THE CUTTING EDGE

REGION IX NEWSLETTER

Winter Newsletter – Januarv 2005

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Happy New Year Everyone

I hope you all managed to have a wonderful holiday season. Mine was quiet and relaxing, which was quite nice. We here on the west coast have been having a bit of a cold spell (for us) resulting in our actually having snow on the ground in Vancouver for over a week now, which is unusual. However, as of this morning we are back into our normal winter rains, meaning the snow will be gone by tomorrow in most areas. It has been good for the ski hills however.

Exciting things are happening with the Newsletter as you will notice in this issue. We have the first part of an article written by Dr John Kiernan from the University of Western Ontario in London on the effects of formaldehyde fixation on tissues used for immunohistochemistry. The second part of this article will appear in the Spring edition of the Newsletter. Bryan Hewlett from the Quality Management Program-Laboratory Services section of the Ontario Medical Association in Toronto also provides a preview of his article on “Quality Issues in Histotechnology” which will also appear in the spring issue of the Newsletter.

Rose and I are currently working on trying to set-up an Education Day here in Vancouver, hopefully in June around the same time as CAP is having their meeting in Victoria. We will keep you posted as the arrangements proceed in the Newsletter as well as on the Website. If anyone else is arranging any special events/Education Days/Workshops in your area, please let us know and we will publicize them in the newsletter and on the website. Speaking of Education, in this issue you will also find information on the educational materials available from the NSH. These cover a wide range of topics and some are free to NSH members.

Hope everyone has a great 2005 and that all your expectations are met!

Mark Elliott
Chair, Education Committee
Co-Editor

Greetings

Happy New Year to you all!! As we move into 2005, we should celebrate all our accomplishments in 2004 – both personal and group or team effort accomplishments!!

2005 will be a great year for all of us - I can feel it! I have received quite a few compliments both on our website www.nshregionix.org and our e-Newsletter, ***The Cutting Edge***.....I believe this name is apropos to the type of membership we have in Region IX – yes, ***we are the cutting edge*** – we are the experts in our field and will continue to be in 2005!!

We are all such a busy group. The joint venture of CAP and NSH in the ***Histo QIP*** Program is now on its second year. The program involves regularly scheduled requests for specific tissue types, with a specific stain requested for each tissue. Both H&E and special stains are requested in each cycle. This year, IHC will be included in the program. I'd love to hear from anyone who has participated in the first year of the Histo QIP comprehensive proficiency testing program.

The ***NSH Virtual Library on Line Continuing Education*** is available until May 2005. Visit www.nsh.org ; click on ***Education***, then click on ***Internet Course*** for your e-link to the course site. Click on the title of the course to assess if the Learning objectives fit with what you have in mind.

Big plans are in progress for "Surfing for Knowledge" NSH Symposium/Convention to be held in Fort Lauderdale, Florida September 10-14, 2005. You can volunteer for positions such as: Liaison, Staff Assistants or Senior Staff Assistants – you must be willing to accept workroom responsibility and have the desire to assist with the daily operation of the S/C as part of the Convention Staff. Applications are usually received prior to June 30th.

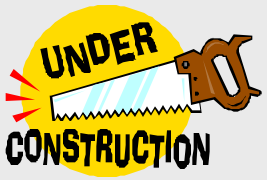
I would like to thank the Region IX members that have updated us with their current e-mail addresses – keep us informed of any changes on your e-mail address as this is our best way to communicate. Our biggest challenge this year is to try and increase the current number of Region IX membership. If each one of us can convince one non NSH Histotech to become a member, we can double our current membership and become a stronger voice!

Good luck in any new challenges coming your way in 2005, and I am looking forward to working with you all this year!!

Rose Clarke, Region IX Director

Happy New Year!!

As we move into 2005, let us all celebrate the accomplishments we have made in 2004!!!



Education Link

www.nshregionix.org

Please send us details of your Education Day and we will advertise for free in our website!!

