MLT 118L - Clinical Immunology/Immunohematology Lab

Approval Date:  Effective Term:

Department: MEDICAL LABORATORY TECHNICIAN
Division: Allied Health/Public Safety
Units: 1.00
Grading Option: Letter Grade
Transferability: CSU Transferable
Course is: AA/AS Degree
Repeatability:

Contact Hours per Term:
Lab: 4.00

Associate Degree GE Applicability: No
Recommended Class Size: 15
-Rationale: Station limitations.

Discipline/Minimum Qualifications:

Catalog Description:
Introduces serological and immunohematology procedures and techniques to measure analytes qualitatively and quantitatively.

Schedule Description:
Introduces serological and immunohematology procedures and techniques to measure analytes qualitatively and quantitatively.

Student Learning Outcome:
1. Explain the criteria of an acceptable specimen including all preanalytical variables that could affect the results.
2. Perform the proper techniques used in Immunology and Immunohematology and their interpretation.

Course Objectives:
1. Practice the use of Standard Precautions as they apply in the Immunology and Immunohematology laboratories according to Occupational Safety and Health Administration (OSHA) mandates.
2. Demonstrate safe use and disposal of biohazardous materials.
3. Perform the proper techniques of pipetting and making serial dilutions when conducting serological tests.
4. Interpret the specific disease states covered in the course and describe the serologic assays used to evaluate them.
5. Demonstrate techniques essential to correct evaluation of immunohematology procedures.
6. Perform and interpret quality control procedures.
7. Illustrate, by diagram, the mode of inheritance (possible genotypes of offspring) of the major blood groups (ABO).
8. Compare and contrast the inheritance and antigen frequency of major blood groups (ABO), secretor blood group substances (Lewis A & B), and major antigens (MN, Fya, Fyb) as related to different cultures.
9. Define the criteria for donor selection.
10. Describe the principle and state the significance of the antiglobulin (Coombs) test, direct and indirect.
12. Define routine prenatal testing and postnatal laboratory investigation to prevent Hemolytic Disease of the Newborn (HDN).
13. Compare and contrast the different methods/procedures utilized for compatibility testing.
14. Describe the correct procedure for processing various blood components: fresh frozen plasma (FFP), cryoprecipitate, and platelets.
15. Perform the proper techniques of antigen-antibody testing and their interpretation.

**Course Content Outline:**

- Evaluate immunohematology procedures.
  1. 3-5% red cell suspensions using proper cell washing techniques.
  2. Agglutination grading as outlined in the laboratory manual procedure.
  3. Interpreting results of agglutination grading.
- Quality Control procedures.
  1. Quality Control of daily reagents used.
  2. Weekly, monthly, and as needed maintenance of other reagents and equipment.
  3. Documentation of quality control results.
  4. Troubleshooting quality control results that did not perform as expected.
- The importance of quality control.
- The mode of inheritance (possible genotypes of offspring) of the major blood groups (ABO).
  1. Methods of ABO grouping (cell and serum), including the characteristics of the antibodies that define the system and reason for the use of each reagent.
  2. Blood type analysis per laboratory manual.
  3. Secretion of blood group substances.
  4. The theory of inheritance and frequency of Rh antigens.
- Tests used for the detection and identification of antigens and antibodies in the RH/Hr blood group system.
- Troubleshooting methods useful in blood type analysis.
- The inheritance and antigen frequency of major blood groups (ABO), secretor substances (Lewis A & B), and other major antigen (MN, Fya & Fyb) as related to different cultures.
  1. ABO phenotype frequencies.
  2. Lewis phenotype frequencies.
  3. MN phenotype frequencies.
  4. Duffy phenotype frequencies.
- Criteria for blood donor selection.
  1. Minimum age and weight for potential donors.
  2. Acceptable vital signs for temperature, blood pressure, and pulse for acceptable blood donors.
  3. Serological test procedures performed on potential blood donor's blood before any of the blood components can be transfused to a patient.
J. Antiglobulin (Coombs) test; direct and indirect.
1. Direct Coombs performed on an in

