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Inquiry Responses

Continued from January, 1983 Issue

Dave Williams, Clinical Pathology
Dow Chemical Company
Midland, Michigan 48640

It has been my experience, working with both large and small animal CNS as well as human CNS tissue, that increasing the impregnation time in a technique (as much as 2 hours in the Novotny and Novotny Technique), one can increase the staining of cell bodies and cell processes.

However, staining success in rat CNS is marginal with tissue that has been kept in fixative for periods greater than nine months. Staining of rat CNS should take place after three days fixation for optimum results.

Three additional methods which may be tried can be found in the following reference: Disbrey, B.D., and Rack, J.H.: *Histological Laboratory Methods*, E & S Livingstone, Edinburgh and London, 1970, pp. 234-239.

L.D. Edenburg, St. John of God Hospital
Subiaco, Western Australia 6008

We have, in histology, used a method called Palmgren's Method for Nerve Fibers in Paraffin Sections. The reference is a journal titled *Medical Laboratory Technology*, Vol. 28, No. 1. The method is outlined as follows:

Fixation:
Formalin, Bouin's fluid, absolute alcohol or Carnoy's fluid are suitable. Osmic acid, chromic acid, dichromate and mercuric fixatives are to be avoided.

Solutions:

Acidified Formalin

Formalin	25.0 ml
Distilled water	75.0 ml
1% nitric acid	0.2 ml

Solution keeps well.

Silver Solution

Silver nitrate	3.0 g
Potassium nitrate	2.0 g
Distilled water	2.0 ml
5% glycine	0.2 ml

Keeps up to two weeks.

Reducer Solution

Pyrogallol	10.0 g
Distilled water	450.0 ml
Absolute alcohol	550.0 ml
1% nitric acid	2.0 ml

Make three days prior to use.

Procedure:
1. Cut paraffin sections 10-15 microns.
2. Bring sections to absolute alcohol, celloidinize with 1% celloidin in 50:50 ethanol ether by pouring this over the sections and standing them vertically for 5 minutes to dry. Harden in 70% ethanol for 5 minutes.
3. Bring sections to water. Place in acidified formalin for 2 hours.
4. Rinse in several changes of distilled water for 2 minutes.
5. Place in silver solution for 30-45 minutes at room temperature.
6. Place a quantity of reducer sufficient for a number of sections (approximately 20 ml per section) in a 60°C oven while the sections are impregnating in silver.
7. Remove one section at a time from the silver solution and reduce as follows: Remove excess silver solution by touching the bottom of the slide onto a filter paper. Place slide on a slide rack and pour approximately 1 ml onto the slide. Rock the slide gently and allow the black cloudiness in the reducing solution to develop. After approximately 1 minute, rinse the slide with more reducer and allow it to develop for another minute.
8. Wash in distilled water.
9. Fix in 5% sodium thiosulphate.
10. Wash in water.
11. Dehydrate, clear and mount.

An addition to this method is to stain the myelin sheath in Luxol fast blue, by any documented method. This is done between steps 10 and 11.

Results:
Nerve fibers — Dark brown to black
Background — Golden brown

INSIDE THIS ISSUE

Collagen Nonstaining Using Glycol Methacrylate

John Koski, Robert Munger & Mary Lou Gregory
Department of Surgical Pathology
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Editor's Note: Following is in response to an inquiry which appeared in Histo-Logic, Vol. XI, No. 3, July 1981. The information was sent to Dr. Peter O. Gerrits, University of Groningen, The Netherlands, by the authors but is being reprinted here as a service to readers of Histo-Logic, interested in this subject.

One current hypothesis of collagen staining holds that cationic dyes bind to dissociated hydroxyl groups in 4-hydroxyproline and 5-hydroxylysine (Hyp, Hyl). Both of these amino acids occur in high concentration in collagen fibers.

In several perfunctory experiments we concluded that the Masson trichrome and modifications thereof will not work with glycol methacrylate sections, at least as well as they do with paraffin. First, variation in staining intensity of all tissue components depends upon the nature of the fixative used. We have tried Bouin's, Carnoy's, Carson's BNF, and Acetic-Zinc Chloride-Formalin (AZF). No fixative improved the intensity or differentiation of collagen fibers. Indeed, we found that elastic fibers stain dark blue when tissue is fixed in Bouin and Carnoy fluids. Glycogen stains dark blue in hepatocytes; this correlated with the PAS reaction. Helly's and Zenker's fluids cannot be used for methacrylate embedding because the chromium ion inhibits polymerization.

We think that Aniline Blue not only binds to hydroxyl groups in Hyp and Hyl but also those in glycogen and the glycol methacrylate polymer. When Aniline Blue does bind to the section, the plastic matrix stains. Differentiation that removes the dye from the plastic also removes it from collagen in varying degrees and does not do so uniformly.

Tissue from autopsies that shows moderate to severe autolysis cannot be stained at all. Only optimally fixed tissue gives (marginal) results. The quality of staining also varies with the thickness of the section from 1.5 to 5.0 microns in 0.5 micron increments.

Between the three of us, we have corresponded with eleven individuals who have attempted to apply collagen stains to glycol methacrylate. None of them were satisfied with the results. We think the solution to the problem will be found by:
a) blocking hydroxyl groups on molecules other than Hyp and Hyl,
b) finding a method to etch or remove the plastic matrix, or
c) changing the chemistry entirely.

One approach that shows some potential is the demonstration of collagen with silver-methenamine borate (SMB) after hydriotic acid treatment. Aldol crosslinks in collagen occur between the aldehyde derivatives of two lysine residues. This introduces an unsaturated carbon-carbon double bond that we think can react with 1% hydriotic acid, for 20 minutes at room temperature, via a Markovnikov addition reaction. The bound iodine attracts the silver ion during exposure to SMB and it, in turn, is reduced to Ag° by gold chloride.

We are not entirely satisfied with the method yet, but there is some indication that at least older collagen fibers do give a positive reaction. The method can use further study.

Correction

The following correction should be made to a procedure titled "Liver Trichrome Stain," by William Dotson, which appeared in HISTO-LOGIC, Vol. XI, No. 3, July 1981: Step 2 of the Staining Procedure, 85°C should read 85°F.

An Aid to Cleaning Paraffin

Donald Axley
Kaiser Hospital
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It has been my experience that cleaning paraffin off the counter and from around embedding centers can be quite a time-consuming effort. In a search to solve this problem, I experimented by rubbing Tissue-Tek® Mold Release compound* (Miles code no. 4141) on the counter before beginning the embedding process. In addition, compound was rubbed on various parts of the embedding center that are prone to paraffin drippings. Upon completion of the embedding process, it was only necessary to take a gauze pad and simply wipe paraffin from the counter and embedding center. The paraffin was removed with ease and did not require scraping.

***Miles Scientific,** Division of Miles Laboratories, Inc., Naperville, IL 60566

Murphy's Laws of Histotechnology

Joan Gibson and Christine Jacobs
Fort Myers Community Hospital
Fort Myers, Florida 33901

1. Stoney prostate will only be cut on your best knife.
2. Any compound ordered as a crystal will always be delivered as a liquid.
3. Unscheduled frozens always are brought to the laboratory at lunch time.
4. Easy-to-pour xylene cans aren't.
5. Once a ribbon is finally obtained on hard to cut tissue, it will blow across the room.
6. The chance of getting silver nitrate on your fingers during the day is directly proportional to the importance of your social activities that evening.
7. The probability that a section will wash off the slide is directly proportional to the amount of tissue remaining in the block.
8. The first block cut on a reconditioned knife will have a staple in it.
9. The chance of a power failure during the night is directly proportional to the number of rush specimens in the processor.
10. When timing for a stain is critical, the timer will not function.
11. The need to filter a solution will always be discovered after the slides have been put into that solution.
12. The pathologist paces most when the tech is working on a frozen.
13. The amount of anxiety felt while waiting for your registry results is directly proportional to your lack of confidence.
14. The chance that you'll need to use acetone is directly proportional to how recently you've done your nails.
15. Serial sections are requested only after you've forgotten to use your "Cling-Free."
16. When a tray of slides is dropped, only the slides with unusual pathology will break.
17. The bulb in the microscope will burn out in the middle of a frozen.
18. If a lab party is planned for the afternoon, there will be double the normal work load for the morning.
19. Your good, dependable knife always gives out on the next to last block of the day.
20. Rush supply orders will always be back ordered.

National Society for Histotechnology Symposium/Convention
Anaheim, California . . . September 25 - 30, 1983

The Ninth Annual Symposium/Convention of the National Society for Histotechnology will be conducted at the Disneyland Hotel in Anaheim. The enclosed program provides complete registration information.

HOTEL RESERVATIONS: Please make hotel accommodations early, as rooms blocked for NSH will be released one month prior to meeting. **MAIL HOTEL RESERVATION DIRECTLY TO:** Disneyland Hotel, 1150 West Cerritos Avenue, Anaheim, California 92802; 714/778-6600.

SYMPOSIUM REGISTRATION: Registration form may be photocopied for additional attendees from the same activity. To avoid delays and ensure workshop availability, REGISTRATIONS AWAITING FUND APPROVAL will be accepted and held in abeyance until final commitment is received. Please include a note to this effect on your registration form. For workshops stipulating a LIMITED ATTENDANCE, please indicate 1st and 2nd choice. Your first choice will be honored as long as openings remain. Workshop quotas will be adhered to. LATE REGISTRATION CHARGE of $10 is applicable to registrations received after September 16th and for attendees registering upon arrival to the meeting. CANADIAN AND FOREIGN attendees must remit fees in U.S. currency. Checks and money orders are payable to: National Society for Histotechnology. **MAIL SYMPOSIUM REGISTRATION AND FEES DIRECTLY TO:** NSH, 5900 Princess Garden Pkwy., #805, Lanham, Maryland 20706. For registration assistance, call Roberta Mosedale, NSH Office, 301/577-4907.

