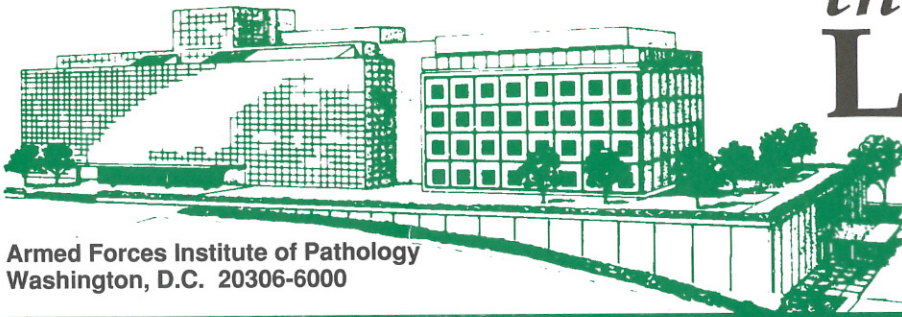


the AFIP LETTER



Armed Forces Institute of Pathology
Washington, D.C. 20306-6000

Vol. 150, No. 2
April 1992

AFIP Performance Questionnaire to be mailed in April

A postage-paid "performance questionnaire" designed to learn what the pathology community thinks of AFIP's consultation services, education programs, and ongoing developments will be mailed in the next few weeks. "It's very important for us to learn more about how well the pathology community thinks we're doing," notes AFIP Director Vernon W. Armbrustmacher, Col, USAF, MC. "With so many new and expanding programs happening here at the Institute, we need to focus on a few key areas to learn more about how well we're doing and to determine areas in which we can improve."

Included will be questions on the frequency and types of cases most often sent, the diagnostic accuracy of our consultations, the wide variety of educational opportunities at the AFIP, and a number of other services which may be available in the future.

"We've made it as easy as possible for pathologists to answer the survey in only a few minutes by including a postage-paid envelope for quick return," says Col Armbrustmacher.

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Telepathology Pilot Study Underway Future plans include military hospitals in U.S., Europe



AFIP Associate Director, Col Kenton S. Hartman, USAF, DC (rear) and Major Elsayed review one of the telepathology cases.

The second phase of AFIP's new telepathology pilot study began April 1, at Malcolm Grow Hospital, Andrews AFB, MD, according to Major Al M. Elsayed, USAF, MC, the project's professional director. "Through this pilot program we hope to one day provide an easily accessible and more timely consultation to the military pathologist, particularly in remote areas where only a single pathologist is present," he says.

Through the use of sophisticated, yet relatively inexpensive technology, the consulting pathologist could prepare digitized images of areas in question from the biopsy, transmit the images to the expert consultant at the AFIP, discuss the case with the consultant, and perhaps resolve the issues in only a matter of hours. According to Major Elsayed, reports on current consultations can take multiple days to be issued. "This program should one day be able to provide prompt consultative support for difficult diagnoses," he notes.

Telepathology involves the use of sophisticated image capturing, processing, and display with modular telecommunication systems to bridge physical distance. "We are currently developing affordable modular send stations and a centralized receiving and processing station with a sophisticated image display facility," he says.

The successful first phase of the project, also tested at Malcolm Grow, looked at the feasibility of initiating such a system. The second phase, set for completion by May 30, will use the equipment on a regular basis. "After that, Phase III will set up a small network of hospitals in the U.S. and Europe to further expand the system."

Pathologists interested in learning more about the telepathology pilot study should contact Major Elsayed, c/o AFIP-CPZ, Washington, DC, 20306-6000, or telephone (202)576-2871 or AVN 291-2871.

Some Thoughts on the Performance Questionnaire and the Telepathology Pilot Study

AFIP's Performance Questionnaire, which will be sent to you this month through the assistance of the American Registry of Pathology, contains a



number of topics which are vital to how we "do business" here at the Institute. It comes to you at a time when we are

undertaking new directions in pathology, including investigations related to cancer and infectious diseases, developing new course locations and videodiscs, and conducting research related to the study of tissue.

To accomplish these goals, however, we'd like to know more about how we're doing right now. When the questionnaire arrives, please take a few minutes to comment on how you feel we're doing. You'll have the opportunity to remark on our consultation and education services, along with a number of proposed future programs which may be of great benefit to you.

The telepathology program, highlighted on the cover, is something that we are excited about. We'll be briefing our Scientific Advisory Board in May on the results of the second phase of this study, which is currently taking place at Andrews Air Force Base's Malcolm Grow Hospital. We expect to initiate the third phase of the study sometime in the next six months at four military hospitals located in the U.S. and Europe.

