Molecular Diagnostics and Cytogenetics Course
UNC Department of Pathology and Laboratory Medicine
October 2015

Goal: To instill expertise in molecular diagnostics and cytogenetics so that our residents and fellows become competent clinical consultants on use of genetic technology in a wide variety of clinical settings. Trainees develop technical, clinical, communication, management, and judgment skills. A fundamental understanding of genetic technologies prepares them to comprehend the medical literature now and as new genetic test procedures are introduced in future years. Training is provided in a structured environment via didactic seminars, laboratory workshops under the supervision of expert faculty, and interaction with clinicians, counselors, and laboratory scientists. A project is completed on a topic of choice.

Objectives:
1. Gain a working knowledge of molecular technologies including polymerase chain reaction, melt curve analysis, sequencing (Sanger, NextGen, pyrosequencing), Southern blot, \textit{in situ} hybridization, and microarrays. Learn about clinical applications in patients with cancer, heritable disease, and infectious disease, and about applications in HLA typing, parentage, forensics, and pharmacogenetics.
2. Gain a working knowledge of cytogenetics including karyotypes, FISH, and SNP chips. Explore clinical applications in prenatal diagnosis, congenital disorders, and cancer diagnosis and monitoring.
3. Interpret molecular and cytogenetic data in correlation with clinical, histo-morphologic, and immunophenotypic findings. Use standard terminology to describe findings.
4. Discuss quality assurance, assay validation, ethics, regulatory issues, and lab administration.

Resident Duties and Responsibilities: The resident attends didactic sessions, delivers case-based and scholarly presentations, observes testing, interprets results, reads articles, and prepares cases for sign-out. Optional texts are-
- Burtis CA, Ashwood ER, Bruns DE: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 5e ($248, 2012);
- Schrijver I: Diagnostic Molecular Pathology in Practice: A Case-Based Approach ($60, 2011);
- Netto GJ, Schrijver I: Genomic Applications in Pathology, ($239, 2015).

Method of Resident Supervision and Evaluation: Participation in scheduled laboratory and didactic sessions is overseen by course faculty. The resident delivers three oral case-based presentations, and a fourth end-of-rotation presentation on a topic of their choice. The course director evaluates performance with input from instructors.

Course Director: Margaret L. Gulley, MD margaret_gulley@med.unc.edu

Faculty: Booker, Chao, Civalier, Eberhard, Farber, Funkhouser, Gulley, Hammett-Stabler, Hayes, Kaiser-Rogers, Kekelean-Fuller, Lai-Goldman, Miller, Moll, Muenzer, Nelson, Patel, Perou, Powell, Rao, Schmitz, Skrzynia, Thorne, Trembath, Weck, Wohl, fellows (Ferguson, King, Crooks, Montgomery, Duncan), technologists, and others.

Registration: Training occurs at UNC Hospitals from ~9-5pm weekdays in October 2015. The course is a requirement for Anatomic and Clinical Pathology Residents and some Fellows at UNC. Participants from other departments / institutions may attend at a cost of $1200 each. The deadline for registering is Sept 8, 2015. For information contact Dr. Gulley at margaret_gulley@med.unc.edu.