REIMBURSEMENT POLICY: Full reimbursement will be effective upon receipt of cancellation notice prior to September 20th. Fees not refundable after this date. After arrival to the meeting, refunds will not be made for unattended workshops, sessions or banquet. Banquet tickets may be purchased at the registration desk but are not refundable. Monetary difference cannot be refunded when changing workshop attendance after arrival to the meeting.

TRAVEL ARRANGEMENTS: There are two main airports servicing the Anaheim area — Los Angeles and John Wayne. The John Wayne Airport is closest to Anaheim. Flight schedules to each airport should be compared when making travel arrangements. The Los Angeles Airport is presently under reconstruction and possible delays in ground transportation may be anticipated. Airport bus service will be the mode of transportation from all airports to the Disneyland Hotel. One way adult fares effective January 1983: Los Angeles $7.70; John Wayne $3.20.

EXHIBIT SCHEDULE: Manufacturing companies will display the latest laboratory supplies and equipment during the exhibit program. Exhibits are open to local pathologists and technologists as our guests. We welcome your visit to the exhibit hall after receiving a guest pass from the registration desk. Exhibits officially open TUESDAY, September 27th, 7:00-9:00 PM, are open WEDNESDAY, 9:00 AM - 4:00 PM, and THURSDAY, 9:00 AM - 3:00 PM.

HEALTH HAZARD STUDY: Under the direction of Dr. Kaye Kilburn, Ralph Edgington Professor of Medicine at the University of Southern California, NSH will continue the Health Hazard Study and examination program in Anaheim. Examinations will be given Sunday through Thursday, September 25-29, anytime during the day, in the Sierra Conference Center, Disneyland Hotel. NSH encourages everyone to support this program and avail themselves of this examination and study.

NSH EXTERNAL DEGREE PROGRAM: Students interested in review sessions or planning to take subsequent course examinations during the convention, should register for WORKSHOP #9, MONDAY, "INTRODUCTORY HISTOTECHNOLOGY/HISTOCHEMISTRY," and WORKSHOP #26, TUESDAY, "HUMAN MICROSCOPIC ANATOMY." Workshop registration is free to students formally enrolled in Thomas Edison College. Student must send proof of enrollment with registration form.

EXAMINATION SCHEDULE: Wednesday and Thursday, 7-9 AM and 3-4 PM; Friday, 7-9 AM. Students planning to take Thomas Edison Exam(s) must pre-register and pay examination fee(s) in advance. Send name, address, examination title(s) and fee(s) to: NSH Office, 5900 Princess Garden Pkwy, #805, Lanham, Maryland 20706.

SAFETY FILMS: NSH Health & Safety Committee will show films titled **SAFETY - IS IT WORTH IT?** and **28 GRAMS OF PREVENTION** on Monday, September 26, 7:30 PM, Disneyland Hotel. Films are open to all.

ROOM SHARING: If interested in being placed on a list for sharing room accommodations during the convention, please check appropriately on the registration form. NSH will assist in providing names of those interested in roommate service, but will not be responsible for making arrangements and cannot be held responsible for problems and/or liabilities as the results of this service.

Disneyland® Hotel

NATIONAL SOCIETY FOR HISTOTECHNOLOGY SYMPOSIUM/CONVENTION — September 25-30, 1983

Name _____

Address _____

City _____ State/Zip _____

Arrival Date _____ Departing Date _____ Est. Arrival Time _____

Please reserve accommodations as circled below:

Single	$ 76.00
Twin/Double	$ 84.00
Triple/Quad	$ 92.00
Imperial Suite	$500.00
Royal Parlor Only	$220.00
Royal One Bedroom Suite	$300.00
Royal Two Bedroom Suite	$375.00
Regal One Bedroom Suite	$220.00
Regal Two Bedroom Suite	$300.00
Crown One Bedroom Suite	$175.00
Coronet One Bedroom Suite	$140.00
Rollaways & Cribs	Available at prevailing rates
All Above Plus 6% City Tax	FIRST NIGHT'S DEPOSIT REQUIRED

If the rate you have requested is no longer available, the next available room category will be confirmed.
Please enclose first night's rental as deposit. Refundable only if hotel is notified 5 days before arrival date.

Reservations not guaranteed if not received by August 24, 1983.
MAIL DIRECTLY TO: DISNEYLAND HOTEL, 1150 West Cerritos Avenue, Anaheim, California 92802.

WORKSHOPS

SUNDAY, SEPTEMBER 25, 1983

No. 1 **8:30 AM - 4:30 PM**
THE USE OF HISTOCHEMISTRY IN DIAGNOSTIC PATHOLOGY: AN IMPORTANT ROLE OF THE HISTOTECHNOLOGIST IN PATIENT CARE
(Hugh McAllister, M.D.)

The primary object of this workshop is to discuss the utilization of special histochemical stains in establishing diagnoses. This role of the histotechnologist in patient care illustrated with actual case presentations. Emphasis on the practical approach to diagnosis of various disease categories.

No. 2 **8:30 AM - 4:30 PM**
PHOTOGRAPHY IN THE LABORATORY
(Robert Kershaw)

Workshop includes lecture and demonstrations in the areas of both photomicrography and gross specimen photography. Information covers all phases of instrumentation, types of film, technique and troubleshooting routine problems.

PHOTOMICROGRAPHY:
a. The microscope
b. The specimen
c. The camera
d. Film and processing
e. Projection

GROSS SPECIMEN PHOTOGRAPHY:
a. The camera
b. Lighting
c. Film and processing
d. Projection

Includes slide presentation covering both areas of photography. Question and answer session covers specific problems presented by attendees.

No. 3 Limit: 50 **8:30 AM - Noon**
ENZYME CYTOCHEMISTRY OF LEUKEMIA: THEORY AND APPLICATION OF ENZYME STAINS TO PERIPHERAL BLOOD SMEARS AND PLASTIC BONE MARROW SECTIONS **CEU: 0.3**
(Intermediate)
(Michael Johnson, HTL (ASCP))

Provides the student with both theoretical knowledge of specimen handling and preparation and practical experience in the application of enzmye cytochemical stains for the diagnosis of leukemias using peripheral blood smears, bone marrow aspirate smears and methacrylate plastic sections of bone marrow biopsy material. Includes a lecture and slide presentation on leukocyte identification, theory and practice of enzyme staining, selection and use of controls, the use of kits, as well as laboratory-prepared reagents. The student will have an opportunity to perform the following enzyme stains: Acid and alkaline phosphatase, myeloperoxidase, Sudan Black, chloracetate esterase, non-specific esterase. The student is encouraged to bring his own smears although slides will be provided. Persons with no knowledge or experience with enzyme stains as well as experienced technologists, will benefit.

No. 4 Limit: 30 **8:30 AM - Noon**
THE CAP WORKLOAD RECORDING SYSTEM IN THE HISTOLOGY LAB **CEU: 0.35**
(Joyce Moore, HTL (ASCP))

The College of American Pathologists through its Laboratory Workload Recording Method has developed standards utilized by management systems in the development of staffing requirements in the Histology Laboratory. Laboratorians must take this and decide what the standard of time is for their laboratory. The student will begin with understanding the workload recording system, how to interpret the units and how to insert this into their staffing requirements.

No. 5 **8:30 AM - Noon**
***BASIC IMMUNOLOGY FOR HISTOPATHOLOGY TECHNOLOGISTS**
(Jules Elias, Ph.D.)

This 20 hour course is designed to allow registrants to become familiar with the language of immunology. Structured to allow individuals to participate in one or more units which will include different aspects of the biology of the immune response. Geared to registrants who have no knowledge of this discipline. Could also be useful to individuals familiar with the topic, who would benefit from a cohesive review of such topics as the structure of immunoglobulins, the cells involved in the immune response and autoimmune disease, to name a few. Course includes five separate units, which can be taken individually or as an entire course. See Sunday, Monday and Tuesday workshops indicated with an asterisk for all five units; Nos. 6, 17, 22, 28.

***UNIT I - THE IMMUNOGLOBULINS** The structure and physiologic properties of the five immunoglobulin classes. Their use as reagents in diagnostic immunohistochemistry including immunofluorescence, immunoperoxidase and biotin-avidin staining techniques.

No. 6 **1 - 5PM**
***UNIT II - ANATOMY OF THE IMMUNE SYSTEM**
(Jules Elias, Ph.D.)

The microscopic anatomy of organs and tissues involved in immune reactions. Identification and biologic properties of the individual cells involved in immune responses and their diagnostic importance.

No. 7 **1 - 4:30 PM**
HOW TO PREPARE YOUR HISTOPATHOLOGY LABORATORY FOR ACCREDITATION INSPECTION **CEU: 0.35**
(Joyce Farow, B.S. HTL (ASCP) & Dorit Le Page, A.A., HTL (ASCP))

Familiarizes participants with the inspection process of various accreditation and licensing agencies. Participants will be given step by step guidelines enabling them to successfully prepare for the inspection and meet accreditation requirements. Topics of discussion will include: brief history, purpose and significance of accreditation agencies; preparation for inspection; review of inspection checklist; summation and results of survey; corrective process. Participants will be provided with samples of inspection checklists, examples of quality control record forms and a detailed outline for note taking.

No. 8 Limit: 25 **1 - 4:30 PM**
ROUTINE IMMUNOHISTOCHEMICAL STAINING PROCEDURES WITH EMPHASIS ON AVIDIN-BIOTIN COMPLEX "ABC" TECHNIQUE **CEU: 0.35**
(Advanced level)
(Robert Petras, M.D., Linda Vargo, HT (ASCP), & Susan Di Carlo, HT (ASCP))

With the increasing popularity of the immunohistochemical techniques and the advent of monoclonal antibody technology with their application as a diagnostic adjunct and their possible implications in therapy, the time for offering immunologic staining techniques as a routine special stain appears close at hand. This workshop is designed to: 1) Present a discussion of theory and application of basic immunoperoxidase techniques. 2) Present a "wet" workshop where participants would have hands on experience in preparing an immunologically stained section using "ABC" technique to demonstrate prostatic acid phosphatase. 3) Demonstrate a batch staining technique whereby large numbers of slides could be prepared in a time efficient manner, even for a variety of different primary antibodies. 4) Provide written discussions and reference materials.

