MLT 118 - Clinical Immunology/Immunohematology Lecture

Approval Date:  Effective Term:

Department: MEDICAL LABORATORY TECHNICIAN
Division: Allied Health/Public Safety
Units: 3.00
Grading Option: Letter Grade
Transferability: CSU Transferable
Course is: AA/AS Degree
Repeatability:

Contact Hours per Term:
  Lecture/Discussion: 4.00
Associate Degree GE Applicability: No
Recommended Class Size: 15
-Rationale: Station limitations.

Discipline/Minimum Qualifications:

Catalog Description:
Introduces the principles of antigen and antibody reactions included in blood grouping and typing, and compatibility testing, and serological and immunohematological procedures.

Schedule Description:
Introduces the principles of antigen and antibody reactions included in blood grouping and typing, and compatibility testing, and serological and immunohematological procedures.

Student Learning Outcome:
1. Compare and contrast basic immunological principles and their application in the Clinical Laboratory.
2. Summarize Blood Banking/Immunohematology principles.

Course Objectives:
1. Compare and contrast the regulations and accrediting agencies of blood and transfusion centers.
2. Evaluate the mechanisms that protect the body from disease or injury and explain the parts and function of each.
3. Differentiate the various antigens and antibodies of several clinical procedures and discuss the assay's clinical significance.
4. Compare and contrast the regulations and accrediting agencies of blood and transfusion centers.
5. Compare and contrast the mode of inheritance of the major blood groups.
6. Compare and contrast the basis of Rh nomenclature.
7. Summarize the principle and state the significance of the antiglobulin test: direct and indirect.
8. Summarize the principle and significance of the procedure used for antibody identification.
9. Compare and contrast the four major causes of transfusion reactions and means of detection in the laboratory.
10. Compare and contrast the mechanisms of sensitization in both Rh and ABO Hemolytic Disease of the Newborn (HDN) and the effects of the antigen-antibody complex of the fetus.
11. Summarize the preparation, storage requirements, effects of storage and use of blood components.

Course Content Outline:

A. The immunological principles and applications of several methods and site applications.
1. The principle and applications of agglutination, precipitation, hemagglutination, and latex agglutination.
2. The principle of immunofluorescent, immunodiffusion, neutralization, and complement fixation.
B. The mechanisms that protect the body from disease or injury, parts and functions of each.
1. Natural resistance and acquired immunity.
2. Cellular immunity in terms of the roles of lymphocytes and phagocytic cells.
3. The mechanism of action after receiving an immunization.
C. Various antigens and antibodies tested in clinical procedures and their significance.
1. The anti-streptolysin test, monotest, C-reaction protein, HCG, rheumatoid factor, RPR, and cold agglutinins.
2. Interpretation of test results and clinical significance.
D. Blood Banking/Immunohematology principles.
1. Related to disease states of the human blood system.
2. General treatments and/or prevention of these disease states.
E. Mode of inheritance of the major blood groups.
1. Methods of ABO grouping (cells and serum).
2. Characteristics of the antibodies that define the system.
3. Use of each reagent to identify them.
4. Inheritance and antigen frequency of the major blood groups and secretor blood group substances and major antigens as related to different cultures.
F. The basis of Rh nomenclature.
2. The most probable genotypes.
3. Tests for the detection and identification of antigens and antibodies in the Rh/Hr blood group system.
G. The principle and significance of the antiglobulin test: direct and indirect.
1. Comparison of the direct Coombs on an infant vs. an adult.
2. The purpose and clinical significance and procedure of the direct and indirect antiglobulin tests.
3. Tests used to diagnosis autoimmune hemolytic anemia.
4. The effects on service.
2. Quality assurance, quality control and continuous quality improvement.
3. Regulatory agencies involved in the safety of health care workers.

of the presence of warm autoimmune hemolytic anemia and cold hemagglutinin diseases on laboratory tests.
H. The principle and significance of the procedure for antibody identification.
1. Test detection for identification of antigens and antibodies.
2. Serologic and immunologic characteristics of the following antibodies:
a. ABO
b. Rh

c. Lewis

d. Kell

e. Duffy

f. Kidd

g. MNSs

h. Lutheran

i. Xg blood group

3. The probability value that should be established when proving an antibody.

i. The four major causes of transfusion reactions and means of detection in the laboratory.

1. Immune, nonimmune, immediate, and delayed transfusion reactions.

2. The three steps that must be taken by the Blood Bank when a transfusion reaction is suspected.

J. The mechanisms of sensitization in the Rh and ABO Hemolytic Disease of the Newborn (HDN) and the effects of the antigen-antibody complex of the fetus.

1. Indications for use of Rh immunoglobulin.

2. Dosage calculation of Rh immunoglobulin.


4. Principle and use of the Kleihauer-Betke test.

5. Routine prenatal and postnatal laboratory investigation of HDN.

K. Preparation, storage requirements, effects of storage, and use of blood components.

1. Advantages and disadvantages of each blood component.

2. Pooling and processing fresh frozen plasma (FFP), cryoprecipitate, and plateletpheresis.

L. The selection and screening process for blood donors.

1. The importance of medical history.

2. Providing educational material to prospective donors.

4. Types of donor reactions and appropriate steps to follow.

5. The serological tests procedures performed on the potential blood donor's blood before any of the blood components are transfused into a patient.

M. Regulations and accrediting agencies for blood and transfusion centers.

1. The role of quality assurance in a blood center or transfusion center.

**Methods of Instruction:**

Lecture:

**Methods of Evaluation:**

Exams/Tests/Quizzes

Case studies

**Typical Assignments:**

**Reading:**

Textbook chapter assignments Supplemental reference books

**Writing, Problem Solving or Performance:**

Problem solving for chapter study questions Short essay answers for some exam questions Some
calculations

Other:

**Required Materials**

**Examples:**

**Book 1**

**Author:** Turgeon, Mary Louise  
**Publication Date:** 2008  
**Edition:** 4th

**Title:** Immunology and Serology in Laboratory Medicine  
**Publisher:** Mosby

**Book 2**

**Author:** Mahon, Connie R. & Diane Tice  
**Publication Date:** 2006  
**Edition:** .

**Title:** Clinical Laboratory Immunology  
**Publisher:** Prentice Hall

**Book 3**

**Author:** Blaney, Kathy D. & Paula R. Howard  
**Publication Date:** 2008  
**Edition:** 2nd

**Title:** Basic & Applied Concepts of Immunohematology  
**Publisher:** Mosby

**Course Preparation:**

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