MEDICAL & SCIENCE MEDIA

LABORATORY MEDICINE SOFTWARE

Cat.# WU-3 - GRAM STAIN TUTOR

COURSE OUTLINE: Introduction: Overview, Gram Stain Procedure, Theory Interpretation. Morphology: Cells, Bacteria, Yeasts, Artefacts. Specimen Sites: CSF, Blood, Respiratory, Urine, Genital, Wound, Eye, Joint Fluid, Stool. Case Studies: Case #1, Case #2, Case #3, Case #4, Case #5, Case #6, Case #7. Exams: Exam #1, Exam #2.

LEARNING OBJECTIVES:

- State the clinical importance of the Gram stain of body fluids, and describe and state the purpose of each step in the procedure
- List the major organisms isolated from the following specimens: blood, CSF, urine, respiratory, genital, wound, joint, eye, and stool
- State whether a specimen is likely to be normal, contaminated, or infected
- Use the proper generic terminology to systematically describe the morphology of bacteria or yeast
- Use the proper terminology to identify and describe cell types and common artefacts

Cat.# WU-2 - URINALYSIS TUTOR


LEARNING OBJECTIVES

- Describe the anatomic structures involved in urine formation
- Describe the three parts of a complete urinalysis
- Describe three methods of enhancing the visualization of urinary sediment structures
- Identify and differentiate the common cell types found in urinary sediment
- Enumerate red blood cells and white blood cells in unstained urinary sediment
- Identify the types of casts seen in urinary sediment and state the clinical significance associated with each finding
- Differentiate between crystals found in normal urine and crystals associated with clinical disease
- Describe typical urinary sediment findings and key biochemical findings associated with selected renal disorders

Cat.# WU-17 - COAGULATION TUTOR

LEARNING OBJECTIVES

- Describe the basic physiology of hemostasis and its regulation
- Name the common bleeding disorders and their associated defects
- Understand the methodology of common coagulation tests and their role in diagnosing bleeding disorders
- Know the common abnormal coagulation test result patterns and the bleeding disorders most frequently associated with them
- Understand the role of coagulation tests in monitoring anticoagulant therapy

LEARNING OBJECTIVES:

- Discuss the function and structure of veins. Identify the names and locations of the veins most suitable for phlebotomy
- List equipment and supplies needed to collect blood and discuss the correct use of each
- Describe the steps in performing a venipuncture procedure
- Discuss techniques and equipment used to minimize biohazard exposure
- Identify procedure errors and discuss remedies for each
- Identify complications associated with blood collection and discuss how appropriately to respond when each occurs
- Recognize sub-optimal specimens and their effect on the quality of laboratory test results

Pediatric Phlebotomy Module

Techniques for blood collection from paediatric patients, including use of special equipment and distraction techniques


LEARNING OBJECTIVES:

- List the equipment and supplies needed to perform a paediatric blood draw
- List the key patient considerations for various age groups of paediatric patients
- Describe the steps in performing a paediatric venipuncture using a syringe and butterfly needle
- Describe the steps in performing paediatric finger stick and heel stick procedures
- Describe the steps in performing a capillary blood gas

LEARNING OBJECTIVES:
- Describe the steps necessary for the preparation of a Wright-stained peripheral blood smear and its proper microscopic evaluation
- Identify the sequence of cell types encountered during normal maturation of myeloid, erythroid, and megakaryocytic cells in the marrow
- Recognize and name the normal and abnormal forms of neutrophils, erythrocytes, lymphocytes, macrophages, and platelets using proper medical terminology
- Integrate combinations of morphologic abnormalities involving one or more cell lineages to suggest a diagnosis of a disease state

Cat.# WU-9 - INTRODUCTION TO TRANSFUSION SERVICES


LEARNING OBJECTIVES:
- Name the 4 components that can be made from a unit of whole blood and describe the function of each
- Define the following terms: antigen, clinically significant antibody, hemolysis, and the complement system
- List compatible components for the following patient blood groups: A, B, O, and AB
- Define the antibody screen and explain why it is important in pre-transfusion testing
- Name 3 crossmatch tests and define when an antiglobulin crossmatch must be done
- Describe the laboratory's role in the evaluation of a suspected transfusion reaction
- Define the elements of accurate and thorough testing prior to infusion of blood components to a patient

