

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 — $4.2\text{-}5.9 \times 10^6/\mu\text{L}$ ($4.2\text{-}5.9 \times 10^{12}$ 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 µg/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 ($4.0\text{-}10 \times 10^9/\text{L}$)

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 ($150\text{-}350 \times 10^9/\text{L}$)

Prothrombin time — 11-13 s

Reticulocyte count — 0.5%-1.5% of erythrocytes; absolute: 23,000-90,000 cells/ μL ($23\text{-}90 \times 10^9/\text{L}$)

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 µg/L)

Aminotransferase, alanine (ALT) — 0-35 U/L

Aminotransferase, aspartate (AST) — 0-35 U/L

Ammonia, plasma — 40-80 µg/dL (23-47 µmol/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 µmol/L)

Direct — 0-0.3 mg/dL (0-5.1 µmol/L)

Blood gases, arterial (patient breathing room air)

pH — 7.38-7.44

P_{CO₂} — 35-45 mm Hg

P_{O₂} — 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 µmol/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 µmol/L; female: 3-14 µmol/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 µg/dL (11-29 µmol/L)

Iron-binding capacity, total, serum — 250-460 µg/dL (45-82 µmol/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 µmol/L)

Direct — 0-0.3 mg/dL (0-5.1 µmol/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

Tropionins, 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