

Blood tests:

<b>Ions and trace metals</b>	<b>Lower limit - Upper limit</b>	<b>Unit</b>
Sodium (Na)	136 - 146	mmol/L or mEq/L
	315 - 335	mg/dl
Potassium (K)	3,5 - 5,1	mmol/L or mEq/L
	14 - 20	mg/dl
Chlorid (Cl)	97,7 - 107	mmol/L or mEq/L
	340 - 370	mg/dl
Ionized calcium (Ca)	1,06 - 1,27	mmol/L
	4,2 - 5,1	mg/dL
Total calcium (Ca)	2,1 - 2,7	mmol/L
	8,4 - 10,4	mg/dL
Total serum iron (TSI) - male	12,6 - 32,4	µmol/L
	70 - 187	µg/dL
Total serum iron (TSI) - female	38 - 170	µmol/L
	6,7 - 30,4	µg/dL
Total serum iron (TSI) - newborns	18 - 45	µmol/L
	100 - 250	µg/dL
Total serum iron (TSI) - children	9 - 21	µmol/L
	50 - 120	µg/dL
Total iron-binding capacity (TIBC)	45 - 83	µmol/L
	251 - 262	µg/dL
Zinc (Zn)	10,1 - 19	µmol/L
	66 - 120	µg/dL
Magnesium (Mg)	0,6 - 0,9	mmol/L
	1,6 - 2,2	mEq/L or mg/dL

<b>Acid-base and blood gases</b>	<b>Lower limit - Upper limit</b>	<b>Unit</b>	
pH	7,34 - 7,45		A
	7,31 - 7,41		V
Base excess	-3 - +3	mEq/L	A+V
oxygen partial pressure (pO <sub>2</sub> )	10,5 - 13,5	kPa	A
	79 - 102,5	mmHg or torr	A
Oxygen saturation	95 - 100	%	A
	75 - 75	%	V
Carbon dioxide partial pressure (PCO <sub>2</sub> )	4,55 - 5,95	kPa	A
	34 - 44,5	mmHg or torr	A
Bicarbonate (HCO <sub>3</sub> <sup>-</sup> )	18 - 23	mmol/L	A+V
	110 - 140	mg/dL	A+V
Standard bicarbonate (SBCe)	21,5 - 27,5	mmol/L or mEq/L	A+V
	134 - 170	mg/dL	A+V

A - arterial, V- venous

Liver function	Lower limit - Upper limit	Unit	
Total Protein	61,5 - 81,4	g/L	
Albumin	35 - 51,5	g/L	
	540 - 740	μmol/L	
	3,5 - 5,15	U/L	
Total Bilirubin	3,02 - 21,34	μmol/L	
	0,19 - 1,24	mg/dl	
Alanine transaminase (ALT/ALAT)	0,15 - 0,75	μkat/L	F
	0,15 - 1,1	μkat/L	M
	6,66 - 32,34	U/L	
Aspartate transaminase (AST/ASAT)	0,25 - 0,6	μkat/L	F
	0,25 - 0,75	μkat/L	M
	6 - 34	IU/L	F
	8 - 40	IU/L	M
Alkaline phosphatase (ALP)	0,6 - 1,8	μkat/L	
	42 - 98	U/L	F
	53 - 128	U/L	M
Gamma glutamyl transferase (GGT)	- 0,63	μkat/L	F
	- 0,92	μkat/L	M
	6,5 - 59	U/L	

F - female, M - male

Lipids	Lower limit - Upper limit	Unit		Therapeutic target
Triglycerides	0,61 - 1,2	mmol/L		10-39 y < 1,1
	0,77 - 1,7	mmol/L		40-59 y < 1,1
	0,9 - 1,7	mmol/L		> 60 y < 1,1
	54 - 110	mg/dL		10-39 y < 100
	70 - 150	mg/dL		40-59 y < 100
	80 - 150	mg/dL		> 60 y < 100
Total cholesterol	3,3 - 5,75	mmol/L		< 3,9
	130 - 225	mg/dL		< 150
HDL cholesterol	1,16 - 2,2	mmol/L	F	> 1,3
	0,9 - 2,0	mmol/L	M	> 1,3
	45 - 86	mg/dL	F	> 50
	35 - 80	mg/dL	M	> 50
LDL cholesterol (Not valid when triglycerides >5.0 mmol/L)	2,2 - 3,2	mmol/L		< 2,5
	87 - 125	mg/dL		< 100

F - female, M - male, years

Other electrolytes and metabolites	Lower limit - Upper limit	Unit	
Urea	3 - 7	mmol/L	
	7 - 19,5	mg/dL	
Creatinine	64 - 104	μmol/L	M
	59 - 94	μmol/L	F
	0,75 - 1,15	mg/dL	M
	0,7 - 1,05	mg/dL	F
Plasma glucose (fasting)	3,9 - 6,05	mmol/L	
	69 - 105	mg/dL	
Full blood glucose (fasting)	3,3 - 5,6	mmol/L	
	60 - 100	mg/dL	

F - female, M - male

Vitamins	Standard range		Unit	Optimal range	
	Lower limit	Upper limit		Lower lim	Upper lim
Vitamin A	30	65	µg/dL		
Vitamin B9 (Folic acid/Folate) - Serum, Age > 1year	6,8	36	nmol/l	11	
	3	16	ng/mL or µg/L	5	
Vitamin B9 (Folic acid/Folate) - Red blood cells	450	1400	nmol/L		
	200	600	ng/mL or µg/L		
		Pregnant	nmol/L	900	
		Pregnant	ng/mL or µg/L	400	
Vitamin B12 (Cobalamin)	110	610	pmol/L		
	145	825	ng/L		
Homocysteine	4,6	11,25	µmol/L	- 6,3	
	62,5	155	µg/dL	- 85	
Vitamin C (Ascorbic acid)	23	85	µmol/L	50	
	0,4	1,5	mg/dL	0,9	
25-hydroxycholecalciferol (a vitamin D)	21,5	122,5	nmol/L	92,5	140
	8,5	60	ng/mL	35	82,5
Vitamin E			µmol/L	28	
			mg/dL	1,2	