The benefits of this program could be substantial. In addition to saving time, this cost-effective technology

AFIP LABORATORY METHODS IN HISTOTECHNOLOGY PUBLISHED

Quality histopathology depends on quality histotechnology. The AFIP has long been concerned with promoting high standards of histotechnology: through its courses, publications, the Tri-Service Histopathology School, and its diagnostic consultative mission.

Since 1953, when Mary Francis Gridley compiled the Laboratory Manual of Special Staining Techniques, the Institute has been engaged in documenting the methods of its histology laboratories. The current manual, written by AFIP staff who perform the procedures on a daily basis, presents those methods currently used at the Institute.

There is an excellent series of bench-top candid photographs of embedding and sectioning procedures. Of great practicality are groups of line drawings describing how to and how not to arrange tissue

blocks when embedding, the causes of poor sections, and how to retrieve a section from a broken slide and remount it like new. A number of color photomicrographs of histological preparations permit comparisons with one's own material.

Procedures are spelled out in step-by-step detail. Here one will find the famed Movat pentachrome and Warthin-Starry stains and the AFIP modification of the Ziehl-Neelsen method. Chapters are devoted to frozen sections; immunohistochemistry; and orthopedic, ocular, and even insect histotechnology.

This book is a must, not only for histotechnologists, but for the pathologist who wants to know what is available from today's laboratory.

An order form can be found on page 8 of the Letter or by calling the American Registry of Pathology at (202) 576-2940.

would allow military pathologists to provide a consultation at hospitals closer to troop centers. Transporting of patients to large medical centers for specialized consultations could be minimized, and dependent family members could remain at medical facilities closer to home. We'll keep you informed of our progress in this area as the study continues.

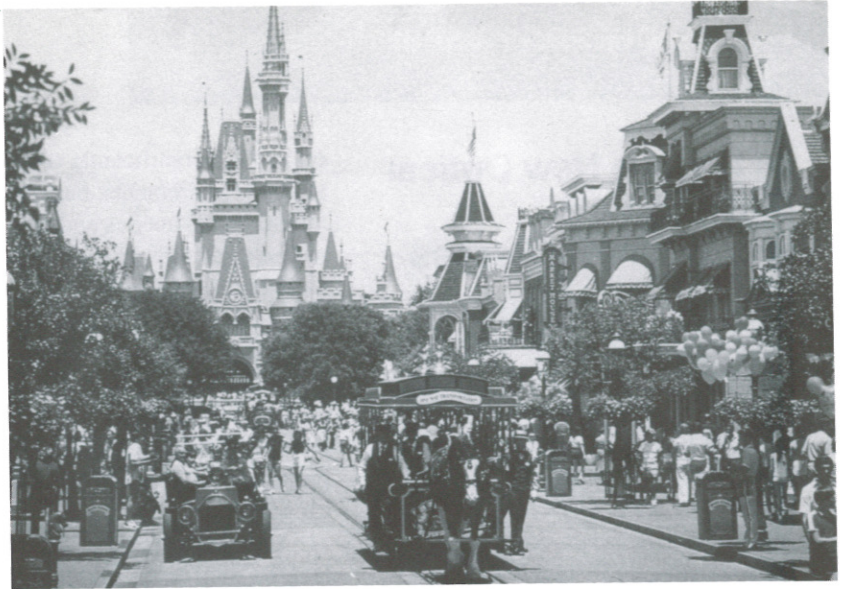
Correction: The February 1992 AFIP Letter profile of Dr. Linda K. Johnson should have stated that her research on ovine lentiviral infection took place in Dr. Christine Zink's laboratory at the Johns Hopkins University School of Medicine, Division of Comparative Medicine. We apologize for the error.


Vernon W. Armbrustmacher
Col, USAF, MC
The Director



Orlando Course Called 'Unqualified Success'

Future courses planned for Denver, San Antonio



© WALT DISNEY WORLD

Orlando and the wonders of WALT DISNEY WORLD® played host to over 150 pathologists and their families for the February 1992 "Controversies and Recent Advances in Surgical Pathology" course. "It was a marvelous experience for both our faculty and the participants," says AFIP Deputy Director, J. Thomas Stocker, COL, MC, USA. "Pathologists who had not attended AFIP courses in 5-10 years were just delighted to be there, and we'll hold it again next February 8-12 at WALT DISNEY WORLD®."

The course was viewed as a very positive sign that the AFIP wants to expand from Washington, DC-based

"'Controversies and update' is the ideal subject approach for practising anatomical pathologists. This course is as good as any AFIP offers and better than most."

