

HSTO 226
Special Stains
4 Credits

Community College of Baltimore County
Common Course Outline

Description

HSTO 226 – Special Stains: is a course in which students explore the use of a variety of special stains, dyes, and techniques to highlight individual tissue components once a Hematoxylin and Eosin (H&E) stain is evaluated. The student demonstrates the purpose, principles, reagents, controls, troubleshooting, and results of each special stain. Learning the theory and techniques employed in the histology laboratory prepares the students to successfully integrate greater skills to enter the field of histotechnology.

Pre-requisites: HSTO 155

Overall Course Objectives

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

1. identify the theories of staining carbohydrates, amyloid, connective tissue, muscle, lipids, microorganisms, tissue pigments, minerals, and neural tissue;
2. describe the different stains in a classroom setting;
3. identify tissue structures and their staining characteristics;
4. explain the difference between carbohydrates and amyloid;
5. describe the different types of carbohydrates;
6. explain the difference between primary and secondary amyloid;
7. explain the best method for screening amyloid;
8. distinguish the three connective tissue fibers;
9. summarize the various types of cells in connective tissue proper;
10. indicate the most widely used stain used for the demonstration of elastic fibers;
11. explain the silver techniques for reticular fibers;
12. distinguish the three types of muscle fibers;
13. explain the techniques for staining muscles;
14. describe the tissue preparatory techniques for oil red O, osmium tetroxide and Sudan black B;
15. describe bacteria, spirochetes, mycobacteria, fungi, hyphae, mycelia, and protozoans;
16. name the stains used in the detection of acid-fast mycobacteria in tissue sections;
17. identify the types of organisms stained by: Auramine-rhodamine, Giemsa, Gram stain, Periodic Acid-Schiff (PAS), Grindly, Grocott's methenamine silver (GMS), Mucicarmine, Dieterle, Warthin-Starry, and Steiner and Steiner;
18. describe endogenous and exogenous pigments;
19. describe what substance is indicated by: Prussian blue, Turnbull blue, Schmorl, Fontana-Mason, Grimelius, Gomori methenamine silver (GMS), Hall, von Kossa, alizarin red S and rhodanine;

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20. state the method for bleaching melanin pigment;
21. compare and contrast argentaffin and argyrophil reactions;
22. describe the neuron and its various structural components;
23. identify what is demonstrated in the following techniques: cresyl echt violet, Bodian, Holmes, Beilschowsky, Sevier-Munger, Weil, and Luxol Fast Blue;
24. outline each stain in the above categories including the desired fixatives, microtomy thickness, primary reagents and dyes and their purposes, staining results, appropriate control and any special techniques; and
25. explain the sources of error in staining and appropriate corrective action.

Major Topics

- I. Carbohydrates
 - a. PAS
 - b. PAS with diastase digestion
 - c. Best carmine
 - d. Alcian blue
 - e. Alcian blue with hyaluronidase
- II. Amyloid
 - a. Alkaline Congo red
 - b. Crystal violet
 - c. Thioflavin T
- III. Connective tissue
 - a. Masson trichrome
 - b. Van Gieson picric acid-acid fuchsin
 - c. Verhoeff elastic stain
 - d. Aldehyde fuchsin elastic stain
 - e. Movat pentachrome
 - f. Gomori stain for reticular fibers
 - g. Gordon and Sweets stain for reticular fibers
 - h. Toluidine blue
 - i. Mallory phosphotungstic acid hematoxylin (PTAH)
- IV. Lipids
 - a. Oil red O
 - b. Sudan black B
 - c. Osmium tetroxide paraffin procedure for fat
- V. Microorganisms
 - a. Kinyoun acid-fast stain
 - b. Ziehl-Neelson acid fast stain
 - c. Fite acid-fast stain
 - d. Auramine-Rhodamine fluorescence technique
 - e. Brown-Hopps
 - f. Giemsa
 - g. Gridley
 - h. Grocott methenamine-silver nitrate (GMS)
 - i. Warthin-Starry
 - j. Dieterle
 - k. Stiener and Steiner

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- VI. Pigments and Minerals
- a. Prussian blue
 - b. Turnbull blue
 - c. Schmorl
 - d. Fontana-Masson
 - e. Grimelius
 - f. Churukian-Schenk
 - g. Gomori methenamine-silver (GMS)
 - h. Hall's bile stain
 - i. Von kossa
 - j. Alizarian red S
 - k. Rhodamine
- VII. Nerve tissue
- a. Cresyl echt violet
 - b. Bodian
 - c. Holmes silver nitrate
 - d. Bielschowsky-PAS
 - e. Sevier-Munger
 - f. Thioflavin S
 - g. Mallory phosphotungistic acid hematoxylin (PTAH)
 - h. Holzer
 - i. Cajal
 - j. Weil
 - k. Luxol fast blue

Course Requirements

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

- Weekly quizzes
- Weekly assignments
- Three exams
- A cumulative final exam

Other Course Information

This course is part of a program sequence, which requires admission to the program.

This course is offered in the spring semester only.

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