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Synovial Fluid Module

Classification of synovial effusions. Gross and microscopic examination, including the use of polarized light


LEARNING OBJECTIVES

- Describe the basic classification of synovial effusions
- Discuss the principles and applications of polarizing microscopy and compensated polarizing microscopy, and how to perform them
- Distinguish urate crystals from calcium pyrophosphate dihydrate (CPPD) crystals
- Describe other crystals, artefacts, inclusions, and cell types that may be present in synovial fluids

Serous Fluid Module

Serous fluid production. Distinguishing transudates and exudates using laboratory testing. Gross and microscopic examination of serous fluids


LEARNING OBJECTIVES

- Describe the normal production of serous fluids and the mechanisms of formation of transudates and exudates
- Distinguish transudates and exudates using lab testing, and understand their significance
- Describe the gross appearance of serous fluid specimens
- Identify the major types of normal and abnormal cells in serous fluids and their significance

Seminal Fluid Module

Semen analysis, including the determination of sperm concentration, motility and morphology


LEARNING OBJECTIVES

- List the glandular contributions and cellular components of seminal fluid
- Describe the methods used to determine sperm concentration, motility and morphology
- List the abnormalities detected and reference ranges for semen analysis
- Discuss the goals and limitations of semen analysis in the clinical setting
Cerebrospinal Fluid Module

Overview of the lumbar puncture procedure. Gross and microscopic examination of cerebrospinal fluid


LEARNING OBJECTIVES

- Describe the production and collection of cerebrospinal fluid (CSF)
- Describe the gross appearance of CSF specimens
- Describe the principles of manual chamber counts, cytocentrifuge preparation, and Wright staining
- Identify the major types of normal and abnormal cells in CSF and describe their significance

Amniotic Fluid Module

The amniocentesis procedure and laboratory analysis of amniotic fluid


LEARNING OBJECTIVES

- Describe the amniocentesis procedure and the most common indications for amniocentesis
- List the most common genetic abnormalities detected by cytogenetic analysis and their clinical features
- Describe the L/S ratio and other assays used to assess foetal lung maturity
- Describe the tests used to screen for open neural tube defects
- Describe haemolytic disease of the newborn (HDN) and how the severity of HDN is assessed in the lab

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Biosafety Module

Standard precautions, personal protective equipment and spill cleanup


LEARNING OBJECTIVE:

• List 3 modes of disease transmission and a way to reduce risk of laboratory transmission for each mode
• List the 3 control methods used to limit exposure in laboratories, and give 2 examples of each
• List 4 types of Personal Protective Equipment (PPE) commonly used in laboratories and when to use them
• State the steps to follow when cleaning up a spill of biohazardous material
• List 3 items that should be discarded as regulated medical waste

Chemical Safety Module

Proper handling, storage, and disposal of laboratory chemicals, and methods for responding to chemical spills and exposure


LEARNING OBJECTIVES:

• List the 4 routes of entry for hazardous chemicals
• Define acute and chronic health effects
• Describe the proper method for labeling hazardous chemicals
• Describe the purpose of a material safety data sheet and list the 7 required types of information
• State the main hazard classes for dry chemicals, liquid chemicals and compressed gases
• List 5 requirements for disposal of hazardous chemicals
• State the method for assessing and cleaning a hazardous chemical spill
• State the steps to follow after exposure to a chemical

Electrical Safety Module

Basic electrical theory, and how to identify and avoid electrical problems in the lab


LEARNING OBJECTIVES:

• Describe the basic theory behind Voltage, Amperage, Short Circuits and Grounding Systems
• List 3 things that are indications of electrical problems in an instrument
• Identify 2 serious outcomes associated with electrical shock
• Describe when and how to inspect portable electrical equipment
• List the steps to take if someone is experiencing electrical shock
Ergonomic Safety Module