MONDAY, SEPTEMBER 26, 1983

No. 9 **8:30 AM - 4:30 PM**
INTRODUCTORY HISTOTECHNOLOGY/HISTOCHEMISTRY (Basic) **CEU: 0.6**
(Richard Schroeder, M.A.)

Workshop is designed as an introduction and refresher for the discipline of histotechnology. Concepts of fixation, tissue preparation, sectioning and staining will be presented. Staining procedures utilized as routine in histopathology laboratories, i.e., carbohydrates, lipids, proteins, minerals, bacteria are discussed. The histochemistry program provides the participant with a more in-depth understanding of routine and sophisticated procedure mechanisms. Cryostat and cryogenic techniques are discussed. Recommended for students in the NSH External Degree Program.

No. 10 Limit: 40 **8:30 AM - 4:30 PM**
BASIC MICRO-ANATOMY **CEU: 0.65**
(Robert Rawlinson, FIMLS, A.R.T., & Carolyn Rawlinson, LCSLT)

A full day "hands on" workshop where participants microscopically examine 40 tissue sections aided by a step by step workbook. Morning session begins with an illustrated lecture on the four basic tissues and introduces participants to the subsequent microscopy. The afternoon follows the same pattern, but the direction is toward the structure of the major body systems. Two sets of twenty slides each are examined during the workshop and emphasis placed on two-way dialogue and interaction throughout the sessions. Recommended for those with little or no knowledge of tissue structure as well as a refresher for those who are more advanced.

No. 11 Limit: 12 **8:30 AM - 4:30 PM**
HOW TO WRITE AND ORGANIZE A SCIENTIFIC PAPER
(Patricia Cornett, Ph.D.)

Workshop includes the basic principles of clear, effective writing and organizing of the scientific paper. Morning: participants learn some principles of concise, effective writing. Guidelines for how to organize the scientific paper will also be presented. Afternoon: participants who want personalized help with their own writing analyze preassigned exercises and examples of their own or other's writing under the director's guidance. Individualized instruction.

No. 12 Limit: 40 **8:30 AM - 4:30 PM**
IF THE STUDENT HASN'T LEARNED, THE TEACHER HASN'T TAUGHT **CEU: 0.6**
(Elaine Boyd, HT (ASCP))

Study and apply the principles and theories underlying the basic techniques essential to the preparation and presentation of information by an instructor, with the ultimate goal of providing documentation of, and credibility to a course of instruction.

No. 13 **8:30 AM - Noon**
HISTOCHEMISTRY SYMPOSIUM **CEU: 0.3**
(Nathan Brion, HTL (ASCP); Leonard Noble, HTL (ASCP); Frieda Carson, Ph.D.)

MUSCLE HISTOCHEMISTRY: The advances in enzyme histochemistry over the past few years have enabled the routine histology laboratory to provide vital diagnostic information to aid in the determination of ongoing disease processes in skeletal muscles. In this presentation the enzyme histochemical stains applicable to muscle biopsy procedures will be discussed and demonstrated through a kodachrome slide presentation. Those procedures to be discussed include: NADH Diaphorase, Succinic Dehydrogenase, Acetyl Cholinesterase, Adenosine Triphosphatase, Reverse Adenosine Triphosphatase, Phosphorylase, Periodic Acid Schiff, Acid Phosphatase and the Non-Specific Esterase.

HEMATOLOGIC HISTOCHEMISTRY: Ordinarily, routine Romanowsky stains (i.e., Wright's) are sufficient for most diagnoses of hematologic disorders. However, in certain conditions, it is now possible, through the use of special stains, to be more precise concerning diagnosis. Certain special stains have been used for many years (i.e., PAS, Sudan Black B, Myeloperoxidase), whereas more recently esterase and acid phosphatase procedures have been made readily available. The results of these procedures and how they are used in the FAB classification of granulocytic leukemias will be demonstrated through a kodachrome slide presentation.

CHEMISTRY OF HISTOCHEMISTRY: The chemistry of the techniques used for diagnostic aids in neuromuscular diseases, hematopathology and tumor identification will be discussed in detail, along with some of the problems encountered. Kodachrome slides will be used as a visual aid to explain the various reactions involved in the histochemical procedures.

No. 14 **8:30 AM - Noon**
ANSWERS TO THE SUPERVISOR'S QUESTION, "THEY DID WHAT?"
(Jo Thiessen, M.B.A.)

What role does a supervisor play when asking and answering questions concerning the histology laboratory? We will look at the people, the process and the end product of the total group.

No. 15 **8:30 AM - Noon**
ROLE OF HISTOPATHOLOGY LABORATORY PROCEDURES IN KIDNEY, IN THE EVALUATION OF RENAL BIOPSY SPECIMENS
(Arthur H. Cohen, M.D.)

Current methods for examining kidney biopsies include the use of sophisticated light microscopy, immunohistochemical procedures and electron microscopy. As a result, the histopathology laboratory plays a large role in the preparation of the specimens. Because of the nature of the tissue (small, difficult to obtain, risk of procedure) it is imperative that care and proper methodology be used. This workshop will review the specialized care and handling necessary, as well as the anatomic, pathological and clinical, and prognostic significance of the structures and lesions which are demonstrated by the various methods. It will discuss the various stains for light microscopy, specific reasons for their use and techniques of performing the procedures. It will also deal with immunofluorescence and immunoperoxidase methods and examine the usefulness of each. Finally, this session will be involved with electron microscopic procedures as they apply to renal pathology.

No. 16 **8:30 AM - Noon**
FIXATION AND SPECIMEN HANDLING: THE KEY TO COPACETIC SLIDES **CEU: 0.35**
(Richard Elia, M.D., Eric Glassy, M.D., Pam Stanley, HT (ASCP) & Terri Seeley, HT (ASCP))

Discussion and demonstration of the most critical area of tissue processing — fixation. The advantages and disadvantages of many fixatives will be discussed in an approach that will be understandable to the beginning histotech and useful to experienced histotechnologists. Hematopoietic tissues will be used as models since they require critical fixation and have presented problems for many laboratories. Other topics will include cost comparisons of fixatives, tips on how to get pathologists to improve their fixation technics, and post fixation methods. A separate discussion will cover technics on handling and transportation of special tissues such as kidney and muscle biopsies. Participants will review photographs and microscopic slides in packet form to gain a first hand experience of the various fixative methods discussed. Syllabus provided that outlines the course and gives pertinent recipes.

MONDAY, SEPTEMBER 26, 1983

No. 17 **8:30 AM - Noon**
***UNIT III — CELLULAR INTERACTIONS INVOLVED IN THE IMMUNE RESPONSE**
(Jules Elias, Ph.D.)
The immunophysiology of the immune response, including the cell-cell interactions, antigen recognition and processing. The basic concepts of immunologic regulation and memory.

No. 18 Limit: 15 **8:30 AM - Noon**
FIXATION BY PERFUSION
(Jane A. Metheny, HTL (ASCP), William O. Crawford, & Kathy Hardy, HT (ASCP))
Fixation of tissues for electron microscopy and autoradiography, a learn by doing workshop designed for the histologist involved in, or with interest in, the research field. Participants will be instructed in the preparation of glutaraldehyde/paraformaldehyde fixative, its advantages and safety precautions required in the use of these solutions. Techniques of perfusion/immersion fixation with and without a pressure device will be demonstrated. The anatomy of a mouse will be reviewed followed by instruction and demonstration of a complete necropsy for the harvesting of target organs. Each participant will be given the opportunity to reinforce what they have learned by doing.

No. 19 **1 - 5:00 PM**
IMMUNOHISTOLOGIC TECHNQUE IN SURGICAL PATHOLOGY — A NEW FRONTIER
(Clive Taylor, M.D.)
Immunoperoxidase methods permit the demonstration of a variety of antigens in routinely processed tissues. The morphological detail obtained by this procedure is comparable to orthodox hematoxylin and eosin-stained sections, and so offers the diagnostic pathologist the opportunity of simultaneously identifying normal and neoplastic cells both by their morphological characteristics and by their antigenic constitution. The application of this method to a study of malignant lymphomas has contributed to current reappraisal of classification criteria for this group of neoplasms. It is anticipated that, as specific antisera against a range of different tissue antigens become available, immunoperoxidase methods will have a similar impact upon the redefinition of morphologic criteria related to other neoplasms. The workshop will illustrate staining of more than 50 different antigens and their practical applications, including many hormones, immunoglobulins, cancer-related antigens, etc.

No. 20 **1 - 4:30 PM**
THE MUCIN STAINS — DIAGNOSTIC APPLICATIONS
(Judy Vogt, HT (ASCP) & Philip Vogt, M.D.)
Workshop will consist of lectures and photomicrographs which will address specific surgical pathology problems and the choice of the most appropriate mucin stains, followed by a demonstration of the most popular and useful stains.

No. 21 **1 - 4:30 PM**
ESSENTIALS OF QUALITY EMBEDDING: THEIR IMPACT ON MICROTOMY **CEU: 0.3**
(Billie Swisher, HTL (ASCP))
There is no substitute for proper paraffin embedding in producing diagnostic tissue sections. This workshop defines and describes desirable embedding practices. Various types of tissues which are routinely submitted for paraffin embedding and subsequent microscopy will be discussed, emphasizing the specific anatomic areas where disease most frequently occurs, such as the squamocolumnar junction of the uterine cervix in cervical carcinoma. Tissue grossing techniques, section selection and basic tissue identification will also be discussed. Color transparencies will be used to correlate gross tissue sections with their microscopic counterparts.

