticism or oral estrogen intake
pregnandiol	**1** **4**	< 0,7 (M) < 3 (W)	0,5 -1,5 mg/24h(M) 2,0 -5,0 mg /24h(W: mid luteal phase)	Progesterone deficiency; (Hypothyroidism, estrogen deficiency)	Oral progesterone treatment
Testosterone	**110 (M)**	< 60(M)		Testosterone deficiency; oral estrogen intake (w/excess SHBG)	Testosterone treatment(not necessary excessive)

M= men, W= women

The suggested optimal and pathological values are only indicative and based on Dr. Hertoghe's experience. They should always be submitted first to the physician's own medical expertise and experience and adapted to each patient. These values are not intended to be used as strict dogmatic guidlines. Each patient is different and unique and in fact may need different optimal levels for his hormones than others, although many patients may benefit by having their hormone levels increased to the suggested „optimal" levels.