NSH MISSION STATEMENT

The National Society for Histotechnology is a non-profit organization, committed to the advancement of Histotechnology, its practitioners and quality standards of practice through leadership, education and advocacy.

You've Got Mail...

From: Colin Benjamin, Past Region IX Director

"I have received a copy of the November edition of 'The Cutting Edge' and I must extend to you and your editorial teams my congratulations for producing such an exciting, informative and creative newsletter. Keep up the good work!!"
Colin

From: Alain Prince, ITR Laboratories Canada Inc.

"This is a great idea to send The Cutting Edge by electronic mail....I would like to receive all documents that NSH prepares sent this way. I found this valuable to me. Thank you!"
Alain

From: Janet Dapson, Editor, NSH In Action

Congratulations on your new position as Region IX Director! I understand that you have been working hard on the website and e-newsletter. They are both very nicely done!
Sincerely,
Janet Dapson

E-mail Etiquette

Before you send an e-mail, think about the following guidelines.

E-mails Travel

What you put in an e-mail can travel the world.
If you don't want that, don't write it.

Think calm

Write and respond with a cool head. Something that sounds OK when spoken can seem much harsher in print.

Think action

Make that subject line identify what you want to happen.

Sell the value of your message with a great subject line.

If someone reads that one line, and then hits "delete," make sure they know what you want them to know.

Response Time

Be reasonable.
If you need a response within 24 hours, think about other ways to reach a person. In most cases, give people three days to respond to an e-mail.

Think Modest

Twenty five people do not want to know you will not be at a meeting. Abandon that "Reply to all" button unless it is justified.

Permission obtained from the Fraser Health Authority, B.C. ~ To use some of the E-mail Etiquette tips~

Leadership Corner
Change

Today's workplace is faster paced than it ever was. Change is happening so fast, that we are just introducing a change, when another change is being implemented. Our ability to respond to these changes is crucial, because the only thing constant in our world today is *Change* itself.

Implementation of Change

Change is the norm in health care. With this reality in sight, managers can no longer afford to ignore the emotional aspects of change within themselves or with their employees. It is important to note that when change is managed with "human potential in mind," employees are very much motivated and inspired and can be creative and innovative (Calnan, 2001). All these skills are required, especially when we have fewer resources and still insist on high-quality performance.

Transition stage

The first step in understanding change is to understand the behavior patterns that exist when a change is introduced. Transition is the state or the psychological process that change puts people into to come to terms with a new situation. A transition stage occurs at every attempt of change. Bridges (1991) suggested that the intended changes are often not the issue. The different policy, practice, or structure that the leader is trying to bring about in change is external. Transition is internal; it is the psychological reorientations that people have to go through before any change can work. Transition happens more slowly than change. Some leaders set deadlines for change to occur based on a timeline or a schedule and not on getting people through the transition period. People go through the transition stage at different times. Transition requires people to undergo three upsetting separate processes: an ending, a neutral zone, and a new beginning.

Endings involve letting go of the old situation and the loss of identity that went with the past. The first requirement for endings to take place is for people to let go of the ways that things were done in the past. When endings take place, people are angry, sad, depressed, and confused. Bridges (1991) suggested that these emotional states often are mistaken for bad morale. They are the signs of grieving, the natural sequence of emotion people go through when they lose something that matters to them.

Neutral Zone

The neutral zone is the in-between state and the second difficult phase of transition that is full of confusion and uncertainty and usually takes away people's energy. This stage involves the "recognition of the need to change and the uncertainty of the desirable state" (Hayes, 2002, p. 150). The time spent in the neutral zone is not wasted, because this is the stage where all the creativity and energy of transition are found and the real transformation takes place.

Moving Forward or New Beginning

Some people get through the first two phases of transition, but freeze when they face the new beginning, which is the third phase. Beginnings involve having a new identity and a reorientation to the new situation. People need to be able to recognize that they can accept the situation and move forward.