No. 22 **1 - 5:00 PM**
***UNIT IV — DISEASES DUE TO ANTIBODY AND CELL MEDIATED IMMUNITY**
(Jules Elias, Ph.D.)
Injury due to various forms of hypersensitivity reactions, including immune complex disease, immediate and delayed hypersensitivity. Immunohistologic and histochemical analysis of hypersensitive tissue.

No. 23 Limit: 50 **1 - 4:30 PM**
GLYCOL METHACRYLATE — BONE BIOPSY PROCEDURE **CEU: 0.35**
(Norma Appel, B.S., HTL (ASCP))
Workshop will take you step by step through a schedule which enables you to do at least a dozen bone biopsies (or any other tissue) daily. A discussion of problems and pitfalls and some remedies will be presented. Thirty-five mm slides will be shown of bone biopsies and soft tissue. Includes a question and answer period.

TUESDAY, SEPTEMBER 27, 1983

No. 24 **8:30 AM - 4:30 PM**
CONCEPTS OF LABORATORY MANAGEMENT (Basic to Intermediate) **CEU: 0.7**
(Don Hammer, HTL (ASCP))
Introduction to leadership styles, understanding individual behavior and motivation. Emphasis will center on participative management through demonstration and attendee participation. Video tapes, chart paper, photomicrographs and handout material will be utilized in presenting the subject matter.

No. 25 Limit: 25 **8:30 AM - 4:30 PM**
COMMUNICATING FOR EFFECTIVENESS
(Donna Simmons, HTL (ASCP) & Carissa Sanchez, HTL (ASCP))
A participatory workshop to aid in improving your ability to communicate with coworkers in the laboratory and in other areas of your life. Discover and discuss several basic elements of communication that can be barriers if we are not aware of them.

No. 26 **8:30 AM - 4:30 PM**
HUMAN MICROSCOPIC ANATOMY (Intermediate to Advanced) **CEU: 0.9**
(Freida Carson, Ph.D.)
Workshop will emphasize basic tissues and their organization into the different organs. Visual identification, function and some special staining correlation will be included. Participants will be given a self-assessment test and handout material will be in a workbook format to be filled-in during the workshop. Recommended for students in the NSH External Degree Program.

No. 27 **8:30 AM - 4:30 PM**
INSTRUCTIONAL TECHNIQUES USED IN TEACHING (Basic)
(Janet Maass, HTL (ASCP) & Robert Rawlinson, FIMLS, A.R.T.)
This workshop is designed for telenet conferences. Workshop will include small group instruction, writing goals for curriculum, effective communication, writing behavioral objectives, preparing activity lists for instruction and making a simple visual aids.

No. 28 **8:30 AM - Noon**
***UNIT V — AUTOIMMUNITY AND TUMOR IMMUNOLOGY**
(Jules Elias, Ph.D.)
Initiation and pathological mechanisms of autoimmune diseases. Immunohistological detection of tumor antigens such as alphafetoprotein and carcinoembryonic antigen and their diagnostic value.

No. 29 Limit: 40 **8:30 AM - Noon**
CHALLENGES IN MICROTOMY **CEU: 0.3**
(Elaine Boyd, HT (ASCP), Coral Angus, HT (ASCP), & Vivian McClure, HT (ASCP))
Provides the technologist with the opportunity to acquire and develop skills in the area of microtomy and appropriate techniques in cutting and mounting paraffin sections. The hands-on workshop will emphasize desirable as well as undesirable bench practices in cutting, artifacts produced through inappropriate procedures and the care of the rotary microtome and the microtome knives.

No. 30 **8:30 AM - Noon**
BASIC CHEMISTRY OF STAINING **CEU: 0.35**
(Asta Feldman, HTL (ASCP))
Defines chemical terminology pertinent to staining procedures. Examples of subjects to be covered are: Bond types, oxidation, reduction, pH and pH signatures, isoelectric points, the major macromolecules (carbohydrates, lipids, proteins and nucleic acids), acids, bases, acidophilia, basophilia, metachromasia, mordanting, argyrophilia and argentaffin reaction. Examples will be drawn from clinical histology. All material will be introduced at a level which assumes the participant has no previous knowledge of chemistry.

No. 31 **8:30 AM - Noon**
CRYOTOMY TECHNOLOGY
(Frank Avallone, B.A.)
Workshop is designed to teach technicians, technologists and researchers, both experienced and non-experienced, who wish to become more competent in the field of cryotomy. The program will include a multitude of subjects related to all phases of the art, as well as a brief history of frozen sectioning, the technique and instrumentation from its inception to present day. Workshop contents will include information on sectioning, orientation of specimen, cutting and section evaluation. Antiroll plate technology, adjustment, problems, solutions and repairs. Cryostat knives, types, sharpening, angle adjustments. The cryostat, purchasing, cleaning and maintenance. The problems associated with, the remedies and cryostat evaluation. Staining methods for routine surgicals and other related tissues, histochemical reactions, immunofluorescence and immunoperoxidase techniques. Kidney and muscle biopsy technology will be discussed at length. Methods for handling of specimens, shipping, freezing, sectioning and staining. Frozen section artifacts, mounting medias, coverslipping, slide coatings and transport media will be discussed, in addition to numerous tricks of the trade.

No. 32 Limit: 50 **8:30 AM - Noon**
TISSUE IDENTIFICATION FOR THE UNTRAINED EYE **CEU: 0.35**
(Delver Cain, M.D.)
A "novel" approach to tissue identification with emphasis on pattern recognition at low power microscopic magnification. This is followed with key features used in tissue identification at high power magnification. Included in the practical sessions are short lectures concerning tissue-organ systems classification. The workshop is concluded with examples using the pattern approach to tissue identification as it applies to diagnostic pathology and a self-graded examination. Numerous organs and tissues, concepts and topics are covered during this workshop.

No. 33 **1 - 5:00 PM**
NEW FRONTIERS IN HISTOTECHNOLOGY
(Sharon Van DeVelde, B.A.)
An overview of professional opportunities potentially available to qualified histotechnologists with an emphasis on immunohistochemical/cytochemical techniques for light and electron microscopy.

No. 34 **1 - 4:30 PM**
PRACTICAL AUDIO-VISUAL TECHNICS FOR THE HISTOTECHNOLOGIST **CEU: 0.35**
(Richard Ellis, M.D. & Eric Glassy, M.D.)
Provides the histotechnologist with various practical applications and ideas for using audio-visual technics. These technics and tips will be of special interest to histotechnologists in hospitals without major multi media departments. Topics covered include gross photography, copy work, simple title slides, glass mounting of tissue slides, selecting the right camera and lens, and how to give more effective slide presentations. Brief discussion of advanced technics and equipment such as the use of 8 mm movie and video cameras.

No. 35 **1 - 4:30 PM**
THE CHEMICAL BASIS OF PROCESSING AND STAINING — A UNIFIED THEORY
(Richard Dapson, Ph.D.) **CEU: 0.35**
Histotechnology traditionally has been considered a mixture of art and black magic. Until now, no really satisfactory explanation has been proposed to explain events at the molecular level during processing. Well known concepts from the fields of organic and physical chemistry have now allowed the development of a scientific basis of processing and staining. Every chemical solution that comes into contact with a specimen has the potential for affecting final staining results. Inconsistencies and heretofore unexplainable results can now be understood. Workshop is designed for those with a basic knowledge of chemistry.

No. 36 Limit: 30 **1 - 4:30 PM**
BASIC STAINING OF NUCLEAR AND CYTOPLASMIC COMPONENTS IN ANIMAL TISSUE
(Patricia Buckley, HT (ASCP))
Some procedures for staining animal tissues will be demonstrated. Emphasis will be placed on a variety of hematoxylin and eosin stains, with discussion of special considerations required for several tissue types. The effects of such conditions as mordanting, pH, age of dye, color balance and other potential problems will be discussed. Photomicrographs of tissues stained with Delafield, Harris, Mayer, Weigert Iron Hematoxylins and counterstained with alcoholic, aqueous and Phloxine B solutions of eosin will be presented. Goal of the final presentation in this workshop is to demonstrate that if the best techniques of fixation, processing, sectioning and staining are employed, a standardized, reproducible and diagnostic light microscopy slide will result.

No. 37 **1 - 5:00 PM**
PROCEEDINGS OF THE FIFTH BASIC SCIENCE WORKSHOP ON HISTOLOGY **CEU: 0.35**
(A. R. Vrhunevs, Ph.D., & Jules Elias, Ph.D.)
Scientific presentations designed to provide conferees a valuable means of disseminating information and ideas concerning the frontiers of histology. Program speakers will bring us up-to-date on the latest scientific developments and analyze the significance of these developments. Didactic lectures on several diversified topics, including new methodologies by various speakers, will be featured. Workshop will include the following lecture topics:
- Membrane Markers in Lymphoma and Leukemia (Jules Elias, Ph.D.)
- Undecalcified Thin Sections of Bone for Histomorphometry (Toshiyuki Konno, M.D.)
- Movie: Bone Biopsy — Clinical Applications (Dhanwade Rao, M.D.)
- Examination of Bone and its Importance to the Pathologist (Carlos Ortegoso, M.D. & Vivian McCoy)
- Approaches to Study Retinal Detachment in the Eye During Processing (Richard Schroeder, M.A.)
- Value of Histologic Section of the Bone Marrow to the Hematologist (Olga Sachan), HTL (ASCP)
- Trypsin Digestion on Retinas of Laboratory Rats (Kathy Hardy)
- Histologic Staining for the Diagnosis of Mesothelioma (Colin Benjamin, HT (ASCP))
- The Computerization of the Surgical Pathology Laboratory (Peter Zinnig, HT (ASCP))

SCIENTIFIC SESSIONS

WEDNESDAY, SEPTEMBER 28, 1983

Center Ballroom — **8:30 - 9:30 AM**
PROFESSOR C.F.A. CULLING MEMORIAL LECTURE
(Nobel Laureate, Renato Dulbecco, M.D., The Salk Institute for Biological Research La Jolla, California)

Center Ballroom — **9:30 - 10:00 AM**
SPECIAL TECHNIQUES TO AID IN DIAGNOSIS OF INFECTIOUS DISEASES OF LABORATORY ANIMALS
(David Fairchild, D.V.M.)
A variety of methods used routinely to study and diagnose laboratory animal diseases will be demonstrated. Results of special stains, enzyme histochemical, immunohistochemical, fluorescent microscopic and diagnostic electron microscopic techniques that aid in the clarification of pathogenic mechanisms will be discussed briefly. Emphasis will be placed on using simple and reliable methods (or modifications) which can be used in diverse animal species to elucidate or confirm the different disease processes in laboratory animals when used as animal models of human conditions.