A. Standard Precautions as they apply in the Clinical Immunology and Immunohematology departments according to Occupational Safety and Health Administration (OSHA) mandates.
1. Basic aspects of infection control policies, including how and when to use personal protective equipment (PPE) or devices (gown, cloves, and goggles).
2. Use of PPE in Immunology and Immunohematology departments during all laboratory work with hazardous material.
4. Pre and post exposure prophylactic measures for handling potentially occupational transmission of certain pathogens.
5. Disinfectants used to decontaminate the work area when a hazardous spill has occurred or when beginning or ending a laboratory session.
6. Basic steps in first aid.
7. Issues in a Safety Program:
   a. Evacuation routes,
   b. Biohazardous material,
   c. Blood borne pathogens (BBP),
   d. Standard precautions,
   e. Aerosols,
   f. Material Safety Data Sheets (MSDS).
B. Safe use and disposal of biohazardous materials.
1. Segregation and disposal of various types of waste products generated in the clinical laboratory including the use of sharps containers for needles, lancets, and/or other sharps.
2. Disposal of biological samples.
C. The proper techniques of pipetting and making serial dilutions when performing serological tests.
1. Titer and serial dilutions.
2. Technique for diluting a serum specimen serially
D. Specific disease states and the serological assays used to evaluate them.
1. Principles and applications of agglutination, precipitation, hemagglutination, and latex agglutination.
   (RPR, Cold agglutination test, Hepatitis, Monotest)
3. Other specific disease states and the serological assays used to evaluate them.
4. Interpretation of serologic assays used in lab.
E. Techniques used to correct infant vs. an adult.
2. Indirect Coombs tests and its interpretation.
K. Principles and procedure for antibody identification.
1. Detection and identification of antigens and antibodies in the Rh blood group system
3. Performing and interpreting antibody panel results.
4. Elimination method used to interpret antibody identification.
L. Prenatal testing and postnatal laboratory investigation to prevent Hemolytic Disease of the Newborn (HDN).
1. Indications for use of Rh immunoglobulin.
2. ABO and RH with variant D testing on adults and neonates.
3. Fetalscreen test.
4. Dosage calculation of Rh immunoglobulin.
M. Methods/procedures used for compatibility testing.
1. Different testing techniques used in compatibility testing.
2. The criteria used for selection of blood donor units for transfusion.
3. Causes of transfusion reactions and means of detection in the laboratory.

N. The correct procedure for processing various blood components: fresh frozen plasma (FFP), cryoprecipitate, and platelets.
1. Preparation, storage requirements, effects of storage, and use of blood components and advantages and disadvantages of each in a clinical situation.
2. Pooling and processing FFP, cryoprecipitate, and platelethpheresis.

Methods of Instruction:
Lab:

Methods of Evaluation:
Exams/Tests/Quizzes
Skill Demonstrations
Writing assignments

Typical Assignments:
Reading:
Textbook assignments Supplemental reference books Handout (lab procedures)
Writing, Problem Solving or Performance:
Problem solving for case studies Short essay answers for some exam questions Some calculations
Other:

Required Materials
Examples:
Book 1
Author: Mahon, Connie R. & Diane Tice
Publication Date: 2006
Edition: .
Title: Clinical Laboratory Immunology
Publisher: Prentice Hall

Book 2
Author: Turgeon, Mary Louise
Publication Date: 2008
Edition: 4th
Title: Immunology and Serology in Laboratory
Publisher: Mosby
Medicing
Book 3

Author: Blaney, Kathy D. & Paula R. Howard
Title: Basic & Applied Concepts of Immunohematology
Publication Date: 2008
Publisher: Mosby
Edition: 2nd

Course Preparation:

Prerequisite(s): None
Co-Requisite(s): MLT 118
Recommended: None