Resistance is a natural part of the change process; people think it will cause them to lose something of value. Leaders increase their resilience by understanding and respecting the natural patterns of the change process and the inevitable knowledge that resistance will occur. People may recognize the need to change, but they may not necessarily have the desire to change. Hayes (2002) stated that there are those who recognize the need for change but have little confidence in the ability of the managers to implement the change, due to a past history of failures to bring about change.

The most significant implication in our world today is, in spite of all the virtual world of technological advances of the twenty-first century, people still need to be treated with respect and dignity. It is apparent that organizations are made up of people and that relationships still play a key role in our work life.

Rose Clarke, Editor ~ The Cutting Edge

Preservation and retrieval of antigens for immunohistochemistry – methods and mechanisms. 1. Effects of formaldehyde fixation.

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There is no ideal way to prepare all tissues for immunohistochemistry. The access of antibodies in solution to tissue-bound antigens may be enhanced or inhibited by **fixation**. Some antigens can be detected only in unfixed cryosections; most are more easily detected after fixation. Paraffin embedding is usually preferable to either plastic embedding or cutting unembedded specimens with a vibrating microtome or in a cryostat. There are, however, plenty of exceptions to this generalization. Antibodies penetrate thin sections more quickly than thick ones, but sometimes the requirements of an investigation demand thick sections or even whole-mounts for proper interpretation of the results.

The first article (this one) briefly explains the effects of formaldehyde on tissues and the antigens that they contain. The second paper of the pair will examine several techniques commonly called **antigen retrieval**. These methods, applied to sections, allow immunostaining of antigens that might not otherwise be detectable after fixation of in formaldehyde.

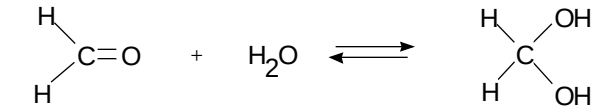
These two articles also have some **references**, which fall into two categories: most are ordinary books or chapters in books; a few are papers in scientific journals. I urge readers to look up and study some of these references. Immunohistochemical staining is a responsible job, and should be undertaken only by people who understand the reasons for all the steps in a particular technique. Without proper understanding it is impossible to intelligently troubleshoot a procedure that does not yield the expected results.

Preservation of structure and antigenicity by formaldehyde

The fixative solution

In histopathology laboratories the great majority of specimens are fixed in an aqueous formaldehyde solution that contains sodium phosphates, contrived to provide **buffering** (minimal pH change following addition of a small amount of strong acid or base) to pH 7.2-7.6 and an approximately **isotonic solution** (one whose osmotic pressure is the same as that of mammalian extracellular fluids). The formaldehyde is usually derived from **formalin**, which is a solution containing 37% w/w (= 40% w/v) formaldehyde in water. The working fixative is a ten-fold dilution of formalin (4 grams per 100 ml). A solution of almost identical composition may be made with **paraformaldehyde** as the starting material. Paraformaldehyde is a solid polymer that changes into formaldehyde when heated (in slightly alkaline water) to 60EC. Many people do not realize that there is no such thing as a solution of paraformaldehyde. The frequently published phrase “fixed in 4% paraformaldehyde” is a clear indication that the writer knows nothing about fixation, even though this is the preparative step that most affects the appearance of a microscopical preparation.

Most of the formaldehyde in a diluted aqueous solution is present as **methylene glycol**, which is formed by addition of a molecule of water to one of formaldehyde:



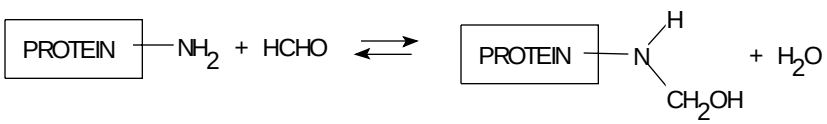
Formaldehyde Methylene glycol

This reaction is reversible, but the equilibrium lies far to the right. The concentration of free formaldehyde in the fixative solution is, therefore, very low. Nevertheless, it is free formaldehyde, rather than methylene glycol, that enters the chemical reactions of fixation. There is always a large reservoir of methylene glycol that instantly replaces formaldehyde molecules that are removed from the solution by reaction and combination with the specimen being fixed (Pearse, 1980; Fox et al, 1985).