Center Ballroom — **10:30 - 11:15 AM**
AN INTRODUCTION TO THE ROUTINE AND SPECIALIZED TECHNICAL ASPECTS OF TISSUE PREPARATION FOR ELECTRON MICROSCOPY
(Kai Chen, B.A., EMT & Robert Heusser, B.A., EMT)
This talk will include a brief historical synopsis of electron microscopy, an explanation of the electron microscope construction and preparation of specimens to include fixation, dehydration, plastic embedment and polymerization. Glass knife making and block trimming will be described as well as sectioning and staining of both thick and ultrathin sections. Basic photography procedures as they relate to EM will be covered. A specialized technique for re-embedding paraffin embedded blocks or slides will be described in a simple one step procedure, allowing for rapid EM diagnostic interpretation of tissue lesions.

Center Ballroom — **11:30 AM - 12 Noon**
SLOW VIRUS DISEASES OF THE CENTRAL NERVOUS SYSTEM
(Hideo Ibbeshi, M.D.)
Slow virus diseases of the human central nervous system form a small group of an important category of lethal diseases. A viral etiology has been proven in a few of the conditions such as subacute sclerosing panencephalitis, progressive rubella panencephalitis and progressive multifocal leukencephalitis, whereas the cause of others such as Creutzfeldt-Jakob disease and Kuru remain unknown, although a virus-like agent is suspected. Man to man transmission has occurred in both the latter conditions and the agents have been transmitted to animals. The histopathology of these several disorders are different, and they will be reviewed. A procedure for processing the infected materials for histopathologic preparations will be outlined.

Center Ballroom — **1:00 - 1:45 PM**
LUNG PATHOLOGY — A DIFFERENT VIEW
(John T. Sinclair, M.D.)
Alternate ways of looking at lung disease and various tissue preparatory techniques. Special stains as they apply to specific lung diseases and their usefulness and/or specificity. Helpful hints and proper technological combinations.

Center Ballroom — **1:45 - 2:15 PM**
MY LAB IS THE REAL ZOO
(H. R. Rimmer, MT (ASCP))
Slide presentation of problems in Histopathology peculiar to the exotic medicine field.

Center Ballroom — **2:15 - 3:00 PM**
THE PITUITARY GLAND AND ITS HORMONES
(Nancy E. Warner, M.D.)
Correlation of form and function of the cells of the anterior pituitary has been a major effort in past decades. It was postulated long ago that the granules of chromophil cells represent stored hormones, but proof has been difficult. Full understanding of the functional cytology of the pituitary has required a variety of techniques, including histochemistry, electron microscopy, autoradiography, analysis of granules by ultracentrifugation, immunocytologic stains and the effects of endocrine ablation. Some of these methods are only recently available. The bewildering array of data that has accumulated will be synthesized and presented in an abbreviated form. The functional classification of pituitary cells has given rise to a new classification of adenomas of the pituitary. At the same time, advances in laboratory medicine, radiology and neurosurgery have revolutionized the treatment of pituitary tumors. The highlights of these advances will be presented.

Center Ballroom — **3:30 - 4:00 PM**
FINE NEEDLE ASPIRATION
(Britt-Marie Liung, M.D.)
Lecture will cover the development of the technique, present state of the art and future prospects.

Center Ballroom — **4:00 - 4:30 PM**
THE MECHANISM OF BONE AGING
(Toshiyuki Kosno, M.D.)
In 110 iliums taken from individuals who were thought to be normal in bone metabolism (58 biopsy cases, 52 autopsy cases) histomorphometrical study was done by using our image analysis system. Among the various static parameters, TBV (total bone volume) decreased in age but MWT (Mean wall thickness) and MTT (mean trabecular thickness) didn't change significantly. Consequently we made the following hypotheses about the mechanism of bone loss in age. After the 3rd or 4th decades, resorption may become dominant in trabeculae bearing against little load and they may disappear rapidly without having formation phase. This phenomenon may occur in small parts of trabeculae in succession. On the other hand, most trabeculae bearing up against much load may remain thick. But those trabeculae may also become thinner in aged according to the progress of the imbalance between resorption and formation.

Center Ballroom — **4:30 - 5:00 PM**
THE HISTO IN HISTOTECHNOLOGY
(Robert Rawlinson, F.I.M.L.S., A.R.T.)
Why is kidney cut thin? Why cut cross sections of muscle biopsy? Why do plasma cells stain purple with hematoxylin? A "histotechnologist" is not a "technologist" without the "histo". In other words, a knowledge of normal histology along with the chemistry of fixation and staining provides the key to a fuller understanding of histotechnology. This lecture explores the applications of the above statement in day to day laboratory work and will emphasize the need for a thorough knowledge of tissue structure through the use of examples and case histories.

VETERINARY HISTOTECHNOLOGY

South Ballroom — **10:30 - 11:00 AM**
OPERATING A HISTOLOGY LABORATORY UNDER THE "GOOD LABORATORY PRACTICE REGULATIONS"
(Donald Kirchen, D.V.M., Ph.D.)
Nonclinical laboratory studies must be under the "Good Laboratory Practice (GLP) Regulations" if used to support applications for research or marketing permits for products regulated by the Food and Drug Administration. The histology laboratory must be operated under GLP's in a very organized and efficient manner to be an acceptable member in the complex science of drug safety evaluation.

South Ballroom — **11:00 - 11:15 AM**
TRYPSIN DIGESTIN ON RETINAS OF LABORATORY RATS
(Kathy Hardy, HT (ASCP))
Controlled trypsin digestion is a simple and reliable way to demonstrate microvascular changes of diabetes mellitus in laboratory rats. The retina was chosen as an exceptionally appropriate tissue since it has an abundant capillary vascular supply. After digestion, the retinas are mounted on slides, dried overnight and stained with PAS/hematoxylin. This technique can be done in any laboratory at very little cost and with very little time.

South Ballroom — **11:15 AM - 12 Noon**
ANIMAL TISSUE PREPARATION TECHNIQUES
(Leonardo Gonzales, HT (ASCP))
The objective of this lecture is to identify, familiarize and assist the technologist in standard processing techniques and procedures for the successful microscopic preparation of animal tissue. Procedures which are applicable to pathological and normal tissue will be discussed. Emphasis, with the use of photomicrographs, will be placed on artifacts, how to identify and how to avoid making them. Modules which have been established to achieve the objectives are: A. Appropriate Collection, Preservation and Fixing Procedures; B. Processing and Embedding Procedures; C. Sectioning and Mounting Procedures; D. Staining, with Use of Microscope.

South Ballroom — **1:00 - 1:45 PM**
ANIMAL TISSUE PREPARATION TECHNIQUES, cont'd.
(Leonardo Gonzales, HT (ASCP))

South Ballroom — **1:45 - 2:30 PM**
COLLECTION AND PREPARATION OF BONE MARROW SPECIMENS FOR DOGS AND RODENTS EMPLOYED IN TOXICOLOGIC/ ONCOGENIC RESEARCH STUDIES
(William Hallwell, D.V.M., Ph.D.)

South Ballroom — **2:30 - 3:45 PM**
THE ROLE OF THE HISTOTECHNICIAN IN DRUG SAFETY EVALUATION
(Donald Kirchen, D.V.M., Ph.D.)
The histotechnician/technologist plays an important role in complex science of drug safety evaluation. The histology laboratory must be highly regimented and efficient and operate under the "Good Laboratory Practice Regulations." The technician must ensure high volume, high quality work that is produced in a timely manner.

South Ballroom — **3:45 - 4:30 PM**
PULMONARY CYTOLOGY IN ANIMALS
(William Hallwell, D.V.M., Ph.D.)

South Ballroom — **4:30 - 5:15 PM**
PURPOSE, METHODS, TECHNIQUES AND INTERPRETATIONS OF CARCINOGENESIS STUDIES IN PHARMACEUTICAL INDUSTRY
(Leonard Shott, D.V.M., Ph.D.)
Aspects of testing for carcinogenesis in laboratory rodents will be addressed. Areas to be presented will include purposes and procedures that provide data for evaluations. Interpretation of data will also be discussed. Emphasis will be placed upon identification, preservation, description, histologic preparation and evaluation of tissue masses suspected of being neoplasms seen during carcinogenicity studies.

THURSDAY, SEPTEMBER 29, 1983

PRACTICAL PROBLEMS IN LARGE TISSUE PROJECTS — **8:30 - 9:15 AM**
(Catherine Wilson, B.A., HT (ASCP))
Lecture will discuss theories and particular solutions for the practical problems in fixation, decalcification, processing, sectioning and staining in large tissue projects. Special emphasis will be given to bone, heart and brain tissues. Established research protocols will be presented.

