

y reflectance photometry provide an alternative to the color chart and offer better precision and standardization. Bilirubin/Urobilinogen Hemoglobin degradation ultimately results in the formation of the waste product bilirubin, which is then converted to urobilinogen in the gut through bacterial action. A gram-positive pathogen, such as Staphylococcus, Enterococcus, or Streptococcus, may not produce nitrate-reducing enzymes; alternatively, a spot urine sample may not have been retained in the bladder long enough to pick up a sufficient number of organisms to register on the reagent strip.

**16 Leukocyte Esterase** White blood cells (WBCs), especially phagocytes, contain esterases. Dipstick methods for urobilinogen differ, but most rely on a modification of the Ehrlich reaction with p-dimethylaminobenzaldehyde.

**16 Hemoglobin/Blood** Intact or lysed RBCs produce a positive dipstick result.

**Nitrite** This assay semiquantitates the amount of urinary reduction of nitrate (on the reagent strip pad) to nitrite by the enzymes of gram-negative bacteria. The analytes routinely tested are glucose, protein, ketones, nitrite, leukocyte esterase, bilirubin/urobilinogen, and hemoglobin/blood. In conditions of prehepatic, hepatic, and posthepatic jaundice, however, urine dipstick tests for urobilinogen and bilirubin may be positive or negative, depending on the nature of the patient's jaundice. Positive dipstick results should be confirmed by more specific chemical assays, as described in Chapter 11, or more commonly by microscopic evaluation to detect casts. Abnormal results are followed up by specific quantitative or confirmatory urine assays.

**Protein** Reagent strips for UA are used as a general qualitative screen for proteinuria. They are primarily specific for albumin, but they may give false-positive results in specimens that are alkaline and highly buffered.

**Glucose and Ketones** These constituents are normally absent in urine. A positive dipstick for esterases indicates possible WBCs in urine. Although most of this urobilinogen is excreted as urobilin in the feces, some is excreted in urine as a colorless waste product. A more in-depth view of bilirubin metabolism and assay methods is given in Chapter 25. The dipstick will be positive in cases of renal trauma/ injury, infection, and obstruction that result from calculi or neoplasms. The clinical significance of these analytes and their testing methods are discussed in Chapter 14. Reagent strip tests for bilirubin involve diazotization and formation of a color change. This amount is normally too small to be detected as a positive dipstick reaction. A negative result does not mean that no bacteriuria is present.