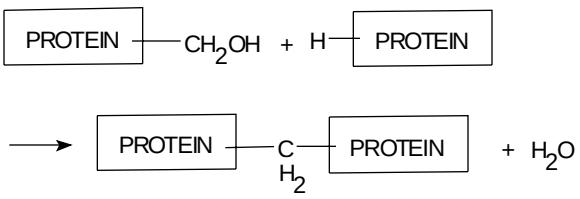
Reaction with tissue proteins

The small molecules of formaldehyde (MW 30) and methylene glycol (MW 48) penetrate quite rapidly through extracellular materials and cells, typically reaching a depth of 5 mm in about 2 hours (Baker, 1958). The chemical reactions of fixation by formaldehyde are with proteins. These reactions are slower than those of any other substance used as a fixative, and it is generally agreed that for reasonable structural preservation a specimen must remain in a formaldehyde solution for at least 24 hours (Drury & Wallington, 1967; Lillie & Fullmer, 1976). Helander (1994) found that after immersion for 24 hours, tissue-bound [^{14}C]formaldehyde could be largely removed by prolonged washing in water. Half was removed in 17 days, and 90% was removed in 3 weeks. Further studies (Helander, 1999) indicated that maximal binding of formaldehyde to brain and kidney occurred in 50 hours, but half-maximal binding required only about 4 hours. The rapidly bound formaldehyde probably stops autolysis but it does little to stabilize the fine structure of the tissue, and does not provide effective protection against disruptive effects of later treatments such as paraffin embedding. Indeed, nervous tissue immersed for 24 hours in 4% buffered formaldehyde shrinks or swells when transferred to salt solutions with higher or lower osmotic pressure than the fixative (Paljarvi et al., 1979). The structural instability is attributed to the fact that reaction of formaldehyde with proteins occurs in two stages, the first being fairly rapid (hours) and the second much slower (days).

In the first stage, formaldehyde molecules combine with various parts of protein molecules, especially the side-chain amino group of lysine and the nitrogen atoms of peptide linkages:



These reactions can be reversed by washing in water (or alcohol). The slow second stage is reaction of the bound hydroxymethyl groups with other nitrogen atoms of the same or adjacent protein molecules.



The resulting cross-links, known as methylene (—CH_2 —) bridges, are stable and account for the insolubility and rigidity of protein-containing tissues that have been fixed by formaldehyde. The reacting groups for the second stage must, of course, be close together; this condition is not met for a majority of the hydroxymethyl groups formed in the first stage, so it is possible to wash away loosely bound formaldehyde even from thoroughly fixed specimens. Knowledge of the chemistry of formaldehyde fixation has come mainly from investigations in the tanning industry, where bovine dermal collagen is converted into leather (Gustavson, 1956; Walker, 1964).

In addition to the reactions with proteins, formaldehyde may also combine with some basic lipids. These other reactions are not generally considered to participate significantly in the fixation of tissues (Pearse, 1980; Fox et al, 1985; Hopwood, 2002). The immobilization of DNA and RNA is attributed to trapping of the long nucleic acid molecules in networks of associated basic protein molecules, which are cross-linked by methylene bridges (Hopwood, 2002).

