University of Minnesota Lab  
Medicine and Pathology  
Cytogenetics Rotation

**Location:** Phillips-Wangensteen (PWB) 15-120  
**Duration:** One month  
**Rotation Directors:** Betsy Hirsch, PhD and Michelle Dolan, MD  
**Phone:** 612-273-3171

**Goals and Objectives:**
The learning objectives below reference the corresponding ACGME core competencies: Patient Care (PC), Medical Knowledge (MK), Professionalism (P), Communication Skills (CS), Practice Based Learning and Improvement (PBLI), and Systems-Based Practice (SBP).

The general expectations below are expected throughout the rotation. At the end of this month-long rotation, residents are expected to meet/exceed the goals and objectives of each of the subsequent subheadings:

A trainee who has satisfactorily completed the rotation is expected to:

- Describe the most common indications for cytogenetic testing
- Be familiar with the different types of specimens received in the Cytogenetics Laboratory, as well as the collection and storage requirements for each
  - Amniotic fluid, chorionic villi, products of conception
  - Peripheral blood, skin biopsies
  - Bone marrow, lymph nodes, solid tumors
  - Formalin-fixed, paraffin-embedded tissue
- Describe the most common indications for cytogenetic testing
- Know how these specimens are processed for tissue culture depending on the cytogenetic techniques to be used
- Know the technical basis of the cytogenetic technologies commonly used in our laboratory (e.g., G-banding, FISH, microarray)
- Be able to describe the steps involved in validation of a FISH probe
- Work with the rotation director(s) when troubleshooting of assays is needed
- Know how to triage clinical cases, applying one or more of these technologies in an efficient and cost-effective manner
- Understand the clinical situations in which G-banding, FISH, microarray may be informative and help guide patient care
- Interpret selected G-banding, FISH and microarray assays prepared by cytogenetic technologists
- Be able to do a literature search to inform case interpretation
- Be able to use online cytogenomic databases to determine the clinical significance of microarray findings
- Understand how to integrate cytogenetic results with clinical and other pathologic findings, including when genetic counseling and/or studies of other family members may be indicated
- Be familiar with basic ISCN nomenclature for the cytogenomic techniques used in the laboratory
- Describe the major types of QA/QC performed in the laboratory
General Expectations in the Cytogenetics Laboratory

Patient Care
- Perform, review, interpret, and/or report tests with the rotation director(s)
- Understand the clinical implications and limitations of these tests
- With the guidance of the rotation director, communicate with physicians and pathologists about ordering cytogenetic testing and/or cytogenetic test results

Practice Based Learning and Improvement
- Obtain and critically evaluate the literature relevant to testing performed in the Cytogenetics Laboratory
- Identify future directions in testing to advance patient care

Interpersonal and Communications Skills
- Develop effective working relationships with professional and technical staff in the Cytogenetics Laboratory
- Demonstrate effective communication skills in the following areas:
  - Verbal, during discussions with clinicians and pathologists, including at conferences
  - Written, to communicate complex test results clearly and concisely
  - Presentation, to communicate written and visual data to a diverse audience, and to answer questions clearly and effectively

Professionalism
- Attend all laboratory meetings and activities, as instructed by the rotation director(s)
- Attend all required conferences (see below)
- Complete all assigned tasks in the time frame noted by the rotation director(s)
- Complete one case report per week, to be uploaded to case log

Systems Based Practice
- With the guidance of the rotation director(s), assist clinicians and pathologists in ordering cytogenetic testing to use resources efficiently and in a cost-effective manner
- Recognize the ethical and legal issues surrounding genetic testing in general and cytogenetic testing in particular
- Understand how such genetic testing impacts families and affects care provided by other health care professionals
- Know how the Cytogenetics Laboratory complies with various standards and guidelines provided by various scientific and regulatory organizations (e.g., CLIA, CAP, ABMGG)

General Reference Books

Required conferences
- Clinical Pathology Conference: Tues 12:00-1:00 PM (weekly) – Mayo D175
- Resident Didactic Series: Wed 7:00-8:00 AM & 9:15-10:15 AM (weekly) – Mayo D175
- Lab Medicine/Pathology Grand Rounds: Wed 8:00-9:00 AM (weekly) – 450 MCRB
- Morbidity & Mortality Conference: Fri 12:00-1:00 PM (weekly) – Moos 2-690

Assessment
Resident performance on this rotation will be assessed by:
- Global performance assessment completed by rotation director(s)
- Formative feedback will be provided by rotation director(s)