- Comment from an Orlando participant

courses and be part of the national pathology community, according to COL Stocker. It also successfully addressed issues that were pertinent to surgical pathologists from around the country. "Pathologists who found it

impractical to attend a 3-5 day course on a single topic took advantage of such broad areas as hematopathology, neuropathology, pulmonary pathology, and breast pathology," he says.

The scheduling of this course included one full day (8 hours) of presentations and four days with 5 hours of lectures ending by 1 p.m. each day. With the central location at Disney's Contemporary Resort, this scheduling provided easy access to entertainment and restaurants. "To the last minute of the last day we had 95% - plus attendance," COL Stocker says. Arrangements have already been made for **February 8-12, 1993**, for special accommodation rates and tickets to attractions. "The weather was spectacular, and we hope to have an even larger number of participants next year," he notes.

Future AFIP courses around the country include "Pathology of Radiation and Cancer Chemotherapy Drugs" from 29-31 August 1992, in San Francisco, CA; Forensic Pathology from 14-18 September 1992, in Denver, CO; and, Hematopathology from 16-18 December 1992, in San Antonio, TX. "The hematopathology course will be held at the Marriott Rivercenter and will coincide with the spectacular Christmas activities along San Antonio's famed Riverwalk," says Stocker. "We hope that pathologists will start off the Christmas season with a great educational course in a beautiful setting and

still allow plenty of time to enjoy the Christmas season with their families."

Other planned AFIP courses around the country include a late 1992 or early 1993 Infectious Disease and AIDS Pathology seminar in San Juan, Puerto Rico; the 31st Annual Neuropathology Course, 17-22 January 1993, in New Orleans, LA; and a Hepatic Pathology seminar in San Diego, CA, in April, 1993. "We're also looking for a site to

"One of the best I've taken! Course was comprehensive, well-organized with excellent speakers, and was conducted in a most hospitable location."

- Comment from an Orlando participant

hold a surgical pathology course in the summer of 1993, in a resort area, where we can hold a first-class educational experience along with a family vacation," COL Stocker says. "AFIP courses combine the best of ARP and AFIP, with some of the money derived from these courses supporting research and fellowship programs. As the DoD budget decreases in upcoming years, this will be a very important source for supporting our research and educational activities at AFIP," he added. □

AFIP Uses New Optical Disk Imaging for Easier File Access

In January of this year, the Records Repository began the task of scanning our paper-based pathologic case files onto optical disk storage media. The AFIP currently has almost 800,000 paper-based records out of our 2.3 million case files. Our older files are on microfiche, with the exception of approximately 30,000 records which were of poor print quality. We will attempt to scan these poor print quality records utilizing the image enhancement capabilities of the optical disk imaging technology to hopefully obtain a legible image of all documents.

We at the AFIP are excited about utilizing this technology for long-term storage of our pathologic case files. Not

only will it significantly reduce our storage requirements, but it will provide almost instantaneous and simultaneous access to records on the data base. Our pathologists and researchers will be able to access records through retrieval workstations located throughout the Institute, eliminating the time-consuming task of pulling and refileing of the records. The system offers on-demand printing as well as automatic FAX capability.

Our new system is called PADSTARS or the Pathology Document Storage and Retrieval System. We hope to be able to image up to 4,000 document images each day utilizing three scanning workstations. We anticipate that this will allow us to keep up with the volume of records we currently accession, thereby not adding to our storage backlog, as well as to make some inroads into the backlog of our

paper-based records in storage. Eventually, as resources permit, we hope to expand our imaging capability to include photographs and x-rays, as well as increase our daily scanning rate.

Further information regarding our progress in the PADSTARS implementation will be published in future editions of this letter. Meanwhile, anyone interested in obtaining additional information concerning our use of optical disk imaging technology may contact the AFIP Research Office at (202)576-2884 or the Records Repository at (202)576-2833.

Histotechnology Notes

Lens paper prevents floaters in the embedding center paraffin bath

Lens paper has long been used as a container for processing fragmentary and minute specimens. The open "weave" of the lens paper confines the specimens while allowing free passage of the processing fluids. We use these characteristics of the lens paper to prevent cross contamination (floaters) of the paraffin in the specimen holding area of the embedding center.

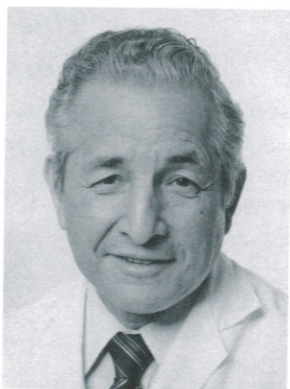
We simply slip a sheet of 7 1/2- by 11-inch (substitute appropriate size for your particular unit) lens paper beneath the surface of the molten paraffin and press it to the bottom of the tray, removing all the air bubbles before adding our cassettes. After we have completed the embedding, we carefully remove the lens paper by grasping the corners and slowly lifting to allow the molten paraffin to flow through while capturing any dislodged tissue fragments.

