

NORMAL LABORATORY VALUES

MKSAP® 14

U.S. traditional units are followed in parentheses by equivalent values expressed in S.I. units.

Hematology

Activated partial thromboplastin time — 25-35 s
Bleeding time — Less than 10 min
Erythrocyte count — $4.2-5.9 \times 10^6/\mu\text{L}$ ($4.2-5.9 \times 10^{12}$ cells/L)
Erythrocyte sedimentation rate
Male: 0-15 mm/h
Female: 0-20 mm/h
Erythropoietin — less than 30 mU/mL (30 U/L)
D-Dimer — less than 0.5 $\mu\text{g/mL}$ (500 mg/L)
Ferritin, serum — 15-200 ng/mL (15-200 mg/L)
Haptoglobin, serum — 50-150 mg/dL (500-1500 mg/L)
Hematocrit
Male: 41%-51%
Female: 36%-47%
Hemoglobin, blood
Male: 14-17 g/dL (140-170 g/L)
Female: 12-16 g/dL (120-160 g/L)
Leukocyte alkaline phosphatase — 15-40 mg of phosphorus liberated/h per 10^{10} cells; score = 13-130/100 polymorphonuclear neutrophils and band forms
Leukocyte count — 4000-10,000/ μL ($4.0-10 \times 10^9/\text{L}$)
Mean corpuscular hemoglobin — 28-32 pg
Mean corpuscular hemoglobin concentration — 32-36 g/dL (320-360 g/L)
Mean corpuscular volume — 80-100 fL
Platelet count — 150,000-350,000/ μL ($150-350 \times 10^9/\text{L}$)
Prothrombin time — 11-13 s
Reticulocyte count — 0.5%-1.5% of erythrocytes; absolute: 23,000-90,000 cells/ μL ($23-90 \times 10^9/\text{L}$)
Schilling test (oral administration of radioactive cobalamin-labeled vitamin B₁₂) — 8.5%-28% excreted in urine per 24-48 h

Blood, Plasma, and Serum Chemistry Studies

Albumin, serum — 3.5-5.5 g/dL (35-55 g/L)
Alkaline phosphatase, serum — 36-92 U/L
 α -Fetoprotein, serum — 0-20 ng/mL (0-20 $\mu\text{g/L}$)
Aminotransferase, alanine (ALT) — 0-35 U/L
Aminotransferase, aspartate (AST) — 0-35 U/L
Ammonia, plasma — 40-80 $\mu\text{g/dL}$ (23-47 $\mu\text{mol/L}$)
Amylase, serum — 0-130 U/L
Antinuclear antibody, serum — positive: titer of greater than, equal to 1:160
Bicarbonate, serum — 23-28 meq/L (23-28 mmol/L)
Bilirubin, serum
Total — 0.3-1.2 mg/dL (5.1-20.5 $\mu\text{mol/L}$)
Direct — 0-0.3 mg/dL (0-5.1 $\mu\text{mol/L}$)
Blood gases, arterial (patient breathing room air)
pH — 7.38-7.44
Pco₂ — 35-45 mm Hg
Po₂ — 80-100 mm Hg
Oxygen saturation — 95% or greater
Blood urea nitrogen — 8-20 mg/dL (2.9-7.1 mmol/L)
Calcium, serum — 9-10.5 mg/dL (2.2-2.6 mmol/L)
Carbon dioxide content, serum — 23-28 meq/L (23-28 mmol/L)
Chloride, serum — 98-106 meq/L (98-106 mmol/L)

