Laboratory Studies by Category

- Chemistries
- Hematology
- Immunology
- Microbiology
- Urinalysis
- Anticoagulation
- Blood gas
- Cytology
- Pathology
Specimen Collection

- Obtaining a specimen by venipuncture:
The robotic LAB InterLink® automated specimen processor control station:
Variable regions:
- Determine antigen specificity.
- Subdivided into the hypervariable (HV1-3) & framework regions (FR).
- Proteases may cleave this region, leaving the FAB (fragment antigen binding).

Constant region:
- Determines the mechanism to destroy the antigen.
Antibodies

- **IgG Antibody:**
  - Heavy chains in blue and blue-green.
  - Light chains in green and yellow.
  - Carbohydrate in red.

http://www.umass.edu/microbio/rasmol/padlan.htm
Antibody-Antigen Interaction
Chemistries: ELISA

ENZYME IMMUNOASSAY:
THE ENZYME-LINKED IMMUNOSORBENT ASSAY (ELISA)
DESIGNED FOR ANTIBODY DETECTION AND QUANTITATION

PATIENT'S SERUM CONTAINING ANTIBODIES + LIGAND COATED WELL

ENZYME CONJUGATED ANTI-HUMAN ANTIBODIES + ENZYMATIC SUBSTRATE

Steven S. Saliterman
Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Chemiluminescence (CL)
Nephelometry


Steven S. Saliterman
Lipoprotein Analysis

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Spectrophotometric Assays

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Protein Electrophoresis

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Hemopoiesis
Complete Blood Count
Basic Flow Cytometry

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Flow Cytometry with Cell Markers
Peripheral Blood Smear

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Immunology: Antinuclear Antibodies

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Immunofixation

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Direct & Indirect Immunofluorescence

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Microbiology: Bacteria

Staphylococcus aureus

Bacillus anthracis

Clostridium difficile

Neisseria gonorrhoeae

Bordetella pertussis

Bacteroides fragilis
Gram Stain

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Plating a Microbial Specimen

1. Body fluid
2. Solid or semisolid samples: stool, sputum, tissues from biopsy
3. Swab of infected site

Twist plate 90°

Incubation until growth of organisms or 7 days with no growth

Colonies are separated and subcultured for species identification

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Antimicrobial Susceptibility Tests

Dilution Method

- A suspension of the organisms is prepared to a turbidity of 0.5 McFarland units.
- A series of tubes containing increasing concentrations of the antimicrobial agent are set up.
- The organisms and the antimicrobial agent are inoculated into the tubes.
- Incubation for 18-24 hours at 35°C in a room air incubator.
- The presence or absence of bacterial growth is observed.

Disc Diffusion Method

- The material is evenly distributed over the entire surface of the plate.
- Antimicrobial discs are placed on the plate.
- Incubation for 18-24 hours.
- Zones of inhibition are measured. Larger zones indicate higher susceptibility of the organism to the antibiotic.

Steven S. Saliterman

Laposata M, Laboratory Medicine, Clinical Pathology in the Practice of Medicine, ASCP Press, Chicago (2002).
Urinalysis
Anticoagulation

- Anticoagulant drugs are used in patients with:
  - Heart disease (including coronary artery disease and mural thrombi),
  - Atrial fibrillation (an arrhythmia),
  - Pulmonary embolism (clot in the lung vasculature),
  - Deep venous thrombophlebitis (DVT),
  - Artificial heart valves and other prosthetic cardiovascular devices, and
  - Other disorders.

- Coagulopathies include genetic and acquired deficiencies in coagulation factors, abnormal synthesis performance of the liver in hepatic (liver) diseases.
The International Normalized Ratio (INR)

- Created by the World Health Organization (WHO) because PT results can vary depending on the thromboplastin reagent used.
- The INR is a conversion unit that takes into account the different sensitivities of thromboplastins.
- The INR is widely accepted as the standard unit for reporting PT results.
PT & INR Measurement
Arterial Blood Gases

Steven S. Saliterman

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Summary

- Antibodies
- Studies by categories include:
  - Chemistries
  - Hematology
  - Immunology
  - Microbiology
  - Urinalysis
  - Anticoagulation
  - Blood gases