Inadequate and adequate fixation

These chemical reactions account for some of the difficulties encountered when working with formaldehyde-fixed material. Brief exposure to formaldehyde does not cause sufficient cross-linking to immobilize proteins. Instead, fixation is due to coagulation of proteins by the alcohols used to dehydrate the specimens. Alcohol alone is a poor fixative for blocks of tissue (Baker, 1958). Nuclei of cells can be greatly damaged during processing through paraffin after inadequate times in formaldehyde (Dapson, 1993). With adequate formaldehyde fixation, however, the cross-linked protein molecules form a dense network that can impair the penetration of paraffin wax. Cross-linking also impairs the penetration of large antibody molecules applied to sections of tissue as imunohistochemical reagents, so that antigen molecules of interest may be masked even if their epitopes have not been chemically modified by reaction with formaldehyde.

Cellular structure after formaldehyde fixation is often better preserved in frozen than in paraffin sections, especially when exposure to the fixative has been brief. Minimal fixation, either before or after sectioning in a cryostat, is customary in enzyme activity histochemistry because most (though not all) enzymes are inactivated by exposure to formaldehyde, organic solvents or heat. Completely unfixed cryosections can deteriorate or even disintegrate when incubated in the near-neutral aqueous solutions used in enzyme activity histochemistry and immunohistochemistry, though some protection is afforded by including a hydrophilic polymer such as polyvinyl alcohol in the medium (Chayen & Bitensky, 1991; Van Noorden & Frederiks, 1992, 2002).

Requirements for immunohistochemistry

For successful immunostaining of an antigen in a section of a tissue there must be:

1. Retention of the antigen at the sites it occupied in the living organism. This is favoured by formaldehyde fixation, which, by way of methylene bridges, can bind protein antigens to other protein molecules and trap antigens of any kind within a cross-linked protein matrix.

2. Permeability of the tissue, including cell membranes, to the large antibody molecules used as immunohistochemical reagents. A proteinaceous matrix that is tightly cross-linked by methylene bridges impedes penetration of large molecules, as do intact cell membranes. Exposure to organic solvents damages cell membranes and also distorts protein structures that have been incompletely fixed by formaldehyde. Hence, inadequate fixation and paraffin processing enhance the penetration of a tissue by antibodies, at the expense of inferior structural preservation.

3. The epitopes of the antigen must be accessible to the primary antibody. An epitope is a small part of a large molecule, such as a sequence of 3 to 10 amino acids, that specifically binds to the active site of an antibody molecule. A monoclonal antibody recognizes only one epitope.. An antiserum, on the other hand, is polyclonal, containing antibodies that recognize several different epitopes of the same antigen. Cross-linking due to formaldehyde fixation is likely to mask epitopes, leading to false negative immunostaining. This failure is more likely to occur when the primary immunoreagent is a monoclonal antibody than when a polyclonal antiserum is used.

In summary, fixation in formaldehyde can impair immunohistochemical staining, not usually by damaging or removing the antigens but by preventing contact between epitopes and antibody molecules. There are several strategies for avoiding or reversing these undesirable consequences of the otherwise desirable process of fixation. The simplest form of avoidance is to use a fixative mixture other than neutral buffered formaldehyde - one that immobilizes proteins either by coagulation or by a combination of coagulation and cross-linking (Polak & Van Noorden, 1997; Van Noorden, 2002). If neutral formaldehyde has already been used for fixation it is necessary to reverse some of its actions and re-expose the concealed epitopes. Techniques for antigen retrieval and their possible mechanisms of action will be discussed in the second article.

Featuring in the Spring edition of “The Cutting Edge”

Part 2 ~ Antigen Retrieval

“Preservation and retrieval of antigens for immunohistochemistry – methods and mechanisms”

By J. A. Kiernan

References

Preservation and retrieval of antigens for immunohistochemistry – methods and mechanisms. 1. Effects of formaldehyde fixation. J. A. Kiernan

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References

Leadership Corner: Change

Bridges, W. (1991). *Managing transitions: Making the most of change*. MA: Addison-Wesley Publishing Co.

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Quality Issues in Histotechnology

Shown below are two adjacent sections of a single block of 'routinely' NBF-fixed and processed lung tissue from a confirmed case of TB.

