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Normal Tissue Controls for Immunohistochemistry

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In the field of immunohistochemistry, antibody control tissues are an important and necessary part of the quality control of the reagents that are used to determine if a tumor or other structure is positive or negative. Many pathologists prefer to use known positive tumor tissue as their positive control, others prefer a sausage block control, and some use normal tissues that are known to contain the specific antigen that they are trying to identify. For many laboratories, obtaining specific tumor controls can be a problem. We have compiled the following list of normal control tissues that can be used to test the reaction of the specific antibody in immunohistochemistry procedures.

This list is an accumulation of data from manufacturers' antibody specification sheets, our own personal experiences, and research from manuals of microscopic anatomy, such as DiFiore's, for tissues that contained the cells that were reported to react with the specific antibody. We have listed the tissues in alphabetical order. This is not a list of all of the controls that can be used for these particular antibodies but a quick reference list of normal tissue that can be used to check for the positive reaction of the antibody being tested. I have also formulated a list of control tissue by antibody that will allow the technician to use different controls if one of the other controls is not available. It is always important to test an unknown tissue control before using that tissue as a control. For instance, if I normally use an ovarian carcinoma as a control tissue for the antibody "CA 125," I would test the fallopian tube control with the ovarian carcinoma to see if this type of control was a satisfactory control for the pathologist. The authors have not tested all of the tissues that are listed for each antibody but we have underlined the control tissue or tissues on the antibody control list that we most frequently use for a particular antibody.

Adrenal	Synaptophysin, Chromogranin, Serotonin
Appendix	Serotonin, S100, HHF 35, Desmin, SMA (Smooth Muscle Actin)
Bone Marrow	Factor VIII, Myeloperoxidase, Glycophorine A
Brain	GFAP, Neurofilament
Colon	AACT, AAT, BerEp4, CEA, Cam 5.2, AE- 1, AE I -AE3, KP1 (cd68), S100, SMA, Vimentin, MSA (HHF 35), Desmin, Factor VIII, HPL

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Fallopian Tube	CA125
Kidney	EMA, Collagen IV, Lysozyme
Liver	AFP, AAT, KP-1, CEA
Pancreas	AE-1, AE1-AE3, [BerH2 (Kl-1) in acinar cells], Chromogranin, Glucagon, Insulin, NSE, Pancreatic Polypeptide, Somatostatin, Synaptophysin
Pituitary	ACTH, Follicle Stimulating Hormone (FSH), Human Growth Hormone (HGH), Luteinizing Hormone (LH), Neurophysin, Prolactin, TSH
Placenta	HPL, PLAP, B-HCG, HCG, Collagen IV
Prostate	AE3, AE1-AE, Desmin, Factor VIII, HHF35 (muscle specific actin), HPCA (CD34), MA903, PAP, PAS, SMA, Ulex, Vimentin
Skeletal Muscle	Myosin, Myoglobin, Sarcomeric actin
Skin	AE 1, AE 1 -AE3, Collagen IV, Factor VIII, Factor XIIIa, KP-1, MIB-1, PCNA, S100, AACT, HPCA (CD 34), SMA
Small Bowel	BerEP4, KP-1, S100, VIP (vasointestinal polypeptide)
Spleen	DBA-44 (hairy cell leukemia), Leu7, Myeloperoxidase, CEA
Stomach	Gastrin, Bombesin
Testis	Testosterone
Thyroid	Calcitonin, Thyroglobulin
Tonsil	AACT, AAT, BCL2, CD43, Factor VIII, Factor XIIIa, HCG, HPCA (CD 34), HPL, IgA, IgD, IgG, IgM, Kappa, Lambda, L26, LCA, Leu22, Leu7, LN-1, LN-2, Lysozyme, MIB-1, MAC387, Myeloperoxidase, MT-1, MT-2, Neutrophil Esterase, PCNA, PLAP, UCHL, Ulex. *NOTE:* Myoglobin, Myosin and Sarcomeric actin will react on tonsil if skeletal muscle is in the section that you are using as a control.
Ureter	AE1-AE3, Desmin, EMA, HHF35, SMA, Vimentin

The following is a list of tissues that can be used as positive controls for the particular antibodies. This list represents a small group of tissues that may be used. Tumors and other pathological entities may also be used as long as the antigen/antibody reaction is considered to be acceptable by the laboratory director.

