JOURNAL OF CLINICAL RESEARCH BEST PRACTICES

Vol. 1, No. 10, October 2005 "Can You Handle the Truth?"

"Understanding Laboratory and Diagnostic Tests"

Marie A. Moisio and Elmer W. Moisio, 1998, 412 pages, Delmar Publishers, $69.95

Review by Norman M. Goldfarb

"Understanding Laboratory and Diagnostic Tests" provides a clear and concise description of the laboratory tests and diagnostic procedures a clinical research professional is likely to encounter, and many obscure ones as well. The Moisios provides enough information about each test for the reader to speak intelligently, but not enough to drown him/her in technical minutiae.

This book has been selected for
The First Clinical Research Bookshelf
Essential reading for clinical research professionals

For example, the book dispels the common belief that "bilirubin" is slang for Jewish redneck:

Bilirubin

Bilirubin is a waste product resulting from the lysis of red blood cells and the release of hemoglobin. The heme (iron) portion of the hemoglobin molecule is converted into the bile pigment bilirubin. Bilirubin is a yellow pigment. An abnormally increased blood concentration creates a jaundiced discoloration of the skin, whites of the eyes, and mucous membranes.

Bilirubin is eliminated from the body through a complex process involving the liver. There are two main forms of bilirubin: **indirect or unconjugated bilirubin**, which is transported to the liver as a bilirubin-albumin complex and converted to **direct or conjugated bilirubin** that is eventually excreted in feces and urine. Liver malfunction can inhibit this process. Consequently bilirubin will not be converted to excretable products and will accumulate in the blood.

Bilirubin testing can include measuring the levels of indirect bilirubin, direct bilirubin, and total bilirubin, the sum of direct and indirect bilirubin.

	Normal Range
Total bilirubin	0.2—1.0 mg/dl
Indirect bilirubin	0.1—0.7 mg/dl
Direct bilirubin	0.1—0.3 mg/dl
Newborn total bilirubin	1—12 mg/dl

Variations from Normal. Elevated indirect bilirubin is usually associated with increased destruction of red blood cells, destruction of hemoglobin as seen in hemolytic anemias, pernicious anemia, sickle cell anemia, transfusion reactions, and hemolytic disease of newborns.

Abnormally elevated indirect bilirubin concentrations may also indicate liver dysfunction in that the liver is unable to convert indirect bilirubin to direct bilirubin. Hepatic diseases associated with elevated indirect bilirubin include hepatitis, cirrhosis, and extensive liver tumors.

An increase in direct bilirubin levels usually indicates an inability to excrete bilirubin. Gallstones, tumors, bile duct obstruction, and cancer of the pancreatic head can cause increases in direct bilirubin.

Interfering Circumstances. Improper handling of the blood sample can alter test results. Exposure of the specimen to sunlight or high-intensity artificial light at room temperature will decrease bilirubin concentration. Shaking the blood specimen and the presence of air bubbles may also decrease bilirubin levels.

Drugs that cause increased bilirubin include allopurinol, anabolic steroids, ascorbic acid, diabinese, codeine, steroids, diuretics, and oral contraceptives. Drugs associated with decreased levels are barbiturates, caffeine, penicillin, and high doses of salicylates.

For the reader seeking more depth, the bilirubin entry in "Mosby's Diagnostic and Laboratory Test Reference" is about four times this length.

The Moisios describe about 300 tests for the blood, digestive, endocrine, lymph, nervous, reproductive, respiratory, skeletal and urinary systems in 16 categories:

- Blood Cell Tests
- Blood Chemistry Tests
- Coagulation Studies
- Infectious Disease Tests
- Immunodiagnostic Tests
- Urine and Fecal Studies
- Culture and Sensitivity Tests
- Amniotic Fluid Tests
- Cerebrospinal Fluid Tests
- Other Body Fluid Tests
- Radiology Studies
- Nuclear Medicine Studies
- Endoscopy Studies
- Ultrasound Procedures
- Special Organ Studies

The book is available at www.delmarhealthcare.com.

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