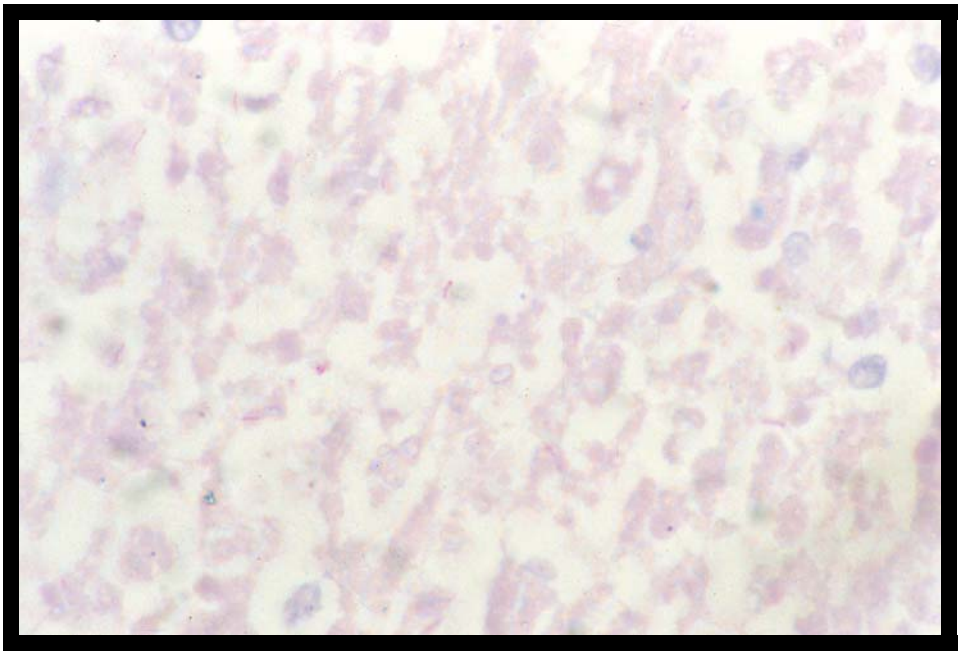

Figure 1 *shows the result of a carefully performed commonly used ZN stain. Very few organisms are seen in this caseous granuloma. The organisms that are demonstrated exhibit weak staining and low contrast. The positive tissue control section, stained at the same time, revealed organisms with more intensity and contrast. This is a common problem in histopathology. In many cases, of both known and suspected TB, the result of ZN staining on tissue sections is completely negative, with only 1 in 5 or fewer cases showing any positivity, which may vary from many to just a few organisms.*