Risk factors and symptoms for repetitive stress injury in the clinical laboratory, with explanation and demonstration of ergonomically correct practices


LEARNING OBJECTIVES:

- Identify eight risk factors for repetitive stress injury
- Identify symptoms of repetitive stress injury
- List eight methods of avoiding repetitive stress injury

Fire Safety Module

The selection and use of portable fire extinguishers, types of fires and fire hazards, and the steps to take in the event of a fire


LEARNING OBJECTIVES:

- List the 3 legs of the Fire Triangle
- List the 4 classes of fire and an example of each
- Identify 5 types of fire extinguishers and the class(es) of fire each can be used on
- Describe the proper use of a portable fire extinguisher
- List the 4 steps to follow if you discover a fire

Formaldehyde Safety Module

Proper handling, storage, and disposal of Formaldehyde, and methods for responding to spills and exposure


LEARNING OBJECTIVES:

- List 4 hazards associated with formaldehyde
- List 4 symptoms associated with overexposure to formaldehyde fumes
- State the airborne exposure limits for formaldehyde
- Describe an appropriate label for formaldehyde-containing solutions
- List the required personal protective equipment necessary when working with concentrated formaldehyde
- Describe appropriate steps to take when cleaning a minor spill of formaldehyde

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UV Safety Module

The hazards associated with UV light in the clinical laboratory and the proper use of safety equipment to avoid exposure

COURSE OUTLINE:

LEARNING OBJECTIVES:
- List two negative health effects of UV light exposure
- List four pieces of UV personal protective equipment and describe how to use them appropriately
- Describe how to distinguish UV protective shielding from shielding that does not protect against UV light

Cat.# WU-13 - MICROSCOPY TUTOR

COURSE OUTLINE:

LEARNING OBJECTIVES:
- Explain the function of each part of the light microscope and show where it is located
- Define "resolution", "contrast", and "definition" as they relate to the light microscope. Explain which parts of the microscope affect each. Manipulate these parts
- The user will be able to summarize the optical path of light throughout the microscope from beginning to end
- The user can determine the magnification, numerical aperture, and optimum cover-slip thickness of an objective lens
- The user can perform each step in the process of Köhler illumination in order. They can also use the fine focus control to visualize the third dimension of a specimen
- The user can recognize when an objective lens is dirty and can perform this simple maintenance procedure
- The user can understand common lens aberrations as evidenced by choosing the best optics for a given application. The user will also be capable of critically evaluating manufacturer's specifications
- The user will have a spatially accurate, 3-D understanding of the three properties of light and how they relate to the light microscope

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Cat.# WU-4 - MYCOLOGY TUTOR

COURSE OUTLINE:

LEARNING OBJECTIVES:
- Recognize the four classes of fungi and the sexual cycles used to divide each group
- Demonstrate the ability to use colour, shape, texture, and differential media and tests to accurately and correctly describe a specimen
- Describe in detail the most common procedures to identify yeasts and moulds
- Recognize further tests that are available if necessary
- List the conidiogenesis methods commonly used in the laboratory to recognize and define different moulds
- List the common superficial, subcutaneous, and systemic mycoses and recognize the clinical presentation, obverse and reverse colonies, and microscopic features of each
- Identify macroscopically and microscopically common opportunistic fungi as well as some of the less common opportunists
Identification of clinically important parasites


Learning Objectives:

- Explain common parasite life cycles and relate how that knowledge aids in selection of the appropriate test methodology
- Discuss the different lab tests available for detection of parasites and compare each in detail
- Discuss how a particular laboratory approach is chosen to detect a certain parasite and why it is the best choice
- Demonstrate the ability to interpret the results of the various methods of identifying the presence of parasites, both intracellular and extracellular in blood and in stool samples
- Discuss the general geographic distribution of many common parasites seen in the laboratory
- Differentiate between true parasites and common artefacts that are seen and recognize when to pay special attention to the possibility of confusing the two
- Identify parasites found in sites other than blood and stool samples and the appropriate way to test for each of them