Fluorescence in situ hybridization (FISH), a molecular cytogenetic method, is used to detect specific chromosomal and molecular abnormalities. The FISH technology allows hybridization of fluorochrome tagged pieces of DNA to a region of interest on a chromosome. Once hybridized, the DNA probe is detected using a fluorescence microscope.

FISH is a useful adjunct to routine cytogenetic analysis, although in some situations, FISH is useful as a stand-alone test. While chromosome analysis requires dividing metaphase cells, FISH can be performed using non-dividing interphase cells for analysis. Advantages of utilizing FISH are rapid results, usually available in 24-48 hours, and the ability to analyze large numbers of cells, e.g., detection of minimal residual disease. One disadvantage of FISH is that a study provides information only for the gene region of the probe(s) utilized. This is in contrast to routine chromosome analysis, which provides a view of the whole genome.

Sample types that are useful for FISH analysis:
- Blood
- Bone marrow
- Tissue
- Solid tumor
- Paraffin-embedded tissue / tumor
- Touch preparations
- Cytospin preparations
- Body fluids

Indications for FISH in neoplasias:
- Detect aneuploidy in products of conception
- Detect sex chromosome anomalies
- Detect subtelomeric deletions / rearrangements
- Identify unrecognized chromosome material in unbalanced karyotypes

Types of FISH DNA probes and their uses:
- Locus-specific probes
  - Detect a specific gene or DNA sequence
  - Detect gene deletion or amplification
- Translocation probes
  - Detect recognized translocations
- Break-apart probes
  - Detect gene rearrangement
- Whole chromosome paint probes
- Telomere probes
- Centromere probes
  - Chromosome enumeration

Common disorders studied by FISH at CMH:
- Acute myeloid and lymphoid leukemias
- Acute promyelocytic leukemia
- Chronic myelocytic leukemia
- Chronic lymphocytic leukemia
- Myelodysplastic syndromes
- Myeloproliferative disorders
- Lymphoma: Burkitt, Mantle cell, Follicular, Marginal Zone or MALT, Anaplastic large cell, others
- Multiple myeloma
- Solid tumor: Ewing’s & other sarcomas, neuroblastoma, atypical teratoid/rhabdoid tumors, other brain & soft tissue tumors
- Microdeletion syndromes: Prader-Willi/Angelman, DiGeorge, Williams, Kallman’s, Miller-Dieker, Wolf-Hirschhorn, Smith-Magenis, other
- Sex chromosome anomalies
- Prenatal aneuploidy detection
- Minimal residual disease detection

Please contact the Cytogenetics Lab at (816) 802-1220 with questions about availability of DNA probes for diagnostic purposes and for updates.
Safety, Safety, Safety

Hospital wide phlebotomy safety product in-services were provided in March. This included demonstration of needle-less transfer devices, use of blood collection adapters, proper engagement of safety devices and appropriate utilization of lancets. Central Processing staff is able to answer any questions regarding product uses. We are evaluating plastic blue top tubes (coagulation testing) and plastic capillary tubes for PKU collection to avoid potential glass sharps problems. All of these projects are part of the hospital Sharps Injury Reduction Team’s work.

Helpful Hints

Lab staff collecting on units
Laboratory phlebotomists collect specimens on the floors at 0700, 1300 and 1600 Monday through Friday and at 0700 and 1300 on weekends and holidays. In preparation of coming to the units, these “batches” are closed 30 minutes prior to the designated draw time. Please have your orders in no later then 0630, 1230 and 1530.

No Orders?
It is very important to put the order in before sending the specimen. Some testing requires special specimen handling such as separation of cells, freezing or immediate testing. This cannot be accomplished when the laboratory does not know what test is desired and may result in the inability to complete the desired test. Additionally, time spent tracking down orders is disruptive to work on the floors as well as the lab.

Pending Lists
Beginning in February, nursing units and clinics began receiving pending lists. These lab reports print in the nursing units/clinics and provide a list of ordered tests which the laboratory has not received specimens for. The desired outcome of these reports is to help identify problems and resolve them as quickly as possible (please cancel orders on discharged or transferred patients and call the lab when you believe a specimen should already be in the lab).

Add On Tests
- It is important to call the lab before requesting an Add On Test to verify that the specimen is available and there is a quantity sufficient to complete the test. Blood specimens are typically held 7 days and urines for 24 hours.
- In Order Entry, the category LAB has a procedure mnemonic “AOT” which is to be used if you want to order additional testing on a specimen already in the Lab. Testing may be missed if the test is ordered and the comment field is used to indicate the specimen is in the lab.

Future Orders
This Meditech function should be used when placing future Outpatient Lab Orders. Orders placed with this function are held in the system for 6 months.

Standing Orders
Meditech has a special order function to set up standing orders. Orders placed with this function are held in the system for 6 months.

We would be happy to assist when you have questions. The main lab number is (816) 234-3230.

Congratulations
Natasha Hundley, the Supervisor of Central Processing, received the Excellence in Leadership award during Nursing and Allied Health Week. She has been with CMH for 2 years and has contributed much to the hospital as well as the laboratory.