Molecular Diagnostics and Cytogenetics Course
UNC Department of Pathology and Laboratory Medicine
(1-month duration, September 2021)

Goal: To instill expertise in molecular diagnostics and cytogenetics so that our residents and fellows become competent clinical consultants on using 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 trainees to critically evaluate the medical literature now and as new methods 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, in situ hybridization, microarrays, and sequencing (Sanger, NextGen, pyrosequencing). 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 terminology and methods (karyotype, FISH, SNP chip). Learn clinical applications in prenatal diagnosis, congenital disorders and cancer diagnosis and monitoring.
3. Interpret molecular and cytogenetic data in correlation with clinical, morphologic, and immunophenotypic findings.
4. Discuss quality assurance, assay validation, ethics, regulatory issues, and lab administration.

Trainee Duties and Responsibilities: The resident/fellow attends didactic sessions, reads articles, delivers case-based and scholarly presentations, and interprets sample results. Recommended resources include:
- Coleman W, Tsongalis G: Diagnostic Molecular Pathology, 1e, Elsevier (2016)
- Leonard D: Molecular Pathology in Clinical Practice, 2e, Springer (2016)
- Arsham MS: The AGT Cytogenetics Laboratory Manual, 4e, Wiley (2017)
- https://www.amp.org/education/education-resources/
- TRIG Genomics Toolkit & Online Genomic Pathology Modules http://www.pathologylearning.org/trig/resources

Evaluation: Participation is monitored in scheduled laboratory and didactic sessions overseen by ad evaluated by faculty and staff. The resident delivers multiple case-based presentations, and a fourth end-of-rotation presentation on a topic of their choice.

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Registration: Training occurs at UNC Hospitals from ~9-5pm weekdays in September 2021. The course is required for Anatomic & Clinical Pathology Residents and selected Fellows at UNC. Participants from other departments / institutions may register for $1200 each. The deadline for registering is Aug 1, 2021.

For information contact Dr. Gulley at margaret_gulley@med.unc.edu.