

Course Description**MLS4195C | Enzyme Histochemistry | 3.00 credits**

Introduction to advanced techniques and special procedures. Students will learn procedures for, muscle enzyme Histochemistry and molecular histology. The course will include tissue preparation, staining technology, quality control and troubleshooting.

Course Competencies:

Competency 1: The student will demonstrate an understanding, knowledge and comprehension of the basic principles of enzyme Histochemistry by:

1. Discussing safety issues in the enzyme Histochemistry laboratory
2. Defining the following terms:
 - a. Enzymes
 - b. Oxidation
 - c. Reduction
 - d. Substrate
 - e. Hydrolase
 - f. Simultaneous coupling
 - g. Esterase
 - h. Phosphatase
 - i. Phosphorylase
 - j. Epimysium
 - k. Perimysium
 - l. Endomysium
3. Describing the histology of normal muscle
4. Differentiating between type I and type II muscle fibers
5. Listing four types of histochemical reactions for demonstration of hydrolytic enzymes

Competency 2: The student will demonstrate an understanding, knowledge and comprehension of theories of enzyme Histochemistry by:

1. Listing three properties of enzymes
2. Listing five factors that influence enzyme demonstration
3. Listing an artifact that may be seen in unfixed frozen sections
4. Outlining the basic procedures for preparing muscle for enzyme Histochemistry
5. Evaluating a storage solution for tissue to be used for enzyme studies

Competency 3: The student will demonstrate knowledge and comprehension of enzyme Histochemistry techniques by:

1. Employing and describing the reactions for:
 - a. Alpha-naphthol acetate esterase
 - b. Naphthol AS-D chloroacetate esterase
 - c. ATPase
 - d. Acid phosphatase
 - e. Alkaline phosphatase
 - f. NADH diaphorase
 - g. SDH
 - h. Phosphorylase.
2. Evaluating how Naphthol AS-D chloroacetate esterase stain differs from most enzyme stains
3. Summarizing why the pH of the NADH diaphorase reaction is critical
4. Categorizing the diseases indicated by an adverse phosphorylase reaction

Competency 4: The student will demonstrate knowledge, comprehension, and application of enzyme

Histochemistry techniques by:

1. Preparing muscle specimens for enzyme Histochemistry testing
2. Describing artifacts from actual enzyme Histochemistry results
3. Discussing the preferred method of freezing muscle tissue for enzyme Histochemistry studies
4. Operate and monitor a cryostat and pH meter
5. Identifying the results of the following stains:
 - a. Alpha-naphthol acetate esterase
 - b. Naphthol AS-D chloroacetate esterase
 - c. ATPase
 - d. Acid phosphatase
 - e. Alkaline phosphatase
 - f. NADH diaphorase
 - g. SDH
 - h. Phosphorylase.
6. Evaluating, interpreting, and reviewing enzyme Histochemistry results