AACT	**Tonsil,** Colon, Skin
AAT	**Tonsil,** Colon, Allelic nasal mucosa, liver
AE- I	**Colon,** Skin, Pancreas
AE-3	Prostate
AE-1 / AE-3	**Colon,** Skin, Prostate, Pancreas
ACTH	Pituitary
AFP	**Fetal liver,** Hepatoma
BER H2 (KI-1) (CD30)	**KI-1 Lymphoma**, Pancreas
BCL2	Tonsil
BEREP4	**Small bowel**, Colon
BHCG	Placenta
Bombesin	**Stomach,** Duodenum, Lung
Breast 2 (GCDFP)	**Breast Ca**, Normal Axilla, Apocrine sweat gland
Breast 3 (B72.3)	**Breast Ca,** Colon Ca, Endometrial Ca, Ovarian Ca, normal secretory endometrium
CA125	**Ovarian Ca,** Fallopian Tube, Endocervix, Endometrium
CAM 5.2	Colon
CEA	**Colon,** Tonsil, Skin, Liver, Spleen
Cathepsin D	**Breast Ca**, Skin, Prostate, Liver
CERB 2	**Breast Tumor**, Gastric Ca, Adeno Ca

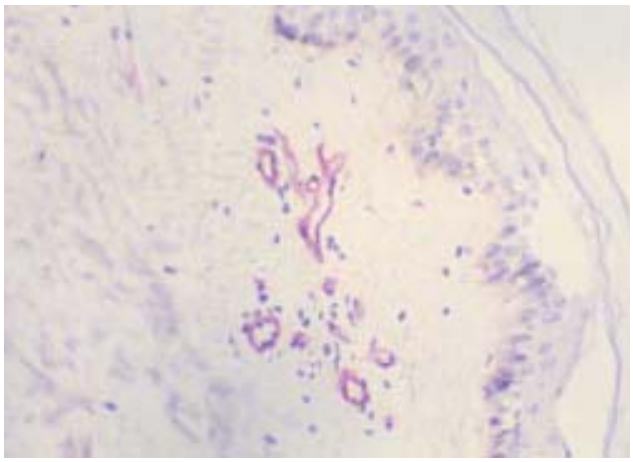

Fig 1. Collagen IV—Skin 3 100

Collagen IV	**Kidney,** Skin, Placenta, Lymph Node
Chromogranin-	**Pancreas,** Adrenal
CD 43	Tonsil
MV	Infected Tissue
Desmin	**Ureter,** Prostate, Colon, Vas Deferens, Appendix
DBA 44	**Spleen,** Node
EMA	**Kidney,** Ureter, Breast, Glandular Epithelium
Estrogen	Breast Ca, or Normal Breast
Epstein Barr Virus	Hodgkin's Node
Factor VIII	**Tonsil,** Skin, Colon, Prostate, Bone Marrow
Factor XIIIa	**Skin,** Tonsil
FSH	Pituitary
Gastrin	Pyloric Mucosa (Stomach)
GFAP	Glial Cells (Brain)
Glucagon	Pancreas
Glyco-phorine A	Bone Marrow
HbcAG	Infected Tissue
HbsAG	Infected Tissue
SV I	Infected Tissue
HSV II	Infected Tissue

