

Course Description**MLS4196C | IN-SITU Hybridization or FISH | 3.00 credits**

This course will explore the theoretical concepts used in fluorescence in-situ hybridization (FISH) testing. Commonly used FISH methodologies, necessary equipment, and the enumeration of FISH signals will also be discussed.

Course Competencies:

Competency 1: The student will demonstrate knowledge and comprehension of the theoretical concepts of fluorescence in-situ hybridization (FISH) by:

1. Defining the following terms:
 - a. Chromosomes
 - b. Centromeres
 - c. Probes
 - d. Centromere probes
 - e. Locus-specific probes
 - f. Break-apart or translocation probes
2. Validating the importance of Fluorescence in Situ Hybridization (FISH) Testing in Cancer Care concerning the following analyses:
3. Detection of Genetic Aberrations with Fluorescence In Situ Hybridization (FISH)
4. Drug Therapy Based on Genetic Aberrations
 - a. DNA Content and Ploidy
 - b. Genetic Aberrations
 - c. Traditional Cytogenetics
 - d. Metaphase Fluorescence In Situ Hybridization (FISH)
 - e. Interphase Fluorescence In Situ Hybridization (FISH) in Formalin-Fixed, Paraffin-Embedded (FFPE) Tissue
 - viii. What type of fluorescence in situ hybridization (FISH) is performed on formalin-fixed, paraffin-embedded (FFPE) tissue

Competency 2: The student will demonstrate knowledge, comprehension, and methodologies of fluorescence in-situ hybridization (FISH) in the laboratory by:

1. Performing tissue Preparation
2. Comparing common FISH methodologies
3. Employing proper slide preparation to include:
 - a. Pre-treatment Strategies
 - b. Standard Pre-treatment
 - c. Standard Protease Digestion
 - d. Standard Denaturation
 - e. Standard Probe Preparation and Hybridization
 - f. Standard Post-Hybridization and Completion
4. Evaluating the differences in:
 - a. Pre-treatment
 - b. Protease Digestion
5. Assessing which pre-treatment solutions are harsher to the tissue
6. Defending the acceptable use of the digital reading on the water bath during the FISH assay
7. Explain the importance of denaturing the tissue DNA and the probe DNA
8. Describing what happens during the hybridization step of a FISH assay

Competency 3: The student will demonstrate knowledge and comprehension and acquire an appreciation of the enumeration involved in fluorescence in-situ hybridization (FISH) by:

1. Assessing Slide Quality
2. Choosing the proper Control Slide
3. Manipulating the Patient Slide

4. Evaluating HER2/neu Examples
5. Reporting Fluorescence In-Situ Hybridization (FISH)
6. Describing the International Standing Committee on Cytogenetic Nomenclature (ISCN) Reporting

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information
- Demonstrate knowledge of ethical thinking and its application to issues in society