

**MOLECULAR PATHOLOGY: Rotation Director: Hui Jia Dong, Ph. D. CLSp (MB)**

**Description of the rotation:** The molecular pathology rotation is designed to train the residents according to the six aspects of competency:

- patient care,
- medical knowledge,
- practice-based learning and improvement,
- interpersonal and communication skills,
- professionalism,
- systems-based practice.

The residents will be trained in the basic concepts of molecular pathology in the area of:

- Basic concept of Molecular pathology
- The technologies used in molecular testing
- Molecular applications in pathology
- Molecular testing variables
- Molecular test validation
- Regulations, and reimbursement issues

The residents will learn to interpret the resulting data and construct consultative reports under the guidance of the attending faculty (practice-based learning, at the last week of the rotation, please coordinates with the sign-out attending). Residents will then be able to correlate this data with the clinical history and other laboratory data through review of the medical record or by contacting the clinical service (patient care, communication skill).

This experience is supplemented by:

- Understanding Molecular Pathology: Methodologies and Applications (Self-Study Course), Gregory L. Blakey and Daniel H. Farkas, 2006
- Molecular Pathology in Clinical Practice, Leonard
- Molecular Diagnostics for the Clinical Laboratorian, William Coleman and Gregory Tsonggalis, Second Edition
- Henry's Clinical Diagnosis and Management by Laboratory Method,
- Journals, including the Journal of Molecular Diagnostics.
- Periodic lectures on Molecular Pathology by the faculty (medical knowledge), molecular results discussion in other rotation, such as cytology, GI, hemepath, coagulation, GYN, and neuropath.

For residents that wish to return for a second month, graduated responsibility includes a wet lab experience although all clinically reported data will be generated by a licensed medical technologist.

Fellows do not participate in this rotation.

Routine molecular pathology services offered by the DRL include:

**Cancer**

- Microsatellite Instability
- Breast Tumor Evaluation; including quantitative morphometry and FISH quantitation of Herceptin 2
- Products of Conception, including DNA Ploidy and p57 immunohistochemistry analysis
- Immunoglobulin gene rearrangements of T cell receptor chain and B cell immunoglobulin heavy chain
- Detection of t(14:18) translocation of BCL-2- IGH fusion gene

- DNA content analysis of ploidy and S phase
- Fluorescent *In Situ* hybridization for diffuse glioma of the central nervous system

#### Infectious Disease

- Detection of Human Papillomaviruses (High Risk)
- Detection of Chlamydia Trachomatis and /or Neisseria Gonorrhoeae
- Hepatitis C viralload quantification
- Hepatitis C viral genotyping
- Human immunodeficiency virus type 1 viralload quantification

#### Coagulation

- Factor V Leiden 1691 G>A mutation analysis
- Prothrombin 20210G>A mutation analysis
- Mehtylenetetrahydrofolate Reductase (MTHFR) mutation analysis

#### Parentage testing

- We offer both legal and non-legal type services

**Goals of the rotation:** At the conclusion of this rotation, the resident will be able to 1) know the specimen handling and common rules in a molecular diagnostic laboratory; 2) explain the basic procedures of DNA and RNA isolation, restriction digestion, agarose gel electrophoresis, Southern blotting, and DNA probing; 3) describe the analysis of Southern blots concerning changes in restriction sites (addition or elimination), DNA insertions, DNA deletions, and DNA inversions; 4) list the basic steps in the PCR or RT-PCR reaction and illustrate how amplification occurs; 5) interpret PCR products for insertions, deletions, changes in numbers of repeats, and changes in restriction sites (if PCR products are restricted); 5) understand other basic techniques in molecular pathology (e.g., FISH) and their interpretation; 6) interpret FISH and IHC results of breast panel;; 7). interpret HCV, HPV, HIV, CT/NG lab results and understand disease management; 8). list the applications of molecular pathology in genetics and cancer diagnosis. 9) know the common applications of molecular tests in different subspecialties of pathology practice.

**Duration of the Rotation:** 4 weeks.

**Duties and responsibilities of residents:** Participate in the generation of the clinical reports, review results related to the molecular diagnostic tests performed in the laboratory. The residents are required to participate the lectures related to molecular pathology. The resident must also satisfactorily complete Understanding Molecular Pathology: Methodologies and Applications (Self-Study Course) produced by the American Association for Clinical Chemistry (AACC; 2006).

**Teaching staff for the rotation:** Ying Li, M.D., Ph.D., Chen Liu, M.D., Ph.D.; Kenneth H. Rand, M.D.; Yachnis, Anthony T., MD.; Wilkinson, Edward J., MD; and Hui Jia Dong, Ph. D.

**Resident Supervision:** Reports are generated in concert with the attending faculty and signed out by the attending faculty.

**Resident Evaluation:** Written monthly evaluation. Evaluation criteria include attendance, degree of preparedness and participation.  
*Revised w/ ACGME competencies, 2004*