White blood cells - hematology		Lower limit - Upper limit		Unit	
Leukocytes Blood Cell Count (WBC)	White	4	10,3	$\times 10^9/L$	A
		9	30	$\times 10^3/mm^3$ or	N
		6	18	$\times 10^3/\mu L$	1 year old
Neutrophil granulocytes (A.K.A. grans, polys, PMNs, or segs)		1,7	6,8	$\times 10^9/L$	A
		49,5	68	% of WBC	A
		6	26	$\times 10^9/L$	N
Neutrophilic band forms (nesegm)		-	0,7	$\times 10^9/L$	
		3	5	% of WBC	
Lymphocytes		0,85	4,1	$\times 10^9/L$	A
		20,5	39	% of WBC	A
		2	11	$\times 10^9/L$	N
Monocytes		0,15	0,8	$\times 10^9/L$	A
		3,5	8,5	% of WBC	A
		0,4	3,1	$\times 10^9/L$	N
Eosinophil granulocytes		0,02	0,47	$\times 10^9/L$	A
		1	5	% of WBC	A
		0,02	0,85	$\times 10^9/L$	N
Basophil granulocytes		40	400	$\times 10^9/L$	A
		0	1,38	% of WBC	A
		-	0,64	$\times 10^9/L$	N

F - female, M - male, N - Newborn

Red blood cells - hematology	Lower limit - Upper limit	Unit	
Hemoglobin (Hb)	1,85 - 2,4	mmol/L	F
	2,05 - 2,6	mmol/L	M
	120 - 154	g/L	F
	132 - 169	g/L	M
Hematocrit (Hct)	0,36 - 0,47		F
	0,41 - 0,55		M
	0,31 - 0,43		CH
Erythrocytes/Red blood cells (RBC)	3,7 - 5,3	$\times 10^{12}/L$	F
	4,2 - 6,2	or	M
	3,8 - 5,5	$mln/mm^3$	CH, I

F - female, M - male, CH - child, I - infant

Coagulation - hematology	Lower limit - Upper limit	Unit
Thrombocyte/Platelet count (Plt)	145 - 400	$\times 10^9/L$ or $\times 1000/\mu L$
Prothrombin time (PT)	11 - 13,9	s
INR	0,9 - 1,2	
Activated partial thromboplastin time (APTT)	24 - 38,4	s
Thrombin clotting time (TCT)	11 - 18	s
Fibrinogen	1,85 - 3,9	g/L
Viscosity	1,5 - 1,72	cP

Imunology	Lower limit - Upper limit	Unit
C-reactive protein (CRP)	- 220	nmol/L
	- 5,5	mg/L
Rheumatoid factor (RF)	- 30	U/mL
ASLO	- 200	U/mL
IgA	90 - 460	mg/dL
IgD	0,5 - 3	mg/dL
IgE	0,01 - 0,04	mg/dL
IgG	800 - 1800	mg/dL
IgM	54 - 220	mg/dL

Tumour markers	Cutoff	Unit
Alpha fetoprotein (AFP)	44	ng/mL or $\mu g/L$
Beta Human chorionic gonadotrophin (bHCG)	5	IU/l or mU/ml
CA19-9	40	U/ml
CA-125	32,5	kU/L or U/mL
Carcinoembryonic antigen (CEA) non-smokers at 50 years	3,5	$\mu g/l$
Carcinoembryonic antigen (CEA) non-smokers at 70 years	4,1	$\mu g/l$
Carcinoembryonic antigen (CEA) - sm	5	$\mu g/l$
Prostate specific antigen (PSA)	3,25	$\mu g/L$ or ng/mL
PAP	3	units/dL (Bodansky units)
Calcitonin	10	ng/L or pg/mL

Toxins	Limit	Unit
Lead	< 30	µg/dL
	Optimal health range	
Blood ethanol content - Limit for dru	0, 0.2, 0.8	‰ or g/L
	17,4	mmol/L

Endocrinology - hormones	Lower limit - Upper limit	Unit	
Thyroid stimulating hormone (TSH or thyrotropin)	0,45 - 4,89	mIU/L or µIU/mL	Astandard
	0,5 - 2,5	mIU/L or µIU/mL	Aoptimal
	1,3 - 19	mIU/L or µIU/mL	I
Free thyroxine (FT4)	10,3 - 20,5	pmol/L	A
	10 - 26	pmol/L	CH
	6,5 - 13	pmol/L	P
	0,75 - 1,57	ng/dL	A
	0,8 - 2	ng/dL	CH
Free triiodothyronine (FT3)	0,5 - 1	ng/dL	P
	3,1 - 7,7	pmol/L	A
	1,5 - 9,2	nmol/L	CH
	0,2 - 0,5	ng/dL	A
Cortisol	0,1 - 0,6	ng/dL	CH
	140 - 700	nmol/L	9.00
	80 - 350	nmol/L	12.00
	5 - 25	µg/dL	9.00
Testosterone	2,9 - 13	µg/dL	12.00
	9 - 31	nmol/L	M
	0,7 - 2,9	nmol/L	F
	265 - 890	ng/dL	M
	20 - 82,5	ng/dL	F

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