Cholesterol, plasma
Total — 150-199 mg/dL (3.88-5.15 mmol/L), desirable
Low-density lipoprotein (LDL) — Less than or equal to 130 mg/dL (3.36 mmol/L), desirable
High-density lipoprotein (HDL) — Greater than or equal to 40 mg/dL (1.04 mmol/L), desirable
Complement, serum
C3 — 55-120 mg/dL (550-1200 mg/L)
Total (CH₅₀) — 37-55 U/mL (37-55 kU/L)
Creatine kinase, serum — 30-170 U/L
Creatinine, serum — 0.7-1.3 mg/dL (61.9-115 $\mu\text{mol/L}$)
Electrolytes, serum
Sodium — 136-145 meq/L (136-145 mmol/L)
Potassium — 3.5-5.0 meq/L (3.5-5.0 mmol/L)
Chloride — 98-106 meq/L (98-106 mmol/L)
Bicarbonate — 23-28 meq/L (23-28 mmol/L)
Fibrinogen, plasma — 150-350 mg/dL (1.5-3.5 g/L)
Folate, red cell — 160-855 ng/mL (362-1937 nmol/L)
Folate, serum — 2.5-20 ng/mL (5.7-45.3 nmol/L)
Glucose, plasma — Fasting, 70-100 mg/dL (3.9-5.6 mmol/L)
 γ -Glutamyltransferase, serum — 0-30 U/L
Homocysteine, plasma — Male: 4-16 $\mu\text{mol/L}$; female: 3-14 $\mu\text{mol/L}$
Immunoglobulins
IgG — 640-1430 mg/dL (6.4-14.3 g/L)
IgA — 70-300 mg/dL (0.7-3.0 g/L)
IgM — 20-140 mg/dL (0.2-1.4 g/L)
IgD — Less than 8 mg/dL (80 mg/L)
IgE — 0.01-0.04 mg/dL (0.1-0.4 mg/L)
Iron studies
Ferritin, serum — 15-200 ng/mL (15-200 mg/L)
Iron, serum — 60-160 $\mu\text{g/dL}$ (11-29 $\mu\text{mol/L}$)
Iron-binding capacity, total, serum — 250-460 $\mu\text{g/dL}$ (45-82 $\mu\text{mol/L}$)
Transferrin saturation — 20%-50%
Lactate dehydrogenase, serum — 60-100 U/L
Lactic acid, venous blood — 6-16 mg/dL (0.67-1.8 mmol/L)
Lipase, serum — Less than 95 U/L
Liver studies, serum
Alkaline phosphatase — 36-92 U/L
Aminotransferase, alanine (ALT) — 0-35 U/L
Aminotransferase, aspartate (AST) — 0-35 U/L
Bilirubin
Total — 0.3-1.2 mg/dL (5.1-20.5 $\mu\text{mol/L}$)
Direct — 0-0.3 mg/dL (0-5.1 $\mu\text{mol/L}$)
Magnesium, serum — 1.5-2.4 mg/dL (0.62-0.99 mmol/L)
Methylmalonic acid, serum — 150-370 nmol/L
Osmolality, plasma — 275-295 mosm/kg H₂O
Phosphatase, alkaline, serum — 36-92 U/L
Phosphorus, serum — 3-4.5 mg/dL (0.97-1.45 mmol/L)
Potassium, serum — 3.5-5.0 meq/L (3.5-5.0 mmol/L)
Protein, serum
Total — 6.0-7.8 g/dL (60-78 g/L)
Albumin — 3.5-5.5 g/dL (35-55 g/L)
Globulins — 2.5-3.5 g/dL (25-35 g/L)
Prostate-specific antigen, serum — optimal less than 4 ng/mL
Rheumatoid factor — less than 40 U/mL (less than 40 kU/L)
Sodium, serum — 136-145 meq/L (136-145 mmol/L)
Transferrin saturation — 20%-50%
Triglycerides — Less than 250 mg/dL (2.82 mmol/L), desirable

Troponins, serum

Troponin I – 0-0.5 ng/mL (0-0.5 µg/L)

Troponin T – 0-0.10 ng/mL (0-0.10 µg/L)

Urea nitrogen, serum — 8-20 mg/dL (2.9-7.1 mmol/L)

Uric acid, serum — 2.5-8 mg/dL (0.15-0.47 mmol/L)

Vitamin B₁₂, serum — 200-800 pg/mL (148-590 pmol/L)

Endocrine

Adrenocorticotropin (ACTH), serum — 9-52 pg/mL (2-11 pmol/L)

Aldosterone, serum

Supine - 2-5 ng/dL (55-138 pmol/L)

Standing - 7-20 ng/dL (194-554 pmol/L)

Aldosterone, urine — 5-19 µg/24 h (13.9-52.6 nmol/24 h)

Catecholamines

Epinephrine, plasma (supine): less than 75 ng/L (410 pmol/L)

Norepinephrine, plasma (supine): 50-440 ng/L (296-2600 pmol/L)

Catecholamines, 24-hour, urine — Less than 100 µg/m² per 24 h (591 nmol/m² per 24 h)

Cortisol, free, urine – less than 90 µg/24 h (248 nmol/24 h)

Dehydroepiandrosterone sulfate (DHEA), plasma

Male: 1.3-5.5 mg/mL (3.5-14.9 µmol/L)

Female: 0.6-3.3 mg/mL (1.6-8.9 µmol/L)

Epinephrine, plasma (supine): less than 75 ng/L (410 pmol/L)

Estradiol, serum

Male: 10-30 pg/mL (37-110 pmol/L);