MODIFICATION OF THE WEIL METHOD FOR MYELIN USING FRESH HEMATOXYLIN — **9:15 - 9:30 AM**
(Laurel Reed, HT (ASCP))
Recent changes in hospital treatment and the increased expense to the patient require some re-evaluation and readjustment of diagnostic procedures in histopathology. The more staining methods that can be modified in relationship to time and performance by the staff of licensed technicians and technologists, the better service to the patient. The staining procedures for myelin accepted for many years require solutions that have been aged; Weil (overnight), Mordant, Kluver (frozen sections), Scheimeyer and Wright or the classic Marchi (one month in time). Myelin has been visualized as black, well differentiated structures against a tan or white background. The latter will accept a counterstain depending upon the need for additional information to contribute to the diagnosis. This modification, using fresh hematoxylin, eliminates aging with anticipation of workload, proficiency in cutting frozen sections and unacceptable delay. The differentiating solution in this procedure can give the familiar tan or, if desired, a white unstained background in less than two hours. Through ardent effort, bench level methodology, and practice, any facility can provide a better service to both patient and the field of histotechnology.

IDENTIFICATION AND CHARACTERIZATION OF CELLS AND THEIR SUBPOPULATIONS IN VITRO USING CYTOCHEMISTRY AT LIGHT AND ELECTRON MICROSCOPIC LEVELS — **9:30 - 10:00 AM**
(Vanda Richters, Ph.D.)
Histochemistry, a very useful tool for characterizing and identifying cells, can be successfully adapted to tissue culture preparations without distorting or losing the cellular integrity. The presentation will include results of some commonly studied enzymes, i.e., phosphatases, dehydrogenases, homoreductases and non-specific esterases. Specifically, the methods of fixation, use of substrates (singly or in combination), staining and selection of cells for both light and electron microscopy studies will be emphasized. The application of techniques for studying and quantitating cells and their subpopulations will also be discussed.

TECHNICAL OVERVIEW OF FORENSIC SCIENCE WITH EMPHASIS ON HISTOLOGY — **10:30 - 11:30 AM**
(Marc Taylor)

THURSDAY, SEPTEMBER 29, 1983

ADVANTAGES OF COMBINING HISTOPATHOLOGY, TISSUE CULTURE AND ULTRASTRUCTURE IN STUDYING DISEASE PROCESSES — 11:30 AM - 12:00 NOON
(Anna Richters, Ph.D.)

Tissue sections stained by a variety of methods have been, and still are, the backbone of pathological diagnosis. However, in recent years it has been possible to supplement the conventional histopathology with tissue culture and ultrastructural observations. Our main interest has been to apply these methods to studies of cancer. By combining the techniques, we have been able to contribute to areas of diagnosis, host responsiveness, therapy, cell identification and cancer biology in general. The time lapse cinemicrophotography is another powerful tool and adds another dimension to studies of cancer. Our studies have included lung, heart, ovarian and other cancers.

PALEOPATHOLOGY — DIAGNOSIS OF DISEASES IN BONE WITHOUT THE HELP OF A HISTOTECHNOLOGIST — 1:00 - 1:45 PM
(Frederick Gilkey, M.D.)

Many human diseases, including syphilis, tuberculosis, chronic hemolytic anemia, degenerative arthritis and cancer, leave traces in skeletal material. These diseases can often be diagnosed reliably by gross examination of bones when no tissues are available (with apologies to all hard-working histotechnologists). The lecture will emphasize the general appearances of human disease in skeletal material rather than fine diagnostic points.

COMPARATIVE ASPECTS OF MARINE MAMMAL MEDICINE — 1:45 - 2:15 PM
(Jay Sweeney, D.V.M.)

Diseases of aquatic mammals, their diagnosis and treatment, will be discussed with emphasis on comparative aspects with human medicine. Some adaptations to the aquatic habitat will be presented as they relate to specific diseases in these animals which include whales, dolphins, seals, sea lions and walruses.

KIDNEY TRANSPLANTS — AN OVERVIEW — 2:45 - 3:30 PM
(Joyce Hostetter, R.N., M.S.N.)

Information to be presented will relate to: A. Tissue Typing; B. Identifying the Kidney Recipient and Organ Donor; C. Organ Rejection and Drug Therapy; D. Psycho-social Aspects of Organ Transplantation.

FRIDAY, SEPTEMBER 30, 1983

THE WINGS OF A GRACKLE . . . THE TONGUE OF AN EEL . . . TWO CROWS FEET AND A BAT GIZZARD. — 8:30 - 9:15 AM
(Coral Angus, HTL (ASCP) & Pamela Stanley, HT (ASCP))

Presentation will trace the depths of despair and bring you to the heights of electrifying exhilaration! Through the sorcery of a solution that was originally used to revitalize mummies, we are able to bring you a method of reconstituting tissue which has been lost diagnostically due to machine failures, pathologist failure and postal service failure. (NOT TO INCLUDE HISTOTECHNOLOGIST FAILURE!!!). We are presenting a step by step procedure along with photomicrographs to prepare you for a possible tissue disaster.

SEXUAL HARASSMENT AND THE HISTOTECHNOLOGIST — 9:15 - 9:45 AM
(Eric Glassy, M.D.)

Sex seems to be the topic of the 80's but no one has dared to discuss this delicate subject and its effects on histotechnologists — until now! Sexual harassment is not confined to secretaries and businessmen; it can happen to you.

RIBBONS OF PLASTIC — 9:45 - 10:00 AM
(Marjorie Boyette, HTL (ASCP))

This is a technique for producing and handling serial ribbons of plastic embedded tissue.

FABULOUS FORMALDEHYDE — WONDER MOLECULE — 10:15 - 11:15 AM
(Cecil Fox, Ph.D., D. Sc.)

Formaldehyde is the most common fixative used in histopathology. Discovered accidentally nearly one hundred years ago, formaldehyde fixes tissues in several ways, both by killing cells, and by stabilizing their structures in an enormous variety of chemical reactions. Unfortunately, the proper use of formaldehyde to produce consistent fixation and structural fidelity has become less common because of changes in laboratory routines and misunderstandings about its formulation. Recently developed morphometric methods and image analysis techniques now make it possible to make quantitative measurements of the effects of formaldehyde. In this lecture, effects of fixation on cells and tissues will be described and some directions for its use will be described. Simple analytical methods for quality control of fixative solutions have been developed so that formulations of formaldehyde can be rigidly controlled as to pH, buffering capacity, osmolarity, and the presence of foreign substances. Laboratory safety in handling formaldehyde solutions in the light of recent studies on carcinogenicity will also be considered.

HISTOTECHNOLOGY HEALTH STUDY: A PROGRESS REPORT — 11:15 AM - 12:15 PM
(Kaye Kilburn, M.D.)

Results of the Los Angeles-San Francisco study of histology technicians, which encompassed 146 persons and 106 controls, will form the basis for discussion of the respiratory, neurobehavioral and dermatologic symptoms. The average woman technician had 12 symptoms and the average man 7.3. Fifty-six hospital employed women and 50 research technicians served as controls and had a symptom frequency of 3.5. There was a clear gradient of symptoms with increasing exposure to formaldehyde and within the higher formaldehyde levels an additional gradient to xylene-toluene. Environmental sampling of 11 work sites will be completed and results reported. Results of further testing in approximately 400 technicians attending the 1982 NSH Convention in Boston will be reported. We plan to administer additional neurological tests to develop a better picture of the neurobehavioral impairment during the convention at Anaheim, September 25-30, 1983. They will include nerve conduction velocities, reaction time, dexterity and indices of memory, cognition, perception-integration and depression. A special effort will be made to retest participants of the previous studies (Los Angeles, San Francisco and Boston) to detect interval changes.

Secondary Fixation Enhances Nuclear Detail

Heidi Weddington
Richmond Memorial Hospital
Rockingham, North Carolina 28379

Zinc sulfate can be used as a secondary fixative in routine tissue processing to yield greater nuclear detail. Zinc sulfate forms crosslinkages in the nucleus to give a crisper, more detailed view of nuclear elements. When used in conjunction with 10% neutral buffered formalin, excellent results are achieved.

Staining is intensified when this method is employed. Therefore, it may be necessary to adjust staining times accordingly. (I reduced hematoxylin staining from 6 minutes to 3 minutes, and eosin Y staining from 30 seconds to 7-15 seconds.)

The methodology is as follows:

I. Primary fixation — phosphate buffered 10% formalin (minimum 2 hours after gross dissection).
Wash specimens in running water for 5 minutes. Proceed with secondary fixation.

II. Secondary fixation and tissue processing achieved on tissue processor. (Using two baskets of specimens.)

Baskets[1]

1, 2	—	Zinc sulfate - formalin: 1% $ZnSO_4$ in 10% unbuffered formalin (Minimum 3 hours)
3	—	Phosphate buffered 10% formalin
4	—	70% alcohol
5	—	95% alcohol
6, 7, 8	—	Absolute alcohol
9, 10	—	Toluene
11, 12	—	Paraffin

After cutting block, place slides on warming plate at 37°C until batch is completed. Place batch of slides in oven at 72°C for 10 minutes.

Use this procedure for a batch of tissue and watch your pathologist applaud the use of secondary fixation!

[1] Modification of procedure used by Dr. Peter Banks, Dept. of Surgical Pathology, Mayo Clinic, Rochester, Minn., 1981.

Symposium Registration Form/Fee Schedule

Name: _____
(last) (first) (initial)

Home Address: _____
(street)

_____
(city) (state) (zip)

Employer: _____

Address: _____
(street)

_____
(city) (state) (zip)

Work Telephone No. (_____) _____
area code

DO NOT USE THIS SPACE

Are you an NSH Member? Yes_____ No_____

Is this your first attendance to an NSH Symposium/Convention? Yes _____ No_____

_____ Yes, I wish to be placed on list to share room accommodations.

_____ I am hearing impaired and will require an interpretor for my attendance.

On fee schedule right and below, please indicate first and second choice for limited workshops, marked with an asterisk.

Check to ensure registration is for ONE all-day workshop, OR an AM and PM combination.

LATE REGISTRATION FREE OF $10 required after September 16, 1983.
CANADIAN and FOREIGN registrants please remit fees in U.S. currency.
Make check/money order payable to: National Society for Histotechnology
MAIL complete form & fees to: NSH, 5900 Princess Garden Parkway, #605, Lanham, Maryland 20706.

