Introduction to Laboratory Medicine

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1. What is laboratory medicine?

2. Introduction to the laboratory medicine orientation

What is laboratory medicine?

What is pathology?

My Biases

Clinical Pathologist
(Blood banking and transfusion medicine)

BUT

Was chair of an integrated department
Trained in AP/CP
Teach aspects of AP
Use AP methods in my research

Clinical Service
Research
Education
Administration
What is the clinical practice of pathology?

We receive any tissue or fluid sample (from an FNA to a whole patient) and use any method (from gross visualization to DNA sequencing) to:
1. make a diagnosis, or
2. provide diagnostically or prognostically relevant information

Anatomic Pathology

1. Autopsy
2. Cytopathology: GYN, non-GYN
3. Surgical Pathology
   - Neuropathology
   - Renal pathology
   - Dermatopathology
   - GI/liver
   - Transplant pathology
4. Hematopathology

Laboratory Medicine = Clinical Pathology

1. Clinical chemistry
2. Microbiology
3. Immunology/HLA/flow cytometry
4. Serology
5. “Wet” hematology
6. Coagulation
7. Molecular diagnosis
8. Cytogenetics
9. Informatics
10. Transfusion medicine (BB/apheresis)

Active Recruiting

1. Special Chemistry: Director
2. Biochemical Genetics: Director (new)
3. Core Lab: Associate Director

Clinical chemistry:
- Worgall/Kratz

Microbiology:
- Della-Latta/Wu/Whittier/Huard

Immunology/HLA/flow cytometry:
- Suciu-Foca/Colovai/Vasilescu

Serology:
- Spitalnik

“Wet” hematology:
- Jhang/Kratz/P. Spitalnik

Coagulation:
- Jhang/Kratz

Molecular diagnosis:
- Mansukhani/Jobanputra/micro (Wu)

Cytogenetics:
- Levy/Warburton/Murty/Jobanputra

Informatics:
- Thomas

Transfusion medicine:
- Kaplan/Jhang/Schwartz/Spitalnik

Other hospitals:
- Kratz/Jhang/Spitalnik
Columbia University Medical Center

HOSPITAL
Clinical chemistry
Microbiology
Serology
“Wet” hematology
Coagulation
Cytogenetics
Informatics (Sunquest, Wyndgate, Cornell)
Transfusion medicine

DEPARTMENT (University)
Molecular diagnosis
Immunology/HLA/flow cytometry
Informatics (CoPath)

New Laboratory Information System
(LIS)

Cerner Millennium implementation
Large project: CUMC and WCMC
Replace Sunquest (CUMC) and Cerner Classic (WCMC)
Ongoing
Go-live in April-May, 2009
Wyndgate for transfusion medicine on both campuses
Different Co-Path’s remain on both campuses

Laboratory Medicine

Primarily quantitative
Many types of analytical methods:
enzymology, nephelometry,
ELISA, agglutination, culture,
aggregation, mass spectrometry,
thin layer chromatography, flow
cytometry, electrophoresis, PCR,
Southern blots, etc.

Anatomic Pathology/Laboratory Medicine

Hematopathology:
Diagnosis of APL
Clinical history
CBC and smear
Bone marrow aspirate
Cytochemistry and IHC
Bone marrow core biopsy
Molecular Dx: PCR for t15-17
Cytogenetics: FISH for t15-17
Flow cytometry

Is the morphological examination
of a peripheral blood smear an
AP or a CP activity?

Is this a valid question?
If so, why?
Is flow cytometry an AP or a CP activity?

Is the diagnosis of a basal cell carcinoma by a surgical pathologist more valuable than the identification of a monoclonal spike on an SPEP by a PhD clinical chemist?

Who is going to perform and interpret chip assays using excised tissue in the context of lymphoma?

Are PhD lab directors who have completed clinical fellowships in chemistry, immunology, tissue typing, genetics, microbiology, etc. less competent, less capable, and therefore, less valuable than MD's performing the same roles?