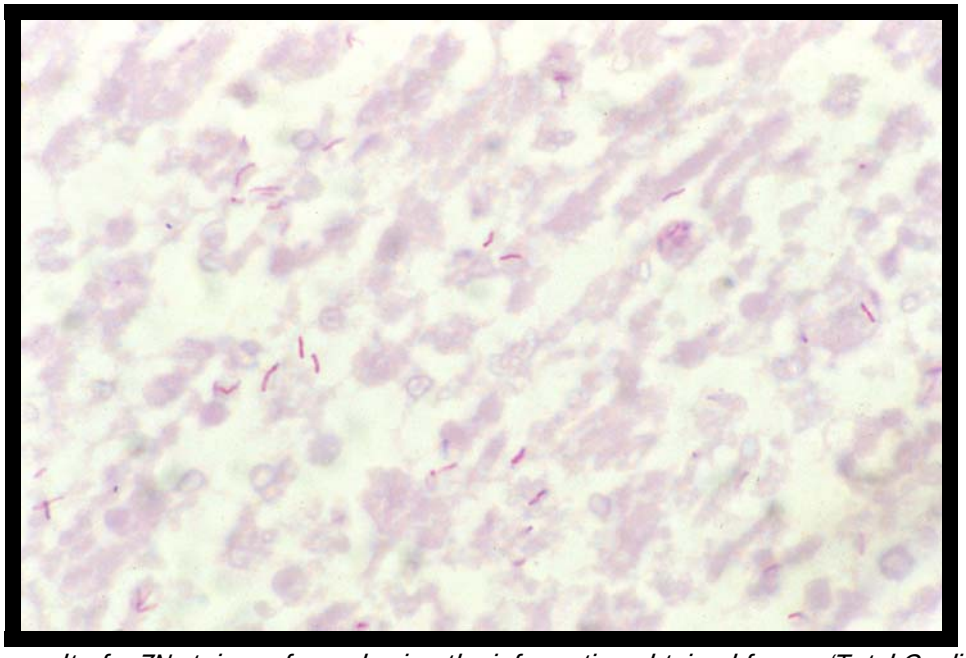

Figure 2 *shows the result of a ZN stain performed using the information obtained from a 'Total Quality Approach' to determine the problem. Impressive numbers of organisms are clearly demonstrated in the same area of the granuloma.*

How were these results achieved? See the spring issue of *'The Cutting Edge'*.

Bryan Hewlett, ART, MLT. Consultant Technologist, QMP-LS

Surgipath

Linear Stainer.

Surgipath' s new LS-1800 linear stainer is smaller than other units yet produces higher output. This unit is very ideal for high volume H&E applications. The stainer is 4 to 6 times faster than most XY stainers!

Tribune Stainer.

"Tribune" means "stadium" in Norwegian. This stainer uses a stadium layout to minimize footprint dimensions and allow for optimal robotic movement. The stainer has 5 pre-load heated Stations. There are 4 water stations, all with separate flow control. The stainer has a built-in computer touch-screen. You will be very impressed with the user-friendliness and capabilities of this stainer.

Automated Glass Coverslipper.

This unit boasts both the smallest footprint and fastest coverslipping time of any glass coverslipper on the market. This coverslipper can be adapted to most automated stainers.

Micro-cassettes:

This is an economical mesh-type cassette excellent for even the smallest biopsy without the need of sponges or paper.
***Coming soon: Surgipath is adding a new microscope slide designed specifically for the Ventana Benchmark. We have responded to our customers requests with this slide. We hope to have samples for September.

Contacting Surgipath Canada

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THE CUTTING EDGE is the official newsletter of Region IX of the National Society of Histotechnology.
It is distributed quarterly to approximately **460** members in Canada.

The Objectives of THE CUTTING EDGE are to:

- Reflect both Canadian and North American articles pertinent to the practice of Histotechnology
- Publish articles that are beneficial to our discipline .
- Promote communication between Region IX members and members of the other NSH Regions
- Provide a medium for exchange of information among members.

Contributions are *welcome.*
Please send your articles to:

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Production of The Cutting Edge is *sponsored by Surgipath Canada Inc.*

NSH Educational Materials

Visit www.nsh.org to access description of the following education materials.

A series of fourteen (14) SELF EXAMINATION BOOKLETS - questions with descriptive answers. *An interactive 3 1/2" computer diskette is also available on booklets one, and five through ten. The diskette is incompatible with Windows NT, 2000, Me, XP, and Macintosh computers.*

Books are available while supplies last. *The complete fourteen (14) book series is now available on CD-Rom. The cost is $100 for members and $175 for non members.*

Booklet only:	Diskette only:	Booklet & Diskette:	CD Rom -all 14 books
$15.00 NSH member	$10.00 Member	$20.00 Member	$100 Member
$35.00 Non member	$40.00 Nonmember	$70.00 Non member	$175 Non Member

Self Assessment #1: FIXATION (2nd Edition)

Self Assessment #2: PROCESSING/DECALCIFICATION (2nd Edition)

Self Assessment #3: EMBEDDING/SECTIONING (2nd Edition)

