

Appendix E

Reference Laboratory Values

Table E.1 Blood, Plasma, or Serum Values

Test	Normal Values	Clinical Significance
Acetoacetate plus acetone	0.32–2 mg/100 mL	Values increase in diabetic acidosis, fasting, high-fat diet, and toxemia of pregnancy
Ammonia	80–110 μ g/100 mL	Values decrease with proteinuria and as a result of severe burns and increase in multiple myeloma
Amylase	4–25 U/mL*	Values increase in acute pancreatitis, intestinal obstruction, and mumps; values decrease in cirrhosis of the liver, toxemia of pregnancy, and chronic pancreatitis
Barbiturate	0	Coma level: phenobarbital, approximately 10 mg/100 mL; most other drugs, 1–3 mg/100 mL
Bilirubin	0.4 mg/100 mL	Values increase in conditions causing red blood cell destruction or biliary obstruction or liver inflammation
Blood volume	8.5%–9% of body weight in kilograms	
Calcium	8.5–10.5 mg/dL	Values increase in hyperparathyroidism, vitamin D hypervitaminosis; values decrease in hypoparathyroidism, malnutrition, and severe diarrhea
Carbon dioxide content	24–30 mEq/L 20–26 mEq/L in infants (as HCO_3^-)	Values increase in respiratory diseases, vomiting, and intestinal obstruction; they decrease in acidosis, nephritis, and diarrhea
Carbon monoxide	0	Symptoms with over 20% saturation
Chloride	100–106 mEq/L	Values increase in Cushing's syndrome, nephritis, and hyperventilation; they decrease in diabetic acidosis, Addison's disease, and diarrhea and after severe burns
Creatine phosphokinase (CPK)	Female 5–35 mU/mL Male 5–55 mU/mL	Values increase in myocardial infarction and skeletal muscle diseases such as muscular dystrophy
Creatinine	0.6–1.5 mg/100 mL	Values increase in certain kidney diseases
Ethanol	0	0.3%–0.4%, marked intoxication 0.4%–0.5%, alcoholic stupor 0.5% or over, alcoholic coma
Glucose	Fasting 70–110 mg/100 mL	Values increase in diabetes mellitus, liver diseases, nephritis, hyperthyroidism, and pregnancy; they decrease in hyperinsulinism, hypothyroidism, and Addison's disease
Iron	50–150 μ g/100 mL	Values increase in various anemias and liver disease; they decrease in iron deficiency anemia

*A unit (U) is the quantity of a substance that has a physiologic effect.

Table E.1 *continued*

Test	Normal Values	Clinical Significance
Lactic acid	0.6–1.8 mEq/L	Values increase with muscular activity and in congestive heart failure, severe hemorrhage, shock, and anaerobic exercise
Lactic dehydrogenase	60–120 U/mL	Values increase in pernicious anemia, myocardial infarction, liver diseases, acute leukemia, and widespread carcinoma
Lipids	Cholesterol 120–220 mg/100 mL Cholesterol esters 60%–75% of cholesterol Phospholipids 9–16 mg/100 mL as lipid phosphorus Total fatty acids 190–420 mg/100 mL Total lipids 450–1000 mg/100 mL Triglycerides 40–150 mg/100 mL	Increased values for cholesterol and triglycerides are connected with increased risk of cardiovascular disease, such as heart attack and stroke
Lithium	Toxic levels 2 mEq/L	
Osmolality	285–295 mOsm/kg water	
Oxygen saturation (arterial) see Po ₂	96%–100%	
Pco ₂	35–43 mm Hg	Values decrease in acidosis, nephritis, and diarrhea; they increase in respiratory diseases, intestinal obstruction, and vomiting
pH	7.35–7.45	Values decrease as a result of hypoventilation, severe diarrhea, Addison's disease, and diabetic acidosis; values increase due to hyperventilation, Cushing's syndrome, and vomiting
Po ₂	75–100 mm Hg (breathing room air)	Values increase in polycythemia and decrease in anemia and obstructive pulmonary diseases
Phosphatase (acid)	Male: total 0.13–0.63 U/mL Female: total 0.01–0.56 U/mL	Values increase in cancer of the prostate gland, hyperparathyroidism, some liver diseases, myocardial infarction, and pulmonary embolism
Phosphatase (alkaline)	13–39 IU/L* (infants and adolescents up to 104 IU/L)	Values increase in hyperparathyroidism, some liver diseases, and pregnancy
Phosphorus (inorganic)	3–4.5 mg/100 mL (infants in first year up to 6 mg/100 mL)	Values increase in hypoparathyroidism, acromegaly, vitamin D hypervitaminosis, and kidney diseases; they decrease in hyperparathyroidism
Potassium	3.5–5 mEq/100 mL	
Protein	Total 6–8.4 g/100 mL Albumin 3.5–5 g/100 mL Globulin 2.3–3.5 g/100 mL	Total protein values increase in severe dehydration and shock; they decrease in severe malnutrition and hemorrhage
Salicylate	0	20–25 mg/100 mL Over 30 mg/100 mL Over 20 mg/100 mL after age 60
Therapeutic		
Toxic		
Sodium	135–145 mEq/L	Values increase in nephritis and severe dehydration; they decrease in Addison's disease, myxedema, kidney disease, and diarrhea
Sulfonamide	0	5–15 mg/100 mL
Therapeutic		
Urea nitrogen	8–25 mg/100 mL	Values increase in response to increased dietary protein intake; values decrease in impaired renal function
Uric acid	3–7 mg/100 mL	Values increase in gout and toxemia of pregnancy and as a result of tissue damage