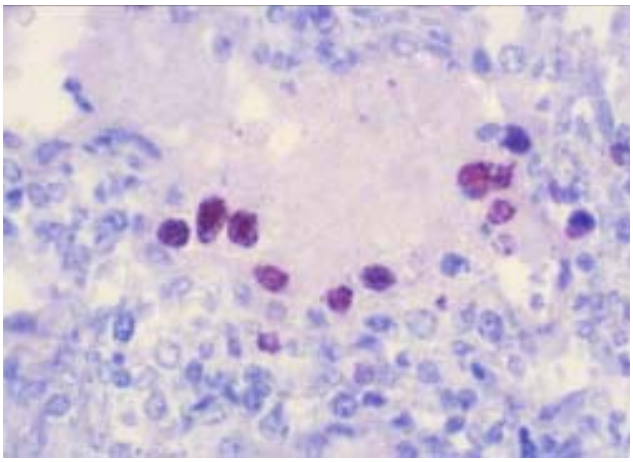

Fig 2. Adenovirus—Infected Lung 3 200

HGH	Pituitary
HCG	**Placenta,** Tonsil, Breast
HHF35 (MSA)	**Ureter,** Colon, Prostate, Vas Deferens, Appendix
HMB45	**Melanoma,** Dysplastic Nevus
HPCA (CD 34)	**Prostate,** Tonsil, Skin
HPL	**Placenta,** Tonsil, Colon
HPV	Infected Tissue
H Pylori	Infected Tissue
IgA	Tonsil
IgD	Tonsil
IgG	Tonsil
IgM	Tonsil
Insulin	Pancreas
KP-1	**Colon,** Small Bowel, Liver, Skin
Kappa	Tonsil
LEU22	Tonsil
Lambda	Tonsil
LCA	Tonsil
L26	Tonsil
LN-1	Tonsil
LN-2	Tonsil
Luteinizing Hormone	Pituitary
LEU7	**Tonsil,** Spleen
LEU M1	Hodgkin's Tissue
Lysozyme	**Tonsil,** Renal Tubular Cells
NM 903	Prostate
MIB-1	Tonsil, Melanoma, Breast Ca, Skin
MT- I	Tonsil
MT-2	Tonsil
Myelo-peroxidase	**Bone Marrow**, Spleen, Tonsil
MAC 387	**Tonsil,** Squamous Epithelium
Myosin	**Skeletal Muscle,** Tonsil, Tongue, Esophagus, Tonsil (if it has skeletal muscle)
Myoglobin	**Heart,** Tonsil (If it has skeletal muscle), Skeletal **muscle**

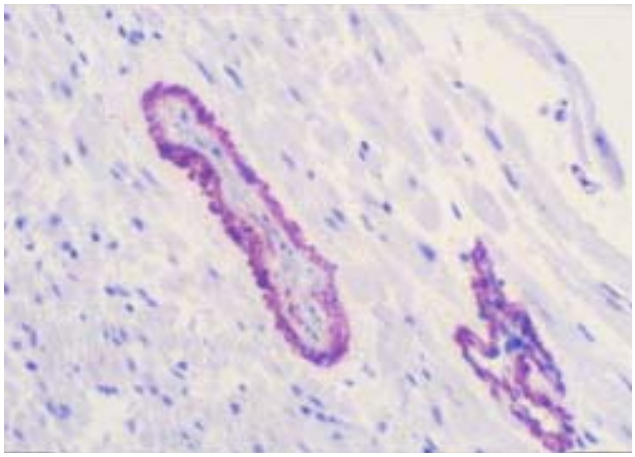

Fig 3. Smooth Muscle Actin—Heart 3 200

NSE	**Pancreas,** Pituitary, Colon, Brain
Neurofilament	**Brain,** Peripheral Nerve
Neutrophil ESTERASE	Tonsil
PAP	Prostate
PCNA	**Skin,** Tonsil, Lymphoma
PSA	Prostate
Pancreatic Polypeptide	**Head of the pancreas**, Duodenum, Gastric Antrum
PTH	Parathyroid
P53	**Adeno Ca of Breast** or Colon
PLAP	**Placenta,** Tonsil, Colon Ca
Progesterone	Breast Ca, or Normal Breast
Prolactin	Pituitary
PS2	Breast Ca
Serotonin	**Appendix,** Adrenal, Bronchial Epithelium
S100	**Small Bowel**, Appendix, Skin, Melanoma, Colon, Nerve
SMA	**Colon,** Ureter, Prostate, Uterus, Skin, Vas Deferens, Appendix
Sarcomeric Actin	**Tongue**, Tonsil (if it has skeletal muscle), Esophagus
Somatostatin	Pancreas
Synaptophysin	**Adrenal,** Pancreas
Testosterone	Testis
TSH	Pituitary
Thyro-globulin	**Thyroid,** Papillary Ca
UCHL	Tonsil
ULEX	**Prostate,** Tonsil, Endothelial Cells
Vaso-intestinal Polypeptide (VIP)	**Duodenum,** Gastric Antrum, Small Intestine
Vimentin	**Ureter,** Colon, Appendix, Prostate, Tonsil, Uterus