SUNDAY

		Member	Non-Member
All Day	#1	____$40	____$45
All Day	#2	____$40	____$45
AM	#3*	____$20	____$25
AM	#4*	____$20	____$25
AM	#5	____$20	____$25
PM	#6	____$20	____$25
PM	#7	____$20	____$25
PM	#8*	____$20	____$25

MONDAY

		Member	Non-Member
All Day	# 9	____$40	____$45
All Day	#10*	____$40	____$45
All Day	#11*	____$40	____$45
All Day	#12*	____$40	____$45
AM	#13	____$20	____$25
AM	#14	____$20	____$25
AM	#15	____$20	____$25
AM	#16	____$20	____$25
AM	#17	____$20	____$25
AM	#18*	____$20	____$25
PM	#19	____$20	____$25
PM	#20	____$20	____$25
PM	#21	____$20	____$25
PM	#22	____$20	____$25
PM	#23*	____$20	____$25

Totals:

TUESDAY

		Member	Non-Member
All Day	#24	____$40	____$45
All Day	#25*	____$40	____$45
All Day	#26	____$40	____$45
All Day	#27	____$40	____$45
AM	#28	____$20	____$25
AM	#29*	____$20	____$25
AM	#30	____$20	____$25
AM	#31	____$20	____$25
AM	#32*	____$20	____$25
PM	#33	____$20	____$25
PM	#34	____$20	____$25
PM	#35	____$20	____$25
PM	#36*	____$20	____$25
PM	#37	____$20	____$25

WEDNESDAY-THURSDAY-FRIDAY

	Member	Non-Member
Scientific Sessions (Wed.-Fri. inclusive)	____$50	____$60
Single Day Fee (Indicate Wed., Thur., Fri.)	____$20	_____
Thursday - BANQUET	____$20	

TOTAL REGISTRATION

Sunday Workshops $_____
Monday Workshops _____
Tuesday Workshops _____
Scientific Sessions _____
Banquet _____
Late Fee $10 (required after Sept. 16, 1983) _____

TOTAL FEES: _____

Immunohistochemicals

Miles Scientific is one of the largest suppliers of research immunochemicals in the United States, offering a wide selection of protein and hormone antisera, enzyme and fluorescent conjugates. The following pages describe many of these products that might be of interest in your investigative studies.

Reagent Preparation

Antisera products are raised primarily in rabbit or goat. The purity, titer and specificity of these antisera are monitored by quantitative precipitin techniques, immunodiffusion and immunoelectrophoresis. In most antisera, nonspecific antibodies are removed using solid-phase immunoabsorbants. These procedures insure that the concentrations of soluble antigen–antibody complex and free antigen are minimal, while specificity and titer remain at a maximum.

Monoform® monoclonal antibodies are obtained from mouse hybridomas, generally as partially purified ascites fluid. Most Monoform products are undiluted, delipidized ascites fluid (the anti-HCG products are diluted somewhat). For convenience in identifying these products, we have included the clone number in the product descriptions.

IgG fractions are prepared from antisera by DEAE cellulose chromatography. After fractionation, the products are checked for non-IgG protein by reverse immunoelectrophoresis. IgG fractions are at least 1% protein, presented in phosphate buffered saline.

Fluorescent, enzyme and protein conjugates are prepared from IgG fractions of antisera or from affinity purified and monoclonal antibodies where so indicated.

FITC Conjugates

Fluorescein and rhodamine conjugates are prepared according to the method of Goldman.[1]

Average total IgG = 10–15 mg/ml. Average specific antibody concentration = 1–2 mg/ml. F/P molar ratios are 3.0–5.5. After conjugation products are rechecked by immunoelectrophoresis and undergo quality control by direct immunofluorescence assay on spleen cells to determine optimal working conditions. For anti-IgG (H + L) products, working dilutions are commonly between 1/16–1/32 for direct methods and 1/32–1/64 for indirect methods.

Peroxidase Conjugates

Peroxidase conjugated antisera are prepared from IgG fractions of antisera and highly purified horseradish peroxidase (RZ ≥ 3.0) according to the method of Avrameas.[2] Peroxidase conjugates, except peroxidase anti–peroxidase complex, are shipped on ice.

Average total IgG = 10 mg/ml. Average specific antibody concentration = 1–2 mg/ml. Molar ratio of proteins to peroxidase are 0.8–1.3. Antisera are tested for potency by agar block precipitin and for enzyme immunoassay titers (usual range = 1:300 to 1:500).

Peroxidase Anti–Peroxidase

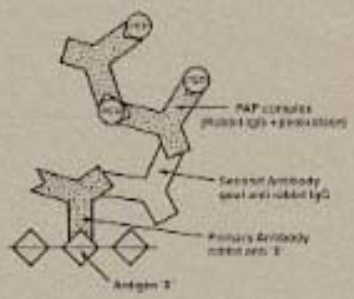
The peroxidase anti–peroxidase (PAP) technique offers superior sensitivity to the indirect method and requires a somewhat longer procedure. PAP is a soluble immune complex in which multiple anti-peroxidase molecules have been reacted with peroxidase. Thus a number of enzyme molecules are bound in a single complex.

PAP complex is available in several forms; the important difference being the animal source of the anti-peroxidase immunoglobulin.

The first step of the procedure is to apply the primary antibody directed against the tissue-associated antigen. This step is followed by the application of an unlabeled second antibody against the animal immunoglobulin which is the primary antibody. A PAP complex is selected which has the same species immunoglobulin as the primary antibody. The complex is applied to the tissue section and is bound by the free arm of the bifunctional second antibody. The location of the antigen site is again visualized by addition of a peroxide–chromogen reagent.

Sensitivity is increased: 1) by virtue of multiple second antibody binding to the primary antibody; and 2) by virtue of the high enzyme content in PAP complex.

USE OF PAP COMPLEX



Ferritin Conjugates

Ferritin conjugated antisera are prepared using IgG fractions of antisera and highly purified horse spleen ferritin (Miles code no. 96-027) using the method of de Petris and Raff.[3] After conjugation, unconjugated materials are removed by gel chromatography. The final product is characterized by immunodiffusion, immunoelectrophoresis and agar block precipitin titration. The products are further checked by electron microscopy to ensure the absence of aggregates.

Each Miles Scientific immunochemical is supplied with a Chemical Credential containing general information and the results of specific lot analyses performed on the product. Most products contain preservative, either thimerosal or sodium azide.

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PRIMARY ANTISERA TO HUMAN PROTEINS

Antigen	Host Form	Code No.	Size	Price
α_1-Acid Glycoprotein	gt/lq	61-056-1	2 ml	$ 45
Albumin	gt/lq	61-015-1	2 ml	23
Albumin	rb/ly	65-051-1	2 ml	24
α_1Anti-trypsin	gt/lq	64-083-1	2 ml	39
Ceruloplasmin	gt/lq	61-017-1	2 ml	31
Complement Components:				
C1 Esterase Inhibitor	gt/lq	65-085-1	2 ml	54
$C1_q$	gt/lq	68-001-1	2 ml	42
$C1_r$	gt/lq	68-012-1	2 ml	44
$C1_s$	gt/lq	68-002-1	2 ml	42
C2	sh/lq	68-003-1	2 ml	59
C3 (β_1 C)	gt/lq	68-004-1	2 ml	29
C4	gt/lq	68-005-1	2 ml	29
C5	gt/lq	68-006-1	2 ml	37
C6	gt/lq	68-007-1	2 ml	65
C7	gt/lq	68-008-1	2 ml	65
C8	gt/lq	68-009-1	2 ml	65
C9	gt/lq	68-010-1	2 ml	65
$C3_b$ Inactivator (KAF or I)	gt/lq	68-020-1	2 ml	65
$C3_b$ Proactivator (Factor B)	gt/lq	68-022-1	2 ml	43
Properdin (P)	gt/lq	68-030-1	2 ml	48

Human antisera, continued

Antigen	Host Form	Code No.	Size	Price
β1H	gt/lq	68-032-1	2 ml	55
Factor VIII (assoc. protein)	gt/lq	68-112-1	1 ml	43
Ferritin	rb/ly	65-077-1	2 ml	52
FDP_D	gt/ly	64-091-1	2 ml	45
FDP_L	gt/ly	64-092-1	2 ml	45
Fibrinogen	gt/lq	61-014-1	2 ml	28
Fibronectin	sh/ly	64-078-1	1 ml	40
IgA	gt/lq	61-019-1	2 ml	29
IgA	rb/ly	65-065-1	2 ml	29
Secretory Component (free + bound)	gt/lq	61-035-1	2 ml	62
IgD	gt/lq	61-068-1	2 ml	34
IgE	gt/lq	61-081-1	2 ml	37
IgE	rb/ly	65-062-1	2 ml	37
IgE, Monoform GE-1	mo/lq	63-058-1	0.25 ml	100
IgG	gt/lq	61-020-1	2 ml	29
IgG	rb/ly	65-066-1	2 ml	29
IgG Lppt, Monoform GG-5	mo/lq	63-050-1	0.5 ml	50
IgG Gppt, Monoform GG-4	mo/lq	63-051-1	0.5 ml	50
IgG (Fc), Monoform GG-7	mo/lq	63-071-1	0.5 ml	75
IgG (Fab), Monoform GG-6	mo/lq	63-070-1	0.5 ml	75
IgG_1 (Fab), Monoform SL-16	mo/lq	63-080-1	0.5 ml	65
IgG_1 (Fc), Monoform SG-11	mo/lq	63-060-1	0.5 ml	65
$IgG_{1,3}$ (Fab), Monoform SL-13	mo/lq	63-065-1	0.5 ml	65
IgM	gt/lq	61-021-1	2 ml	29
IgM	rb/ly	65-067-1	2 ml	29
IgM, Monoform MB-11	mo/lq	63-055-1	0.5 ml	50
Immunoglobulins: Polyvalent:				
IgA + G + M (H + L)	rb/ly	65-068-1	2 ml	29
IgA + D + G + M (H + L)	gt/lq	61-069-1	2 ml	29
Light Chains (free + bound):				
κ-chains	gt/lq	61-032-1	2 ml	33
κ-chains	rb/ly	65-055-1	2 ml	36
κ-chains, Monoform KP-53	mo/lq	63-068-1	0.5 ml	50
λ-chains	gt/ly	64-084-1	2 ml	43
λ-chains	rb/ly	64-056-1	2 ml	45
λ-chains, Monoform LA-84	mo/lq	63-067-1	0.5 ml	50
Lysozyme	gt/lq	64-237-1	2 ml	55
α_2-Macroglobulin	gt/lq	65-082-1	2 ml	31
β_2-Microglobulin	rb/ly	65-089-1	2 ml	59
Myoglobin	gt/ly	64-076-1	2 ml	39
Myoglobin	rb/ly	65-075-1	2 ml	39
Placental Lactogen (HPL)	gt/lq	65-861-1	1 ml	55

