

Normal Laboratory Values - adult

Hematology

Absolute neutrophil count

Male — 1780-5380/ μ L (1.78-5.38 x 10⁹/L)

Female — 1560-6130/ μ L (1.56-6.13 x 10⁹/L)

Activated partial thromboplastin time — 25-35 s

Bleeding time — less than 10 min

Erythrocyte count — 4.2-5.9 x 10⁶/ μ L (4.2-5.9 x 10¹²/L)

Erythrocyte sedimentation rate

Male — 0-15 mm/h

Female — 0-20 mm/h

Erythropoietin — less than 30 mU/mL (30 units/L)

D-Dimer — less than 0.5 μ g/mL (0.5 mg/L)

Ferritin, serum — 15-200 ng/mL (15-200 μ g/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 10¹⁰ cells; score = 13-130/100

polymorphonuclear neutrophils and band forms

Leukocyte count — 4000-10,000/ μ L (4.0-10 x 10⁹/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/ μ L (150-350 x 10⁹/L)

Prothrombin time — 11-13 s

Reticulocyte count — 0.5%-1.5% of erythrocytes; absolute: 23,000-90,000/ μ L (23-90 x 10⁹/L)

Blood, Plasma, and Serum

Chemistry Studies

Albumin, serum — 3.5-5.5 g/dL (35-55 g/L)

Alkaline phosphatase, serum — 36-92 units/L

α -Fetoprotein, serum — 0-20 ng/mL (0-20 μ g/L)

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

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

Ammonia, plasma — 40-80 μ g/dL (23-47 μ mol/L)

Amylase, serum — 0-130 units/L

Bicarbonate, serum — 23-28 meq/L (23-28 mmol/L)

Bilirubin, serum

Total — 0.3-1.2 mg/dL (5.1-20.5 μ mol/L)

Direct — 0-0.3 mg/dL (0-5.1 μ mol/L)

Blood gases, arterial (ambient air)

pH — 7.38-7.44

Pco₂ — 35-45 mm Hg (4.7-6.0 kPa)

Po₂ — 80-100 mm Hg (10.6-13.3 kPa)

Oxygen saturation — 95% or greater

Blood urea nitrogen — 8-20 mg/dL (2.9-7.1 mmol/L)

C-reactive protein — 0.0-0.8 mg/dL (0.0-8.0 mg/L)

Calcium, serum — 9-10.5 mg/dL (2.2-2.6 mmol/L)

Carbon dioxide, serum — See Bicarbonate

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 units/L

Creatinine, serum — 0.7-1.3 mg/dL (61.9-115 μ 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 units/L

Homocysteine, plasma

Male — 0.54-2.16 mg/L (4-16 μmol/L)

Female — 0.41-1.89 mg/L (3-14 μmol/L)

Immunoglobulins

Globulins, total — 2.5-3.5 g/dL (25-35 g/L)

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 μg/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 units/L

Lactic acid, venous blood — 6-16 mg/dL (0.67-1.8 mmol/L)

Lipase, serum — less than 95 units/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 units/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)

Prostate-specific antigen, serum – less than 4 ng/mL
(4 µg/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, total — 2.5-3.5 g/dL (25-35 g/L)

Rheumatoid factor — less than 40 U/mL (40 kU/L)

Sodium, serum — 136-145 meq/L (136-145 mmol/L)

Transferrin saturation — 20%-50%

Triglycerides — less than 150 mg/dL (1.69 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, blood — 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

Adrenocorticotrophic hormone (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 50 µg/24 h (138 nmol/24 h)

Dehydroepiandrosterone sulfate (DHEA), plasma

Male — 1.3-5.5 µg/mL (3.5-14.9 µmol/L)

Female — 0.6-3.3 µg/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, 14-27 pg/mL (50-100 pmol/L); day 11-20, 14-54 pg/mL (50-200 pmol/L); day 21-30, 19-41 pg/mL (70-150 pmol/L)

Follicle-stimulating hormone, serum

Male (adult) — 5-15 mU/mL (5-15 units/L)

Female — follicular or luteal phase, 5-20 mU/mL (5-20 units/L); midcycle peak, 30-50 mU/mL (30-50 units/L); postmenopausal, greater than 35 mU/mL (35 units/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 units/L)

Female — follicular or luteal phase, 5-22 mU/mL (5-22 units/L); midcycle peak, 30-250 mU/mL (30-250 units/L); postmenopausal, greater than 30 mU/mL (30 units/L)

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

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

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

Progesterone, blood

Male (adult) — 0.27-0.9 ng/mL (0.9-2.9 nmol/L)

Female —

follicular phase, 0.33-1.20 ng/mL (1.0-3.8 nmol/L);

luteal phase, 0.72-17.8 ng/mL (2.3-56.6 nmol/L);

postmenopausal, <0.2-1 ng/mL (0.6-3.18 nmol/L);

oral contraceptives, 0.34-0.92 ng/mL (1.1-2.9 nmol/L)

Prolactin, serum

Male — less than 15 ng/mL (15 µg/L)

Female — less than 20 ng/mL (20 µg/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

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

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

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, free (T₃) — 3.6-5.6 ng/L (5.6-8.6

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 — 25-80 ng/mL (62-200 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)

Glomerular filtration rate (GFR)

Normal

Male — 130 mL/min/1.73 m²

Female — 120 mL/min/1.73 m²

Stages of Chronic Kidney Disease

Stage 1 — greater than or equal to 90 mL/min/1.73 m²

Stage 2 — 60-89 mL/min/1.73 m²

Stage 3 — 30-59 mL/min/1.73 m²

Stage 4 — 15-29 mL/min/1.73 m²

Stage 5 — less than 15 mL/min/1.73 m²

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

Protein-creatinine ratio — less than or 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% of predicted

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

FEV₁/FVC — greater than 75%

Cerebrospinal Fluid

Cell count — 0-5/µL (0-5 × 10⁶/L)

Glucose — 40-80 mg/dL (2.2-4.4 mmol/L); less than 40% of simultaneous plasma concentration is abnormal

Pressure (opening) — 70-200 mm 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 — greater than 55%

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