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Rapid Demonstration of Lipofuscin with Microwave Staining Methods

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INTRODUCTION

Lipofuscin, which is also referred to as lipopigment, chromolipid, wear and tear pigment, and age pigment, is a heterogeneous, autofluorescent cytoplasmic organelle found in most animal tissues, especially in aging, metabolically active postmitotic tissue.[1,2,3] It was first observed in human nerve cells in 1842 and was first related to the aging process in 1886.[3] Lipofuscin at the ultrastructural level are secondary lysozymes of the residual body type which vary in functional activity. They are indigestible, unexcreted cellular waste consisting primarily of intracellular membranes which normally accumulates progressively with age. It is hoped that rapid identification of lipofuscin will facilitate its demonstration and ultimately assist in shedding light on its role in physiologic and pathologic processes.

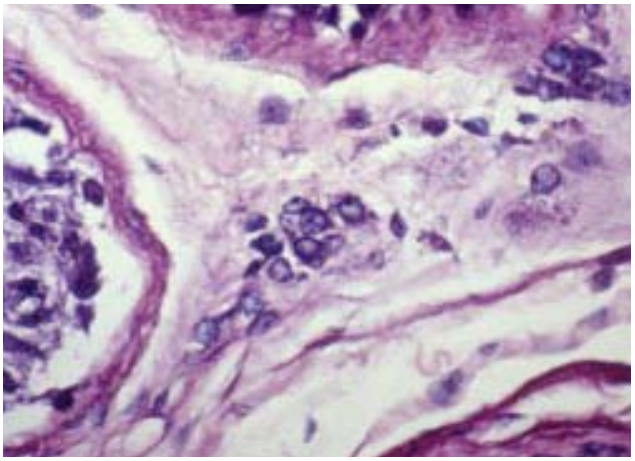

Fig 1. Ziehl-Neelsen AFB Stain 3 400

Although the chemical composition of lipofuscin is inconsistent with physiologic and dietary changes, it generally shares some of the same tinctorial properties. In the absence of a fluorescent microscope, many stain techniques have been applied to demonstrate lipofuscin. These techniques include the periodic acid-Schiff (PAS) stain, fat stains, many

protein reactions, the Schmorl test and the acid-fast stain.[1] With the advent of microwave technology in recent years, many stain procedures have been modified to facilitate the rapidity and ease of application. We have successfully attempted to demonstrate lipofuscin in interstitial cells of atrophic human testes from autopsies with a few rapid histotechnological techniques, which include the Ziehl-Neelsen acid-fast bacilli (AFB) stain, the Wright-Giemsa, Gomori Trichrome, Iron Hematoxylin, and the Iron Stain (Prussian blue reaction). Testicular Leydig cells in rats have been reported to be among those cell types having the most abundant lipofuscin.[1]

MATERIALS AND METHODS

Tissue blocks of testes from six autopsy cases were fixed in 10% neutral buffered formalin and processed through to paraffin on a VIP tissue processor at 37°C with vacuum. Five-micron sections were stained with each of the following techniques. All microwave steps in all of the procedures performed were carried out in an Amana RS50 Radarange rated at 750W full power, in loosely covered plastic Coplin jars.