This practice has allowed us to reduce the frequency of paraffin changes from daily to weekly. The paraffin remains crystal clear and fragment free between changes.

Lee Luna – In Memoriam 1931–1992

Lee Luna, who served as chairman of the Department of Histopathology during his 33-year AFIP career, died of cancer on 27 February 1992. He was 60. Frequently referred to as the "father of histology" by his peers, Luna authored three

textbooks and contributed to over 150 articles on the profession. In 1965, he held the first AFIP Symposium in Histotechnology, which later became the National Society for Histotechnology. In 1971, he founded the first newsletter for the histotechnology community, "Histo-Logic," and had served as editor since. His career included hundreds of national and international lectures on the subject.



Prior to his retirement from AFIP, he founded American HistoLabs, Inc., as a catalyst for laboratory education and the advancement of health care in the United States. He was vice-president of the organization at the time of his death.

Luna was one of only two non-physicians to earn the Meritorious Civilian Service Award from the Department of the Army, and in 1990, he was named "Histotechnologist of the Decade" by the National Society for Histotechnology. He is survived by his wife of 42 years, Martha Iris Luna, three children, and two grandchildren.

AFIP STAFF "IN THE NEWS"

■ Present and past chairmen of the Department of Veterinary Pathology gathered on December 3, 1991, at an international symposium to honor **Dr. Leon Z. Saunders**, a member of the AFIP's Scientific Advisory Board from 1985 to 1991. Pictured (photo at right) from left are the current chairman, John M. Pletcher, COL, VC, USA; T.C. Jones, who chaired the department in the 1950's; Dr. Saunders; Sidney Jones, a past chairman now with Hazleton Laboratories in Vienna, VA; and another past chairman, George Imes, who lives in Silver Spring, MD.



■ **COL George Lupton, MC, USA**, Chairman, Department of Dermatopathology, has been elected to active membership in the American Dermatological Association. Active membership in the ADA is limited to 200.

■ **Jose A. Centeno, PhD**, Department of Environmental and Toxicologic Pathology, presented a paper at two poster sessions held at the 203rd National American Chemical Society Meeting in San Francisco, 5-10 April 1992. In November 1991, he presented a lecture entitled "Analysis of Tissue Using Spectroscopy" at the University of Puerto Rico-Cayey Campus, as part of an NIH-Minority Biomedical Research Support Program.

■ **Kamal G. Ishak, MD, PhD**, Chairman, Department of Hepatic and Gastrointestinal Pathology, presented a lecture entitled "Hepatic and Biliary Diseases Related to Transplantation" at the Hawaii Society of Pathologists' annual winter meeting, held in Honolulu, Hawaii, on 1 February 1992. While there, Dr. Ishak served as consultant to the Department of Pathology, Tripler Army Medical Center, from 3 to 7 February. At Tripler he presented a slide seminar, seven lectures on various medical and surgical diseases of the liver, and a microscopic slide conference of problem cases.

■ **Richard C. Froede, MD**, the Armed Forces Medical Examiner, has been designated as a "Distinguished Fellow" by the American Academy of Forensic Sciences. The award is in recognition of Dr. Froede's distinguished career, professional accomplishments, significant contributions, and activities in support of the academy and other professional organizations. He was presented with a medallion at the academy's annual meeting in New Orleans, on 19 February 1992.

■ **MAJ Victor Weedn, MC, USA**, Deputy Medical Examiner and Chief, Armed Forces DNA Identification Laboratory, was named to Federal Computer Week's "Federal 100 of 1992," the group of 100 executives from government, industry, and academia found to have had the greatest impact on the government systems community in 1991.

The **AFIP** and the **University of Puerto Rico Medical Sciences Campus**, Rio Piedras, signed a memorandum of understanding to establish education and research collaborative enterprises. Pictured at the 28 January 1992 signing ceremony are from left: Francisco J. Muniz, MD, UPR Medical Sciences Campus Dean; Vernon W. Armbrustmacher, Col, USAF, MC, AFIP Director; Florabel G. Mullick, MD, SES, AFIP Associate Director; Carmen Gonzalez Keelan, MD, Acting Director, UPR Medical Sciences Campus Department of Pathology; and, Manuel Marina, MD, Chancellor, UPR Medical Sciences Campus.