Female: day 1-10, 50-100 pmol/L; day 11-20, 50-200 pmol/L;

day 21-30, 70-150 pmol/L

Follicle-stimulating hormone, serum

Male (adult): 5-15 mU/mL (5-15 U/L)

Female: follicular or luteal phase, 5-20 mU/mL (5-20 U/L);

midcycle peak, 30-50 mU/mL (30-50 U/L); postmenopausal,

greater than 35 mU/mL (35 U/L)

Growth hormone, plasma — After oral glucose, less than 2 ng/mL (2 µg/L); response to provocative stimuli: greater than 7 ng/mL (7 µg/L)

Luteinizing hormone, serum

Male: 3-15 mU/mL (3-15 U/L)

Female: follicular or luteal phase, 5-22 mU/mL (5-22 U/L);

midcycle peak, 30-250 mU/mL (30-250 U/L); postmenopausal,

greater than 30 mU/mL (30 U/L)

Metanephrine, urine — Less than 1.2 mg/24 h (6.1 mmol/24 h)

Norepinephrine, plasma (supine): 50-440 ng/mL (296-2600 pmol/L)

Parathyroid hormone, serum — 10-65 pg/mL (10-65 ng/L)

Prolactin, serum

Male: less than 15 ng/mL (15 mg/L);

Female: less than 20 ng/mL (20 mg/L)

Testosterone, serum

Male (adult): 300-1200 ng/dL (10-42 nmol/L)

Female: 20-75 ng/dL (0.7-2.6 nmol/L)

Thyroid function tests (normal ranges vary)

Thyroid iodine (¹³¹I) uptake - 10% to 30% of administered dose at 24 h

Thyroid-stimulating hormone (TSH) - 0.5-5.0 µU/mL (0.5-5.0 mU/mL)

Thyroxine (T₄), serum

Total - 5-12 µg/dL (64-155 nmol/L)

Free - 0.9-2.4 ng/dL (12-31 pmol/L)

Free T₄ index - 4-11

Triiodothyronine, resin (T₃) - 25%-35%

Triiodothyronine, serum (T₃) - 70-195 ng/dL (1.1-3.0 nmol/L)

Vanillylmandelic acid, urine — Less than 8 mg/24 h (40.4 µmol/24 h)

Vitamin D

1,25-dihydroxy, serum - 25-65 pg/mL (60-156 pmol/L)

25-hydroxy, serum - 15-80 ng/mL (37-200 nmol/L)

Urine

Albumin-creatinine ratio – less than 30 mg/g

Calcium — 100-300 mg/24 h (2.5-7.5 mmol/24 h) on unrestricted diet

Creatinine — 15-25 mg/kg per 24 h (133-221 mmol/kg per 24 h)

Creatinine clearance — 90-140 mL/min (0.09-0.14 L/min)

5-Hydroxyindoleacetic acid (5-HIAA) — 2-9 mg/24 h (10.4-46.8 µmol/24 h)

Protein-creatinine ratio – less than, equal to 0.2 mg/mg

Sodium — 100-260 meq/24 h (100-260 mmol/24 h) (varies with intake)

Uric acid — 250-750 mg/24 h (1.48-4.43 mmol/24 h) (varies with diet)

Gastrointestinal

Gastrin, serum — 0-180 pg/mL (0-180 ng/L)

Stool fat — Less than 5 g/d on a 100-g fat diet

Stool weight — Less than 200 g/d

Pulmonary

Forced expiratory volume in 1 second (FEV₁) — greater than 80% predicted

Forced vital capacity (FVC) — greater than 80% predicted

FEV₁/FVC — Greater than 75% (0.75)

Cerebrospinal Fluid

Cell count — 0-5 cells/µL (0-5 × 10⁶ cells/L)

Glucose — 40-80 mg/dL (2.5-4.4 mmol/L); less than 40% of simultaneous plasma concentration is abnormal

Pressure (opening) — 70-200 cm H₂O

Protein — 15-60 mg/dL (150-600 mg/L)

Hemodynamic Measurements

Cardiac index: 2.5-4.2 L/min/m²

Left ventricular ejection fraction: 45%-70%

Pressures:

Pulmonary artery:

Systolic: 20-25 mm Hg

Diastolic: 5-10 mm Hg

Mean: 9-16 mm Hg

Pulmonary capillary wedge: 6-12 mm Hg

Right atrium: mean 0-5 mm Hg

Right ventricle:

Systolic: 20-25 mm Hg

Diastolic: 0-5 mm Hg