A. MODIFIED ZIEHL-NEELSEN AFB STAIN

SOLUTIONS:

Ziehl-Neelsen Carbol-Fuchsin solution
(Polyscientific, Bayshore, NY)

1% Acid Alcohol
70% ethyl alcohol .....99 mL
Hydrochloric Acid, conc. .....1.0 mL

0.2% Light Green SF Yellowish (Polyscientific, Bayshore, NY)

STAINING PROCEDURE

1. Deparaffinize and hydrate sections to water.
2. Stain sections in carbol-fuchsin solution in microwave oven for 15 seconds at full power.
3. Wash sections in running water.
4. Decolorize in acid alcohol until red color ceases to bleed from section (5-10 seconds).
5. Wash sections in running water.
6. Counterstain in light green solution for 30 seconds at room temperature.
7. Rinse sections in distilled water.
8. Dehydrate sections in graded alcohols, clear, and mount with synthetic resin.

RESULTS

Lipofuscin .....bright red
Background .....light green

DISCUSSION

Carbol-fuchsin, the commonly used term for the mixture of phenol and basic fuchsin, will stain acid-fast bacilli. Phenol is known to dissolve the dye and to combine with the dye within the bacilli wall to promote staining. Other additives to the dye mixture, such as dimethyl sulfoxide, alcohol or wetting agents, further dissolve the dye, enhance staining, and reduce the staining time to one minute when microwave bombardment is incorporated. Most tissue components are colored red with the carbol-fuchsin but decolorize with acid alcohol, leaving the resistant lipofuscin stained red (Fig. 1). When counterstained with methylene blue, the lipofuscin appears blue. The nonionizing radiation produced by the microwave oven accelerates the molecular action of certain dyes such as carbol-fuchsin and hastens the penetration of the dye throughout the tissue. The strength and duration of the acid alcohol decolorization influence the outcome of the staining procedure. At no point during the staining process should the section be allowed to dry because artifacts resistant to decolorization could be introduced and prolonged decolorization will remove the stain from the lipofuscin.

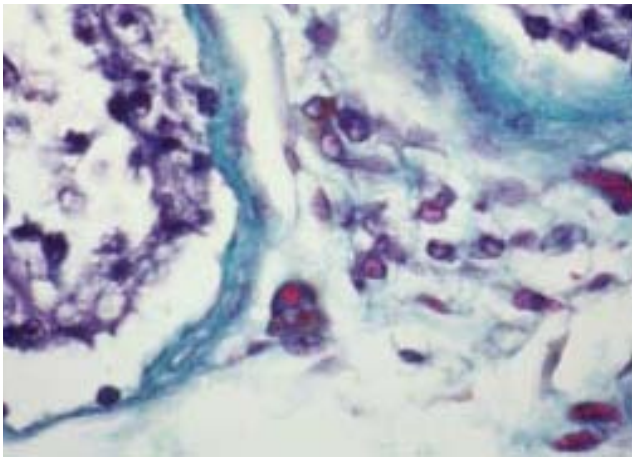

Fig 2. Gomori Trichrome 3 400

B. MODIFIED GOMORI TRICHROME

SOLUTIONS:

Bouin's Fixative (Polyscientific, Bay Shore, NY)
Weigert's Iron Hematoxylin (Polyscientific, Bay Shore, NY)
Gomori One-Step Trichrome Solution
(Polyscientific, Bay Shore, NY)

STAINING PROCEDURE

1. Deparaffinize and hydrate sections to water.
2. Immerse sections in Bouin's solution and microwave for 40 seconds at full power. Allow sections to stand in heated solution for 5 minutes.
3. Wash sections in running tap water until yellow color is no longer seen in the water.
4. Stain sections in Weigert's Iron Hematoxylin for 10 minutes at room temperature.
5. Wash sections in running tap water.
6. Place sections in trichrome solution and microwave for 15 seconds at full power. Agitate slides and repeat heating process for an additional 15 seconds. Allow sections to stand in heated solution for 3 minutes.
7. Wash sections in running tap water.
8. Immerse sections in acetic acid for 30 seconds.
9. Rinse sections in distilled water.
10. Dehydrate, clear, and mount in synthetic resin.