Department of Radiologic Pathology Establishes Asian and Austrian Lecture Series

The Department of Radiologic Pathology has expanded its international educational activities through new agreements with the national radiologic societies of South Korea, Taiwan, Thailand, and the European Society of Radiology/University of Graz (Austria).

The department will conduct an annual series of lectures on the principles of radiologic-pathologic correlation in each of these countries beginning in 1992. Current and former members of the AFIP staff will present selected topics in their respective areas of expertise on a rotating basis.

The new Asian and Austrian lecture series will be similar to AFIP Radiologic Pathology educational programs that have been sponsored by the Spanish

Society of Radiology since 1990, and the Japanese College of Radiology since 1991.

In addition to these annual lecture series, plans are now being formulated to establish visiting fellowships at the AFIP for junior academic radiologists from the sponsoring nations. The goal of this program is to enhance radiologic education in each of these countries through the development of teaching skills and material and to foster research in radiologic-pathologic correlation. The Asian lecture series that will begin this year is being supported by a generous grant from the General Electric Corporation.

AFIP Radiology Residents are health-conscious, survey shows

Young physicians are a health-conscious group. At least that's what a survey of radiology residents (mean age approximately 31 years) attending the AFIP six-week course in radiologic-pathologic correlation would indicate.

Of 135 residents in that course, 105 responded to a questionnaire distributed by Robert H. Ackerman, M.D., this year's Distinguished Scientist in the Department of Radiologic Pathology. All of the 25 women and 70 (88%) of the 80 men who responded had never smoked. Nine other men had stopped years ago, and only one was a regular smoker.

Ninety-three percent of the men and 76% of the women watch their diet for health reasons. Less than 20% said they did not keep to their diet most of the time. Good nutritional habits would be confirmed by their obesity scores. Based on a body mass index calculated from their height and weight, only 2 of 62 US

men and 1 of 19 US women responding were obese; 6 and 1, respectively, were overweight; and 16 and 5, respectively, borderline overweight. Approximately 60% of US-born men and women were normal or light.

The positive effects of good nutrition on the mean height of populations has been long recognized. The mean height of the 62 US men in this survey was over two inches greater than for a sample of 600 Civil War recruits reported in an 1863 Army manual. In

both eras those from the Northeast and Mid-Atlantic states were statistically significantly smaller than their compatriots from the South and more western regions. The stature findings will be explored further in cooperation with the Anthropology Research Group of the National Museum of Health and Medicine. The results of the current survey are as follows:

Mean heights of men in 1991 and 1863

	AFIP, 1991	Civil War
Northeast & Mid-Atlantic States	5' 9-1/2"	5' 8"
Midwest	5' 11-1/2"	5' 9"
South	5' 11-7/8"	5' 9-1/4"
West	6'	No data

Ms. Earlene Turner assisted in the data analysis.



Don't forget the Mailing List Update for any:

- Address changes
- Additions
- Deletions

See the special form on page 12 for details.

Museum breaks attendance records as hours, services expand

AFIP's National Museum of Health and Medicine has broken previous attendance records for two consecutive months. This development comes at a time when the Museum is making significant operational changes to better serve the public. During the first two months of 1992, 10,365 people visited the Museum. In 1991, the figure for this period was 4,945, and the Museum received 4,028 visitors during January/February of 1990. To better accommodate the growing number of visitors, the Museum adopted new hours in February. The Museum is now open from 10:00 A.M. to 5:30 P.M. seven days a week. It is also open every day of the year except Christmas.

Among the important changes that the AFIP's Associate Director for the Museum, Dr. Marc S. Micozzi, has initiated is a gallery to spotlight visiting exhibits that will focus on a variety of health and medical themes. One of the most significant recent developments at the Museum concerns the Institution's AIDS exhibit, "Living In A World With



Dr. Marc S. Micozzi, AFIP's Associate Director for the Museum, explains the AIDS exhibit to Dr. Jack O. Lanier, Principal Deputy Assistant Secretary of Defense, Health Affairs, during Dr. Lanier's February 14 visit to the Institute.

AIDS." This exhibit becomes the first in the Museum's history to be the subject of a professional outside evaluation under the auspices of the National AIDS Exhibit Consortium.

As a result of changes in the Museum's organization, more people are now available to help visitors and assist in the management of the exhibit floor.

