

PARASITOLOGY & MICROSCOPY ROTATION OBJECTIVES

Course: LABM 250

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Introduction

The overall objective of this rotation is to have hands-on experience in a hospital operation and to integrate theoretical knowledge with practical application for the laboratory diagnosis of human diseases related to parasitic infections, male infertility, and disorders detectable by microscopic and biochemical examination of urine specimens.

These objectives are presented as guidelines for the student about what he/she is expected to learn whether by observing and performing, or by instruction or reading about the contents. In addition to daily participation in the work of the laboratory, the student will be performing tests and examinations on several assigned specimens.

Electronic Resources

For more detailed information on tests requirements and management, refer to the Laboratory Service Manual of the Department of Pathology and Laboratory Medicine (PLM) accessible through the following link: https://his.aubmc.org/lb/Lis_emanual/LabTest

Performance Evaluation

Assessment of the student will be based on attendance, interaction & showing interest, aptitude, professional attitude, technologists report through the rotation within the laboratory. Absence from rotation and failure in any of the assessments will reflect adversely on the overall assessment. Students are evaluated based on their performance in the various assigned activities during the rotation as detailed below:

Evaluation	Percentage of Grade
Practical Evaluation	40%
Slide Show Exam	20%
Written Exam	40%

Investigation of Intestinal Parasites and Biochemical Examination of stool

The student should learn about the spectrum of parasites found in stool, their differential characteristics, and laboratory methods used for their detection along the following guidelines:

- Collection and handling of stool specimens e. g. general approach, scotch tape technique.
- Macroscopic examination of the stool: consistency, presence of mucus, blood, roundworms, tapeworms, or their segments.

- The fixation (preservation) of stool specimens e.g., 10% formalin. Other preservation methods are available but not in our lab.
- The different techniques (advantages and disadvantages of each) for preparation and examination of stool specimens for parasites: The wet mount preparation (direct saline smear or Lugol's iodine smear). The concentration methods e.g., Fecal Parasite Concentrator [others can be available but not in our lab such as using zinc sulfate flotation, formalin ether sedimentation, and the formalin ethyl acetate sedimentation].
- The preferred approach of combination technique using fixation (preservation) with PVA and the subsequent concentration by formalin ethyl acetate sedimentation before examination.
- The commercially available systems for concentration of stool specimens e.g., FPC.
- The different staining techniques used for visualizing intestinal amoeba and flagellates, such as trichrome stain, and the interpretation of findings.
- The Kinyon acid-fast staining procedure for detection of *Cryptosporidium*, *Isospora*, and others and the interpretation of findings.
- The proper use of the microscope and the micrometer for examination and interpretation of prepared smears and determination of the size of the parasite or its stages.
- The culture techniques used for the detection of parasites e.g., *Strongyloides stercoralis* (Haradu Mori filter strep Culture), and *Trichomon* [non routine].
- The immunoserologic methods used for diagnosing parasitic infections of the GI tract e.g., *Giardia* and hepatic amoebiasis.
- The biochemical methods used for determining the presence of fat (Sudan III).
- Quality control exercised in checking the reagents e.g. occult blood test, FPC, and others.
- The chromatographic immunoassay for the qualitative determination of human calprotectin and lactoferrin in stool samples.
- The chromatographic immunoassay for the qualitative determination of human Occult blood in the stool sample.
- For the PMN in stool, Para prepares a thin smear & sends it to Hematology for staining & reading.

Investigation of Non-Intestinal Parasites Mostly Seen in Hematology and Pathology Sections

- The spectrum of different blood parasites, identification methods and characteristics e.g., *Plasmodium* and *Trypanosoma*.
- The spectrum of different blood and tissue parasites, identification methods and characteristics e.g., *Wuchereria*, *Loa*, *Brugia*, *Dracunculus*, *Onchocerca*.
- The spectrum of tissue parasites, identification methods and characteristics, e.g., *Echinococcus*, *Cysticercus*, *Trichinella*, *Toxocora*, *Toxoplasma*, *Schistosoma*, and *Leishmania*.
- The parasites found in vaginal or urethral discharge.
- The mechanism of test actions in the dipstick test.
- Knowledge and identification of different types of crystals and casts

Microscopic and Biochemical Investigation of Urine Specimens and other fluids

- The proper collection of urine specimens for microscopic and chemical examination.
- The macroscopic examination of the specimen.
- The routine chemical investigations (Dipstick) e.g., pH, protein, sugar, glucose, urobilinogen, and acetone, as well as the interpretation of results and correlation with disease.
- The use of the refractometer: the determination of specific gravity, the potential interfering factors affecting the specific gravity as well as the normal and fixed (abnormal) specific gravity.
- The performance and interpretation of results for manual tests including reducing substances and their implication in diseases.
- The preparation of urinary sediment for microscopic investigation to detect WBC, RBC, crystals, and parasites as well as their correlation with disease conditions.
- Proper quality control for the refractometer and test strips.
- The proper use and interpretation of polarizing microscopy for crystals.
- The proper use and interpretation of phase contrast microscopy for RBC morphology.

Semen Analysis and Examination

- The instructions to patients for the proper collection of specimens.
- The proper containers, labeling, time of collection, and prompt delivery to the laboratory.
- The macroscopic examination for color, volume, and liquefaction.
- The proper preparation and examination of specimen for motility, the presence of RBC, crystals, and *T. vaginalis*.
- The proper preparation and staining (Giemsa) of specimen for examination of sperm morphology and the differentiation between WBC and spermatocytes.
- The proper staining and interpretation of Eosin stains to differentiate dead from live sperms.
- The proper preparation, dilution (1:20), and counting of the total number of sperms using a hemocytometer, as well as the proper calculation to report sperm counts as millions per ml.
- The proper preparation, incubation, and examination of specimens for viability.
- PH of semen using Combur 10 dipstick.

Specimens and Tests to be Performed and Reported by Each Student Under Supervision

Stool Specimens

- FPC
- Occult Blood
- Sudan III
- Fecal calprotectin-lactoferrin

Spermogram Specimen

- Complete analysis

Urine Specimens

- Routine and Microscopy
- Phase Contrast Microscopy-RBC Morphology

Synovial Fluid Specimens

- Polarized Microscopy

References

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