RESULTS

Lipofuscin .....Red
Muscle cells .....Red
Collagen .....Green
Nuclei .....Blue-Black

DISCUSSION

Trichrome staining is generally lengthy and tedious. The Gomori Trichrome is the least complex of the numerous staining variations and modifications that have been reported. Primary fixation in a fixative containing mercuric chloride or picric acid enhances the intensity and brightness of any trichrome procedure. However, tissues fixed in formalin can be used with a prestaining mordant step. This step may prolong the technique from one to eighteen hours. We have found that brief exposure to Bouin's fluid with microwave bombardment gives excellent plasma and fiber trichrome staining and also eliminates the need for dezenkerization. Microwave treatment of the trichrome solution reduces the staining time further.[4] Lipofuscin stains red with the trichrome procedure (Fig. 2).

C. MODIFIED MICROWAVE GIEMSA STAIN

SOLUTIONS:

Bouin's Fixative (Polyscientific, Bay Shore, NY)
Wright Stain (Polyscientific, Bay Shore, NY)
Giemsa Stain (Sigma Chemical Co., St. Louis, MO)

Working Giemsa Solution

Giemsa Stain .....2.5 mL
Methanol.....2.5 mL
Phosphate Buffer, pH 6.8 .....50 mL

Acetic Acid Water

Glacial Acetic Acid .....5 drops
Distilled water .....100 mL

STAINING PROCEDURE

1. Deparaffinize and hydrate sections to water.
2. Microwave Bouin's fixative at full power for 40 seconds. Add sections and allow sections to stand for 5 minutes.
3. Wash slides in running tap water until yellow color disappears from the water.
4. Immerse sections in methanol for 1 minute.
5. Place slides on a staining rack and cover sections with Wright's stain for 5 minutes.
6. Add an equal amount of the buffer solution to the sections and allow sections to stain for an additional 5 minutes.
7. Place sections directly in working Giemsa solution. Microwave at power level 6 (450 W) for 40 seconds and allow sections to stand in solution for 5 minutes.
8. Rinse sections for 5 seconds each in three changes of acetic acid water.
9. Rinse sections in distilled water, dehydrate, clear, and mount using a synthetic resin.

RESULTS

Lipofuscin .....Red
RBCs .....Red
Muscle tissue .....Pink
Nuclei .....Violet

DISCUSSION

Although the Giemsa stain is a rapid stain, the procedure is greatly enhanced by microwave mordanting and gentle microwave heating of the working Giemsa solution. Lipofuscin will stain red with the Giemsa procedure (Fig. 3).

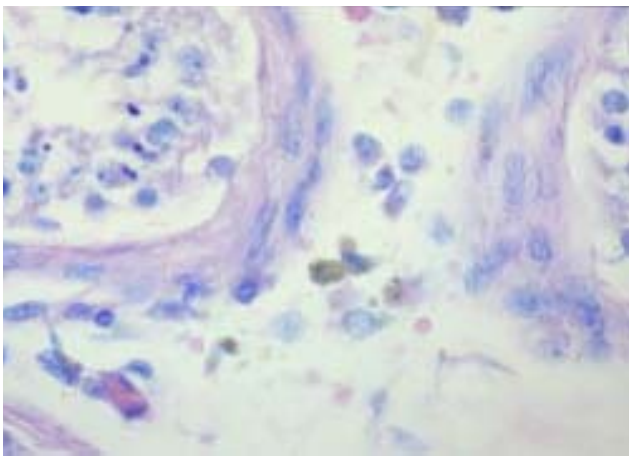

Fig 3. Giemsa Stain 3 250

D. MODIFIED MICROWAVE IRON HEMATOXYLIN

SOLUTIONS:

5% Zinc Chloride, aqueous
Zinc chloride .....5 g
Distilled water .....100 mL

2.5% Ferric Ammonium Sulfate, aqueous
Ferric ammonium sulfate .....2.5 g
Distilled water .....100 mL

0.5% Hematoxylin Solution
Dissolve 0.25 g Hematoxylin (J.T. Baker Chemical Co., Phillipsburg, NJ) in 5.0 mL of 100% ethanol. Add 45 mL of distilled water and 0.12 g Sodium Iodate.

