Common Course Outline

MLTC *150*

Principles of Immunology and Blood Banking

Three Semester Hours

The Community College of Baltimore County

Description

MLTC *150* - Three credits - Principles of Immunology and Blood Banking examines the principles of immunology including the organization and function of the immune system, antigens and antibodies, humoral and cell-mediated immunity, hypersensitivity, complement system, and disorders of the immune system. The course also presents an introduction to the theoretical and practical concepts of blood banking and transfusion medicine. Topics include donor screening and selection, basic blood group serology, component selection and therapeutic use, hemolytic disease of the newborn, and transfusion reactions. Laboratory exercises in immunology emphasize the serological methods for infectious disease diagnosis. Laboratory exercises in blood banking include ABO/Rh(Rhesus) grouping, antibody screening, compatibility testing, and single antibody identification. 2 lecture hours per week, 3 laboratory hours per week. Prerequisites: BIOL 109, BIOL 110, CHEM 107/108, ENGL 101, and MLTC 101.

Overall Course Objectives

Upon completion of this course, students will be able to:

1. define the process of donor screening and selection for allogeneic whole blood donation and autologous pre-deposit donation;
2. explain the preparation, management, handling, and therapeutic use of the following blood products for transfusion: packed red blood cells, fresh frozen plasma, random platelets, and cryoprecipitate;
3. apply the principles and applications of direct agglutination testing(ABO/Rh[Rhesus]) as well as direct and indirect antiglobulin testing to identify unknown antibodies;
4. perform the following tests: ABO grouping, Rh(Rhesus) typing, antibody detection, compatibility testing, and single antibody identification by the test tube method;
5. compare and contrast the serologic characteristics, notable aspects, and clinical significance of the following blood group systems: ABO, Rh(Rhesus), Kell, Kidd, Duffy, MNSs, and Lewis;
6. evaluate the results of routine blood bank testing to recognize expected findings, discrepant ABO findings, and invalid antiglobulin results;

7. formulate a basic plan of action for investigating unexpected findings when given the results of blood bank testing;
8. categorize hemolytic disease of the newborn, and autoimmune hemolytic anemia with regard to testing, cause, management, and treatment;
9. determine the process of investigating a suspected transfusion reaction as it relates to classification of the reaction, as well as, recommendations for future transfusions;
10. compare and contrast the inflammatory process, innate and adaptive immunity, and the cells and immune factors involved in each;
11. apply general immunologic principles to serological testing methods;
12. perform the following serologic assays: Rapid Plasma Reagin (RPR), Anti-Streptolysin-O, Infectious Mononucleosis, Rheumatoid Factor and C-Reactive Protein;
13. interpret Anti-Nuclear Antibody patterns for autoimmunity classification;
14. intrepret quality control measures used in serology and blood bank testing; and
15. demonstrate laboratory safety including universal standard precautions.

Major Topics

I. Immunology
- A. Natural and Acquired (Innate and Adaptive) Immunity
- B. Phagocytosis & Inflammation
- C. Primary & Secondary Immune Responses
- D. Antigens & Immunoglobulins
- E. Complement System
- F. Hypersensitivity Reactions
- G. Immunodiagnostics
  1. Syphilis Serology (Rapid Plasma Reagin testing)
  2. C-Reactive Protein (C-RP)
  3. Streptococcal antibody Test (ASO)
  4. Viral Infectious Diseases (Epstein-Barr Virus, Rubella, Cytomegalovirus, Human Immunodeficiency Virus (HIV), Hepatitis A, B, C, D, and E)
  5. Autoimmune Diseases (Rheumatoid Arthritis, Systemic Lupus Erythematosus)

II. Blood Banking
- A. Donor Screening and Whole Blood Donation
- B. Autologous Donation
- C. Blood Component Preparation, Processing, Storage and Selection
- D. Basic Genetics & Hemagglutination
- E. ABO Blood Group System

F. Rh(Rhesus) Blood Group System
G. Other Major Blood Groups
H. Antibody Screen & Identification
I. Compatibility Testing
J. Direct Antiglobulin Test (DAT)
K. Special Techniques
L. Transfusion Reactions
M. Hemolytic Disease of the Newborn (HDN)
N. New Technologies in Blood Banking

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member, but, at minimum, will include the following:

4 didactic exams
Weekly homework (case studies, lab questions)
Weekly Lab Exercises
2 Lab Quizzes
Final Lab Proficiency Assessment
Mid-Term Exam
Comprehensive Final Exam

Other Course Information

This course is a Medical Laboratory Technology Program core course.