Self Assessment #4: ROUTINE STAINING (2nd Edition)

Self Assessment #5: IMMUNOHISTOCHEMISTRY, ENZYME HISTOCHEMISTRY, FLOW CYTOMETRY, IN-SITU HYBRIDIZATION AND ELECTRON MICROSCOPY (2nd Edition)

Self Assessment #6: MICROORGANISMS STAINING AND IDENTIFICATION

Self Assessment #7: CONNECTIVE TISSUE AND MUSCLE MORPHOLOGY AND STAINING

Self Assessment #8: PIGMENTS, MINERALS AND ARTIFACTS STAINING AND IDENTIFICATION

Self Assessment #9: NERVE TISSUE AND SPECIAL TISSUES AND CELLS STAINING AND IDENTIFICATION

Self Assessment #10: CARBOHYDRATE STAINING AND IDENTIFICATION

Self Assessment #11: LABORATORY OPERATIONS

Self Assessment #12: GROSS DISSECTION AND DESCRIPTION

Self Assessment #13: CYTOPREPARATORY TECHNIQUES

Self Assessment #14: LABORATORY SAFETY

Animal Processing Manual

This manual provides self-help guidelines for animal tissue processing.
The manual is a collection of processing protocols and comments about animal tissue processing that have been used in veterinary diagnostic, research, toxicology and marine biology.
Histotechs just starting to work with animal tissues or those seeking additional help with specific animal species should find the protocols and comments beneficial.
Manual consists of a printed version accompanied by CD-ROM.

NSH Member - $30.00
Non-Member - $50.00

NSH Educational Materials

HISTOTECHNOLOGY STANDARDS OF PERFORMANCE/COMPETENCY

Standards of Performance and Competency is designed to be used as a model for creating specific standards of performance, and implementing it's documentation in the histology laboratory. Sections have been created that stand alone. Generic sections (such as those for basic instrumentation, QC, etc.) are also included if that approach is preferred. The user can select the tasks applicable for their own setting and further add/delete/customize to meet their specific needs.

NSH member - Free

Non member - Not available

HISTOLOGY TASK ANALYSIS

The task analysis was developed to assess education levels, cognitive abilities and motor skills required to perform work in the histology lab. All major job tasks in the histology lab are identified and given listings of necessary cognitive abilities and motor skills for both the technician and technologist levels. A comparative job description for each is included. The document describes the complexity of work performed and can serve as both a reference for defining job responsibilities and a comparison of task level differences appropriate for technician and technologists

NSH member - Free

Non member - Not available

REGULATIONS AND RECORD KEEPING IN THE HISTOLOGY LABORATORY

Where Do I Start? JCAHO, CAP, CLIA '88 regulatory agencies are featured. Procedure manual includes regulatory requirements, NCCLS standards, and other examples. Health and safety standards on formaldehyde monitoring, chemical hygiene plan, exposure control plan and hazardous waste management are included.

NSH member - Free

Non member - Not available

Contact NSH to access

Copies of these Educational Materials

QUALITY CONTROL RECORDS

Sample copies of how to maintain quality control records in the laboratory.

NSH member - Free

Non member - $5.00

PREPARATION OF TECHNICAL PROCEDURE MANUALS IN A HISTOLOGY LABORATORY (per NCCLS guidelines)

NSH member - Free

Non member - $5.00

HEALTH and SAFETY RESOURCE MATERIAL

List of reference materials regarding health and safety in the laboratory.

NSH member - Free

Non member - $5.00

GUIDE TO WRITING HISTOTECHNOLOGY COGNITIVE EXAM QUESTIONS

NSH member - Free

Non-member - $5.00

A CANDIDATES GUIDE TO SUCCESSFUL INTERVIEWING

NSH member - Free

Non member - $5.00

MANAGEMENT TOOL FOR SUPERVISORS: THE SELECTION INTERVIEW

NSH member - Free

Non member - $5.00