0.2% Light Green Solution, aqueous
(Polyscientific, Bay Shore, NY)

STAINING PROCEDURE

1. Deparaffinize and hydrate sections to distilled water.
2. Mordant sections in zinc chloride solution in the microwave for 40 seconds at full power.
3. Wash sections in running tap water for 2 minutes. Rinse in distilled water.
4. Place sections in ferric ammonium sulfate solution and microwave for 40 seconds at power level 6 (450 W).
5. Rinse sections in distilled water.
6. Place sections in hematoxylin solution and microwave for 10 seconds at full power. Agitate sections in the heated solution for 60 seconds. Repeat this step.
7. Wash sections in running tap water for 2 minutes. Rinse in distilled water.
8. Differentiate sections in ferric ammonium sulfate 2-3 dips.
9. Rinse sections in distilled water.
10. Counterstain sections in light green solution for 30 seconds.
11. Rapidly dehydrate sections in ascending grades of ethyl alcohol. Clear and mount sections using a synthetic resin.

Results
Lipofuscin .....Black
RBCs .....Black
Muscle striations .....Black
Background .....Light green

Discussion
Staining time with iron hematoxylin utilizing the microwave oven now takes 20 minutes instead of 48 hours. Hematoxylin ripening is instant. Mordanting is completed in one minute. Mordanting with ferric chloride and staining with alcoholic hematoxylin is accelerated to just a few minutes.[5]

E. MODIFIED GOMORI PRUSSIAN BLUE REACTION FOR IRON

SOLUTIONS:

5% Potassium Ferrocyanide
Potassium ferrocyanide .....5 g
Distilled water .....100 mL

5% Hydrochloric Acid
Hydrochloric acid, conc. .....5 mL
Distilled water .....95 mL

Nuclear Fast Red Solution (Polyscientific, Bay Shore, NY)

Staining Procedure

1. Deparaffinize and hydrate slides to water.
2. Immerse slides in freshly mixed equal parts of 5% potassium ferrocyanide and 5% hydrochloric acid. Microwave at power level 6 (450 W) for 40 seconds.
3. Rinse sections in distilled water.
4. Counterstain sections in nuclear fast red solution for 2 minutes.
5. Rinse sections well in distilled water.
6. Dehydrate, clear, and mount in synthetic resin.

Results
Lipofuscin .....Deep blue
Iron particles .....Deep blue
Background .....Red to Pink

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East Meets West

On July 17, 1997, before construction even began on Sakura's new headquarters facility, a traditional Japanese ground breaking ceremony was performed. The ceremony consists of a series of rituals:

The welcoming address was given by Anthony C. Marotti, Senior Vice President. Reverend Alfred Tsuyuki of the Konko Church of Los Angeles presided over the ceremony. Takashi Tsuzuki, president of Sakura Finetek U.S.A. spoke briefly. Also in attendance were Mayor Dee Hardison, Councilman George Nakano, and Commissioner John LeResche of the city of Torrance.

A sacred prayer of thanksgiving which also asks for safety, goodwill, and prosperity.

Now complete, the new headquarters of Sakura Finetek U.S.A., Inc. extends a welcoming invitation to all customers and friends.

Offering of Tamakushi in which a sacred branch is offered to God by key participants. (The symbol of the True Heart [Saishu Tamakushi] represents the unity of the heart, body, and soul and symbolizes cooperation.)

The Sacred Sake (Naorai) symbolizes appreciation and thanksgiving.

The Rite of the First Shovel (Kuwaire Shiki).

A final thank you and prospectus for the future.

New Headquarters Opened in Torrance

Sakura Finetek U.S.A., Inc. unveiled its new headquarters in Torrance, California. With 53,500 square feet of space, this magnificent structure was designed to be both contemporary and timeless. The curved line of the exterior of the building has been carried through the interior design, notably in the grand staircase, ceiling, and floor. Attention to detail is what sets the building apart, from the stunning blue and aqua reflective glazing on the windows to the custom-designed wall sconce light fixtures.