**Recognized responsibilities of a medical director of a clinical laboratory**

- Establish relationships and communication with medical staff, administration, and other departments
- Provide 24 hr/day medical consultation service
- Responsible for staff performance and qualifications
- Responsible for test performance and results reporting
- Annual review of laboratory procedures
- Develop appropriate reference ranges
- Supervise professional and technical QA program
- Monitor compliance and perform utilization review

**Clinical challenges**

- Contain or lower costs
- Improve quality and speed of analyses
- Incorporate new scientific and technical advances
- Monitor and ensure compliance
- Increasing regulation, inspection, and investigation
- Withstand challenges from without
Point-of-care testing (POCT)

Movement of patient testing from large centralized laboratories to the patient’s side (bedside, outpatient, home)
Loss of control and involvement
Access to data
Quality assurance
Higher costs of testing (other costs lower?)

Clinical Service
Research
Education
Administration

Research in Laboratory Medicine

Develop molecular, mechanistic understanding of how disease pathogenesis leads to morphological changes and clinical consequences
This increased understanding may suggest new diagnostic approaches and treatment regimens

Basic bench research:
Warburton, Murty, Levy, Worgall
Suciu-Foca, Spitalnik

Translational/clinical research:
Della-Latta, Wu, Whittier, Huard, Jhang, Schwartz, Kaplan, Kratz, Mansukhani, Jobanputra

Clinical Service
Research
Education
Administration
Education in Laboratory Medicine

Technologists
Medical students
Residents
Fellows
Attendings

Papers, lectures, journal clubs, clinical conferences

Clinical Service
Research
Education
Administration

Laboratory Medicine Administration

>400 FTE’s
Union and non-union
Hospital and University

Medical oversight (faculty, residents)
Technical oversight
   Director: J. Mahoney
Managers
Supervisors
Technologists
Phlebotomist
Clerks

Introduction to the Laboratory Medicine Orientation

Why are we on call?

Doctoral level intervention is required
   Provide medical interpretation
   Facilitate patient care
   Ensure quality of care
   Solve logistical problems
   Obtain data for discussion with attending
Not “make work”
Graduated responsibility
Always have back-up (attending, administrator, Steve)

What are we trying to do?

Provide you with background to start taking call
Not make you an expert
Attitude towards taking call
Professionalism
   - No yelling
   - Need to be helpful
   - Go the extra mile
   - Documentation and follow-up
   - Read, read, read
Everything is open to question at any time
Periodically re-evaluate role and necessity

Orientation Schedule
Transfusion medicine: blood banking
   - Blood group antigens and antibodies
     (CUMC & NYBC)
   - Composition of blood & indications
     for RBC transfusions
   - Special components
   - Introduction to coagulation
   - Case studies in coagulation disorders
   - Hemolytic transfusion reactions
   - Non-hemolytic transfusion reactions
   - TRALI Journal Club
   - Blood Bank tour
   - Wyndgate training

Orientation Schedule
Transfusion medicine: apheresis
   - Introduction(s) to therapeutic apheresis
   - TTP Journal Club
   - Transfusion therapy in sickle cell disease
   - Introduction to stem cell transplantation
   - Apheresis/Stem Cell Processing tour

Orientation Schedule
Hematology:
   - Quantitative hematology
   - Morphological hematology (multiheaded scope)
   - Morphological hematology: unknowns (multiheaded scope)
   - Identification of cells in body fluids
   - Coagulation cascade, PT, aPTT, etc.
   - Introduction to coagulation
   - Case studies in coagulation disorders

Orientation Schedule
Microbiology:
   - Introduction to malaria
   - Malaria morphology
   - Morphological hematology: unknowns (multiheaded scope)
   - Microbiology tour

Orientation Schedule
Core Lab:
   - Specimen Collection/Labeling/Processing
   - Critical values in laboratory medicine
   - Core Lab tour
Orientation Schedule

Other:
- Introduction to laboratory medicine
- Approaches to on-call: roundtable
- Specialty Laboratory tour
- HLA/flow cytometry tour
- Welcome lunch

Other Things

CP “survival guide”

Mandatory conferences:
- Tues 12:30: Journal Club/Special Topics
- Fri 12:30: Weekly didactics

When on rotation: be physically in the lab

Talk to me (Aysha/Cinthya: 212-305-2204)

Cornell