One of the most exciting developments at the Museum is the creation of "Visualizing The Body." This new

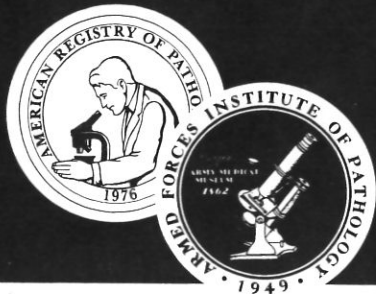
anatomical exhibit will combine anatomical preparations and simple interactive devices to create a user-friendly introduction to the human body for visitors of all ages. The first component of the new exhibit, which focuses on the heart, will open in summer 1992. The final exhibition, which will consist of ten major cases, should be complete in 1993. An exciting time of change and progress has begun at AFIP's National Museum of Health and Medicine.

Recent Publications by AFIP Staff

1. Centeno JA. Evidence of dithionite contribution to the low-frequency resonance Raman spectrum of reduced and mixed-valence cytochrome c oxidase. *Arch Biochem Biophys.* 1992;292:624-628.
2. Hadfield TL. Cat-scratch disease and bacillary angiomatosis. *Current Opinion in Infectious Diseases.* 1991;4:628-635.
3. Hubbard GB, Migaki G, Butler TM, Warner RA. Diagnostic exercise: cutaneous papules in a baboon. *Lab Anim Sci.* 1991;41:370-371.
4. Laxer MA, Timblin BK, Patel RJ. DNA sequences for the specific detection of *Cryptosporidium parvum* by the polymerase chain reaction. *Am J Trop Med Hyg.* 1991;45:688-694.
5. Meis JM, Enzinger FM. Inflammatory fibrosarcoma of the mesentery and retroperitoneum: a tumor closely simulating inflammatory pseudotumor. *Am J Surg Pathol.* 1991;15:1146-1156.
6. Moran CA, Mullick FG, Ishak KG, Johnson FB, Hummer WB. Identification of titanium in human tissues: probable role in pathologic processes. *Hum Pathol.* 1991;22:450-454.
7. Moran CA, Wenig BM, Mullick FG. Primary adenocarcinoma of the nasal cavity and paranasal sinuses. *Ear Nose Throat J.* 1991;70:821-828.
8. O'Leary TJ, Wright CF. Pediatric molecular pathology: principles and practice. *Perspect Pediatr Pathol.* 1991;15:28-82.
9. Sobin LH. *A Pathology Primer* (in verse). 2nd ed. Washington, DC: Nomad Press; 1991.

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and
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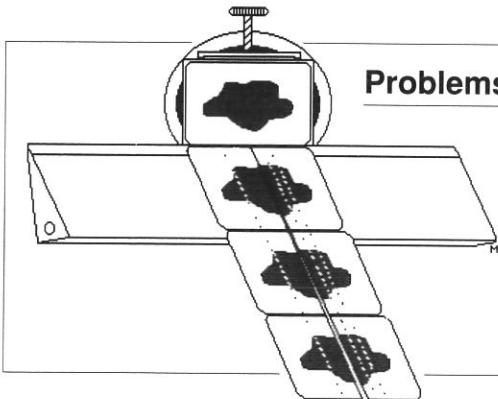


Armed Forces Institute of Pathology

Laboratory Methods In Histotechnology

This protocol laboratory manual is designed for daily laboratory use. With vivid color photographs, descriptive line art and detailed special staining techniques, histotechnologists can achieve the highest quality preparations.

Written by experienced histotechnologists and pathologists at the AFIP, this up-to-date comprehensive laboratory manual gives histotechnologists detailed information and helpful tips on how to produce optimal slides.



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- Calcium, foreign bodies (sutures or crystals in specimens)
- Grit or dirt in paraffin

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Evidence of Dithionite Contribution to the Low-Frequency Resonance Raman Spectrum of Reduced and Mixed-Valence Cytochrome c Oxidase

Jose A. Centeno

The resonance Raman spectra of deoxygenated solutions of mixed-valence cyanide-bound and fully reduced cytochrome oxidase derivatives that have been reduced in the presence of aqueous or solid sodium dithionite exhibit two new low-frequency lines centered at 474 and 590 cm^{-1} . These lines were not observed when the reductant system was changed to a solution containing ascorbate and N,N,N',N' -tetramethyl-p-phenylenediamine (TMPD). Under enzyme turnover conditions, the addition of dithionite to the reoxidized protein (the 428-nm or "oxygenated" form) increases the intensity of these lines, while reoxidation and rereduction of the enzyme in the presence of ascorbate/TMPD resulted in the absence of both lines. Our data suggest that both lines must have contributions from species formed from aqueous dithionite, presumably the SO_2 species, since these two lines are also observed in the Raman spectrum of a solution of aqueous dithionite, but not in the spectrum of an ascorbate/TMPD solution. Since heme metal—ligand stretch vibrations are expected to appear in the low-frequency region from 215 to 670 cm^{-1} , our results indicate that special care should be exercised during the interpretation of the cytochrome a_3 resonance Raman spectrum.