Human antisera, continued

Antigen	Host Form	Code No.	Size	Price
Polyvalent Immunoglobulins - See Immunoglobulins				
Prealbumin	gt/lq	61-024-1	2 ml	38
Prostatic Acid Phosphatase	rb/lq	65-304-1	1 ml	75
Thyroglobulin	sh/ly	64-097-1	1 ml	100
Transferrin	gt/lq	61-026-1	2 ml	29

PRIMARY ANTISERA TO HORMONES

Antigen	Host Form	Code No.	Size	Price
HCG (α + β)	rb/ly	65-073-1	1 ml	72
β-HCG, Monoform PE-4	mo/lq	63-104-1	0.1 ml	90
β-HCG, Monoform PC-2	mo/lq	63-101-1	0.1 ml	85
HGH	rb/lq	65-875-1	1 ml	55
HPL	gt/lq	65-861-1	1 ml	55
Insulin, Bovine	gp/ly	65-101-1	1 ml	79
Insulin, Porcine	gp/ly	65-104-1	1 ml	79
T3-BSA	rb/lq	65-851-1	1 ml	43
T4-BSA	rb/lq	65-850-1	1 ml	32
TSH	rb/lq	65-860-1	1 ml	72

CYTOSKELETAL ANTISERA

The antisera in the following list are the first in a new group of antisera to cytoskeletal proteins. They exhibit very specific activity and broad interspecies reactivity.

Antigen	Host Form	Code No.	Size	Price
Myosin	rb/lq	65-791-A	1 ml	60
Prekeratin	gp/lq	65-792-A	1 ml	60
Actin	rb/lq	65-096-1	1 ml	60
Tubulin	rb/lq	65-095-1	1 ml	60

FLUORESCEIN CONJUGATED ANTISERA

Antigen	Host Form	Code No.	Size	Price
Goat IgG (H + L)	rb/lq	65-176-2	2 ml	49
Guinea Pig IgG (H + L)	rb/lq	65-166-2	2 ml	49
Human IgA	gt/lq	61-043-1	2 ml	59
Human IgE	gt/lq	61-082-3	2 ml	59
Human IgG (H + L)	gt/lq	65-207-3	2 ml	49
Human IgG (H + L)	rb/lq	65-169-2	2 ml	49
Human IgG	gt/lq	61-041-1	2 ml	59
Human IgM	gt/lq	61-044-1	2 ml	59
Human Immunoglobulins (IgA + G + M) (H + L)	rb/lq	65-208-1	2 ml	49
Mouse IgG (H + L)	rb/lq	65-171-3	2 ml	55
Porcine IgG (H + L)	rb/lq	65-172-2	2 ml	49
Rabbit IgG (H + L)	sh/lq	65-204-2	2 ml	49
Rabbit IgG (H + L)	gt/lq	65-173-2	2 ml	49
Rabbit IgG (H + L), Affin.	gt/lq	61-640-1	2 mg	50
Sheep IgG (H + L)	rb/lq	65-205-2	2 ml	49

NOMENCLATURE

We have adopted several forms and abbreviations. Assume all antisera to immunoglobulins are heavy chain specific unless specified to have (H + L) heavy and light chain activity (e.g., Anti-Mouse IgM should be understood to be heavy chain specific).

The following are abbreviations commonly appearing on these pages:

Affin.-Affinity Purified
Agar.-Agarose Bound
AggLab.-Aggregating Antibody
AP-Alkaline Phosphatase
Ferr.-Ferritin
FITC-Fluorescein
Frac.-IgG Fraction
Monoform®-Monoclonal
Neph.-Nephelometric
Per.-Peroxidase
RITC-Rhodamine
PBS-Phosphate buffered saline
SDS-PAGE-sodium dodecyl sulfate-polyacrylamide gel electrophoresis
lq-liquid
ly-lyophilized
dg-dog
dk-donkey
gp-guinea pig
gt-goat
mo-mouse
rb-rabbit
sh-sheep

FERRITIN CONJUGATED ANTISERA

Antigen	Host Form	Code No.	Size	Price
Goat IgG (H + L)	rb/lq	61-281-1	2 ml	62
Human IgG (H + L)	gt/lq	61-282-1	2 ml	62
Rabbit IgG (H + L)	gt/lq	61-280-1	2 ml	62

PEROXIDASE CONJUGATED ANTISERA

Antigen	Host Form	Code No.	Size	Price
Goat IgG (H + L)	rb/lq	61-201-3	2 ml	75
Guinea Pig IgG (H + L)	rb/lq	61-208-1	2 ml	75
Human IgA	gt/lq	61-131-1	2 ml	75
Human IgE	gt/lq	61-133-1	2 ml	75
Human IgG (H + L)	gt/lq	61-230-1	2 ml	75
Human IgG (H + L)	rb/lq	61-231-1	2 ml	75
Human IgG	gt/lq	61-130-1	2 ml	75
Human IgM	gt/lq	61-132-1	2 ml	75
Human Immunoglobulins (IgA + G + M)	rb/ly	61-232-1	2 ml	75
Mouse IgG (H + L)	rb/lq	61-204-1	2 ml	85
Porcine IgG (H + L)	rb/lq	61-212-1	2 ml	75
Rabbit IgG (H + L)	gt/lq	61-202-3	2 ml	75
Rabbit IgG (H + L), Affin.	gt/lq	61-650-1	1 mg	65

PEROXIDASE ANTI-PEROXIDASE

Antigen	Host Form	Code No.	Size	Price
Peroxidase Anti-Peroxidase	gt/lq	61-243-2	2 ml	79
Peroxidase Anti-Peroxidase	rb/lq	61-242-2	2 ml	79

FRACTIONS OF ANTISERA

Products in this listing are IgG fractions except no. 61-610 which is affinity purified.

Antigen	Host Form	Code No.	Size	Price
Goat IgG (H + L)	rb/ly	65-161-2	2 ml	38
Guinea Pig IgG (H + L)	rb/ly	65-152-1	2 ml	38
Human IgG (H + L)	rb/ly	65-155-2	2 ml	38
Human IgG (H + L)	gt/ly	65-156-2	2 ml	38
Mouse IgG (H + L)	rb/ly	65-157-2	2 ml	43
Rabbit IgG (H + L)	gt/ly	65-159-2	2 ml	38
Rabbit IgG (H + L)	sh/lq	65-189-2	2 ml	38
Rabbit IgG (H + L), Affin.	gt/ly	61-610-1	4 mg	50
Sheep IgG (H + L)	rb/lq	65-190-2	2 ml	38

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Disposable Blades Vs. Conventional Microtome Knives: Disposables Have "The Edge"

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The manufacturing industry has improved upon disposable blades so that they are actually a threat to microtome knives that require resharpening. Disposable blades currently on the market have a consistently high quality edge comparable to a well sharpened knife and have facilitated sectioning of paraffin embedded tissue in our laboratory. This consistent high quality has made routine sectioning at four micrometers a relatively simple operation.

Considering the initial cost of a sharpener, tech time involved in the sharpening process, cost of abrasives, repair parts and service, the disposables appear more cost effective than their resharpenable counterparts. Also eliminated is the additional time required to obtain good quality sections when a resharpened knife is beginning to outlive its usefulness or the sharpening process has not produced an optimal cutting edge.

One should not expect, however, that disposables presently on the market will eliminate the need for conventional knives. While 90% of the work in our hospital is now being sectioned with disposables, the other 10% requires the harder, more sturdy edge of a resharpenable knife for good quality sections. Ironically, but not surprisingly, the tissues requiring conventional knives are the harder specimens that lead to the rapid, and more difficult to repair, destruction of the knife edge.

Several companies are currently producing disposable blade systems including **Miles Scientific** (formerly Lab-Tek), American Optical, Scientific Products and Lab-Line. I've only tried two different systems and have a preference for the Tissue-Tek® III Accu-Edge™ Disposable Microtome Blade System*, (Miles code no. 4687) although I know of other laboratories that prefer other systems. Most manufacturers and distributors have demonstration units available to try before you make the decision to purchase them. When first attempting to section, however, don't become discouraged when the block doesn't begin to ribbon right away. Our experience has shown that the blades are apparently too sharp and several cuts have to be made before ribboning begins.

Use of disposable blades in our laboratory has greatly reduced the incidence of frazzled, irritable histotech syndrome which so often results when microtome knives are not sectioning up to par. This alone has made the purchase of disposable blade systems a worthwhile investment. Yet more importantly, the consistent quality of the knife edge has concurrently resulted in an increase in the quality of our sections. Therefore, while the initial expense for holder and blades may appear costly, I've found disposable blades to be a cost effective, preferable alternative to conventional blades for the majority of our paraffin wax sectioning.

*Miles Scientific, Division of Miles Laboratories, Inc., Naperville, IL 60566

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