

TABLE 97-5 LABORATORY TESTS FOR NUTRITIONAL ASSESSMENT

Test (Normal Values)	Nutritional Use	Causes of Normal Value Despite Malnutrition	Other Causes of Abnormal Value
Serum albumin (3.5–5.5 g/dL)	2.8–3.5 g/dL: Protein depletion or systemic inflammation <2.8 g/dL: Possible acute malnutrition or severe inflammation  Increasing value reflects positive protein balance	Dehydration Infusion of albumin, fresh-frozen plasma, or whole blood	<b>Low</b> <i>Common:</i> Infection and other stress, especially with poor protein intake Burns, trauma Congestive heart failure Fluid overload Severe liver disease <i>Uncommon:</i> Nephrotic syndrome Zinc deficiency Bacterial stasis/overgrowth of small intestine
Serum prealbumin, also called transthyretin (20–40 mg/dL; lower in prepubertal children)	10–15 mg/dL: Mild protein depletion or inflammation 5–10 mg/dL: Moderate protein depletion or inflammation <5 mg/dL: Severe protein depletion or inflammation Increasing value reflects positive protein balance	Chronic renal failure	Similar to serum albumin
Serum total iron-binding capacity (240–450 µg/dL)	<200 µg/dL: Protein depletion or inflammatory state; possible acute malnutrition Increasing value reflects positive protein balance More labile than albumin	Iron deficiency	<b>Low</b> Similar to serum albumin <b>High</b> Iron deficiency
Prothrombin time (2.0–15.5 s)	Prolongation: vitamin K deficiency		<b>Prolonged</b> Anticoagulant therapy (warfarin) Severe liver disease
Serum creatinine (0.6–1.6 mg/dL)	<0.6 mg/dL: Muscle wasting due to prolonged energy deficit Reflects muscle mass		<b>High</b> Despite muscle wasting: Renal failure Severe dehydration
24-h urinary creatinine (500–1200 mg/d, standardized for height and sex)	Low value: muscle wasting due to prolonged energy deficit	>24-h collection Decreasing serum creatinine	<b>Low</b> Incomplete urine collection Increasing serum creatinine Neuromuscular wasting
24-h urinary urea nitrogen (UUN; <5 g/d; depends on level of protein intake)	<i>Determine level of catabolism</i> (as long as protein intake is ≥10 g below calculated protein loss or <20 g total, and as long as carbohydrate intake has been at least 100 g) 5–10 g/d: Mild catabolism or normal fed state 10–15 g/d: Moderate catabolism >15 g/d: Severe catabolism <i>Estimate protein balance</i> Protein balance = protein intake – protein loss where protein loss (protein catabolic rate) = [24-h UUN (g) + 4] × 6.25. Adjustments required in burn patients and others with large nonurinary nitrogen losses and in patients with fluctuating levels of blood urea nitrogen (e.g., in renal failure)		
Blood urea nitrogen (8–23 mg/dL)	<8 mg/dL: Possibly inadequate protein intake 12–23 mg/dL: Possibly adequate protein intake >23 mg/dL: Possibly excessive protein intake If serum creatinine is normal, use BUN.  If serum creatinine is elevated, use BUN/creatinine ratio. (Normal range is essentially the same as for BUN.)		<b>Low</b> Severe liver disease Anabolic state Syndrome of inappropriate antidiuretic hormone <b>High</b> Despite poor protein intake: Renal failure (Use BUN/creatinine ratio.) Congestive heart failure Gastrointestinal hemorrhage