Arch Biochem Biophys. 1992;292:624-628.

Cat-scratch disease and bacillary angiomatosis

Ted L. Hadfield, PhD

Cat-scratch disease (CSD) is the most common cause of chronic lymphadenopathy in children and is a relatively common cause of lymphadenopathy in adults. The most common unusual complication of CSD is Parinaud's oculoglandular syndrome. The most serious complication is encephalopathy. Many new complications have been described in recent years, including systemic recurrent disease neuroretinitis, glomerulonephritis, arthropathy, Bell's palsy, and facial paralysis. Another potential complication of CSD is bacillary angiomatosis. Bacillary angiomatosis occurs most frequently in human immunodeficiency virus-infected patients. It usually begins with an eruption of cutaneous papules or nodules, but in some patients cutaneous lesions are absent. Bacillary angiomatosis lesions have been reported in the lymph node, liver, spleen, bone marrow, soft tissue, and intestine. An unusual hepatic lesion is peliosis hepatis caused by

bacillary angiomatosis bacilli in human immunodeficiency virus patients. Many of the patients with bacillary angiomatosis have had contact with cats. CSD bacilli and bacillary angiomatosis bacilli are identical in morphology and appearance in tissue sections. CSD and bacillary angiomatosis bacilli have cross-reacting epitopes in immunohistochemical stains employing rabbit anti-CSD antisera. Erythromycin and doxycycline are effective drugs for treating bacillary angiomatosis but historically have not benefited immunocompetent patients with CSD. Therapy with gentamicin or ciprofloxacin is reported to benefit children or adults with CSD. The bacillary angiomatosis agent was recently shown to be closely related to *Rochalimaea quintana* based on 16S ribosomal RNA homology experiments. Despite the similarities observed between CSD and bacillary angiomatosis, there remains a question as to whether they are related.

Current Opinion in Infectious Diseases. 1991; 4:628-635.

DNA sequences for the specific detection of *Cryptosporidium parvum* by the polymerase chain reaction

Marc A. Laxer, Barbara K. Timblin, and Rubina J. Patel

The objective of this project was to construct specific and sensitive molecular probes and amplification primers for *Cryptosporidium parvum* that could be used in diagnosis, retrospective tissue studies, and epidemiologic surveys. Whole genomic DNA was extracted from oocysts of *C. parvum* purified from human and bovine feces. A genomic library was constructed in plasmid pUC18 and propagated in *Escherichia coli* DH5 α . Transformants were screened by colony hybridization and autoradiography. The 2.3-kilobase segment in plasmid pHCl, a clone specific for *C. parvum*, was sequenced by the Sanger method. Computer analysis gave a G+C content of 35%. A 400-base region (bases 470-870) was selected as an amplification target because it contained a unique restriction endonuclease site that could serve as a useful marker. Primers of 26 nucleotides each were synthesized. Sensitive and specific amplification of the target sequence was demonstrated both by ethidium bromide staining of agarose and acrylamide gels and by hybridization with chemiluminescence-labeled synthetic oligonucleotide probes.

Am J Trop Med Hyg. 1991;45:688-694.

Instructions for Filling Out Application Form for AFIP Courses

1. **Course Fee:** Checks for all courses are to be made payable to the American Registry of Pathology (ARP). To safeguard your course space, we strongly encourage advance fee payment when application form is submitted, but not later than the Application Priority Deadline (does not apply to non-U.S. citizens).
2. **Application Priority Deadline:** Fifty percent of the course spaces are reserved for federal applicants and 50% for non-federal applicants until the Application Priority Deadline Date. After that date applications will be considered on a first-received, first-accepted basis.
3. **Federal Personnel Please Note:** To insure a space will be held for you, submit an application for each course you desire to attend directly to the Education Division, AFIP. Do this regardless of any funding action.
4. **Accreditation:** The Armed Forces Institute of Pathology is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians.
5. **Registration Procedures for International Applicants:**

Civilians:

Mail letter of application to:
 Chief, Program Resources Branch
 E/VCP, Rm 266
 United States Information Agency
 301 4th Street, S. W.
 Washington, D.C. 20547
 FAX: (202) 619-4655

Letter of application should include:

1. Title of Course
2. Inclusive dates of course
3. Your present position
4. Your home and office mailing address
5. Your date and place of birth
6. Your country of citizenship
7. Your financial arrangements for stay at this course (U.S. Government cannot be responsible for any expenses incurred while you are in the U.S.)

With letter of application, attach a copy of course application form, a check drawn on a U.S. bank or International Money Order, payable to the American Registry of Pathology, in U.S. dollars in the amount required.

Military:

Request the desired training through your military training channels to the Security Assistance Office of the U.S. Mission in your country.

International Applicants Employed by an Agency of the U.S. Government

Attach to letter of application (see above) a letter certifying employment from your servicing personnel office and mail to:
 International Training Program Manager,
 U.S. Army Health Professional Support Agency
 Attn: SGPS-EDI; International Training Officer
 5109 Leesburg Pike
 Falls Church, VA 22041-3258
 FAX: (703) 756-7535

APPLICATION FORM - AFIP COURSES

Course Title & Dates _____

Name (Last, First, MI) _____

Mailing Address _____

City, State, Zip _____

Phone _____ Specialty _____ Board Status: Certified Eligible

Citizenship _____ Resident/Fellow Friend of AFIP Membership # _____

Military/Federal Civilian Employees (Only): Rank/Civilian Grade _____

Service Agency: _____

Corps: MC, DC, NC, VC, Biomedical/Allied Science

Payment Enclosed: (Payable in U.S. dollars only) Tuition \$ _____ DoD, VA, and PHS Fee \$ _____

Method of Payment: Check/Money Order MasterCard Visa

Card Number _____ Expiration Date _____

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Signature _____

Make All Payments to: AMERICAN REGISTRY OF PATHOLOGY

Mail To: Armed Forces Institute of Pathology
 Education Division
 Washington, D.C. 20306-6000

Telephone: (301) 427-5231
 AUTOVON: 291-5231 FAX: 301-427-5001

Postgraduate Short Courses in Continuing Education Academic Year 1992

Course Title	Scheduled Dates	Location
Veterinary Descriptive Pathology	8-11 June 92	AFIP, Washington, DC
Diagnostic Exfoliative & Fine Needle Aspiration Cytology	8-12 June 92	Holiday Inn, Bethesda, MD
Forensic Anthropology	22-26 June 92	Uniformed Services University of the Health Sciences, Bethesda, MD
Histopathology Techniques	3-7 August 92	AFIP, Washington, DC
Pathology of Laboratory Animals	10-14 August 92	Holiday Inn, Bethesda, MD
Pathology of Congenital Heart Disease	17-21 August 92	AFIP, Washington, DC
Radiation & Cancer Chemotherapy Injury: Basic Principles of Etiology, Treatment & Diagnosis	29-31 August 92	University of California, San Francisco, CA
Anatomy, Histology, and Electron Microscopy of the Eye, Orbit, and Ocular Adnexa	29-31 August 92	Leavey Conference Center, Georgetown University, Washington, DC
Ophthalmic Pathology for Ophthalmologists	31 Aug - 4 Sept 92	Leavey Conference Center, Georgetown University, Washington, DC
Seminar in Pulmonary Diagnosis	1-4 September 92	Hyatt Regency, Bethesda, MD
Hepatic Pathology	9-11 September 92	Holiday Inn, Bethesda, MD
Conference on Quantitative Histopathology	9-13 September 92	Holiday Inn Crowne Plaza, Rockville, MD
Abdominal Imaging Review	12-13 September 92	Hyatt Regency, Bethesda, MD
Essentials in Forensic Pathology	14-18 September 92	Executive Tower Inn, Denver, CO
Pulmonary Radiology	19-20 September 92	Washington Marriott, Washington, DC
Radiologic Pathologic Correlation	12-14 October 92	Orlando, FL
Placental Pathology	22-24 October 92	Holiday Inn, Bethesda, MD
Future Technologies for DNA Typing	26-27 October 92	Hyatt Regency, Bethesda, MD
Oral Pathology	26-30 October 92	Hyatt Regency, Bethesda, MD
Perspectives in Scuba Diving Safety	14-15 November 92	AFIP, Washington, DC
Update of Identification Methods	16-20 November 92	Old Town Holiday Inn, Alexandria, VA
Surgical Pathology of the Head & Neck	7-9 December 92	Washington, DC area
Hematopathology	16-18 December 92	Marriott RiverCenter, San Antonio, TX

**For course descriptions and tuition information
contact the Education Division at 301-427-5231.**

**Armed Forces Institute of Pathology
Washington, D.C. 20306-6000
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The Director
ATTN: AFIP-PA
Armed Forces Institute of Pathology
Washington, D.C. 20306-6000
Telephone (202) 576-0233. AUTOVON 291-0233

Director
Col Vernon W. Armbrustmacher, USAF, MC

Public Affairs Officer
Christopher Kelly

Graphics
Frances W. Card

Photography
Cathy Barracchini
Seth B. Jones
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