Housing headquarters offices, a training facility, equipment services, and a warehouse, this state-of-the-art facility is capable of expanding to twice its size in the future. Special phone lines have been installed that will allow orders to be placed via the Internet. The official open house ceremony was held on May 1st.

This striking new building represents both Sakura's establishment of firm roots in the community and the company's future growth. The site was chosen for its prime location near Los Angeles Harbor and the Los Angeles International Airport.

New Sakura Finetek U.S.A. headquarters site leveled and ready for foundations.

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For larger, easier-to-read cassette labeling (or simply to include more information on the cassette's contents), there's an oversized front writing surface angled to make the cassette easier to hold and label. With a smooth, burr-free, flat interior ribbing that lies flush with the bottom, the new Tissue-Tek® Uni-Cassette® System simplifies sample removal and does not cause artifacts.

Other tissue processing products related to—and designed to work best with—the Tissue-Tek® Uni-Cassette® System include the Tissue-Tek® Lab Aid® Slide Filing System, Tissue-Tek® Filing Cabinets, Tissue-Tek® Marking Pencils, Tissue-Tek® Mold Release (Concentrate), Tissue- Tek® Processing/Embedding Cassette System, Tissue-Tek® Biopsy Cassettes (similar to the Tissue-Tek® Uni-Cassette® except with 1-mm pores instead of slots), Tissue-Tek® Mega-Cassette® System for larger, thicker specimens including bone, eye, and teeth, and genuine Tissue-Tek® VIP™ Processing/Embedding Medium.

Introducing Erin in Michigan and Ohio

Welcome a new sales representative to Sakura: Erin Stevens. A Speech Communication graduate of Indiana University, Erin worked in the pharmaceutical industry before joining the Sakura team. She is based in Columbus, Ohio, with her territory including both Ohio and Michigan. In her free time, Erin coaches a gymnastics team and enjoys golf, boating, and swimming.

Reminder

NSH

Symposium/Convention

Salt Lake City, Utah

September 12 - 17, 1998

Every Staining Protocol— Automatically— at Any Time, in Any Order

Think about a slide stainer that can stain multiple, different batches at the same time, at any time. Think about a highly automated slide stainer that works the way you do. A slide stainer with an advanced computer so that you can load and stage multiple staining protocols at the same time: up to 11 groups of 40 slides for single methods (slightly fewer for multiple methods). A slide stainer that lets you select the program by name, add baskets, then walk away.

Welcome to the world of the Tissue-Tek® DRS™ 2000 Slide Stainer. With 27 reservoirs and one drying station, the new system increases productivity and efficiency in a 6 sq ft space-saving, ingenious two-level design. The slide basket is totally compatible with the Tissue-Tek® SCA™ Coverslipper for even greater efficiency when functioning in a tandem arrangement.

Each protocol can be programmed to perform up to 50 different, user-determined steps. Each step can be precisely controlled for timing, agitation, and wash. Operators can even define individual program and reagent names. The new slide stainer includes a unique slide washing technique that ensures superior staining performance for both cytology and histology protocols. Computer controlled and user-adjustable automated methodology prevents uneven staining.

With “intelligent loading” design, the Tissue-Tek® DRS™ 2000 Slide Stainer offers unsurpassed productivity and consistency — slide after slide, shift after shift. Operation is elegantly simple. All programming is performed with interactive software for ease of operation. The entire system has been ergonomically designed for truly user-friendly operation. The integral slide dryer and control interface make the system even more productive by minimizing operator involvement.

The Tissue-Tek® DRS™ 2000 Slide Stainer has been busy since its introduction in late 1997. The new system is now making the histotechnology marketplace sit up and take notice of what an “intelligent” system can mean in terms of pure productivity and economics.

Where were you in 1981?

That's when this Tissue-Tek® VIP™ System was installed.

And it's still working very well, thank you.

The Tissue-Tek® VIP™ System remains the leading vacuum infiltration processor for a very simple, traditional reason: it just *keeps* working. Batch after batch. Day in, day out. Year after year.

That's ***proven*** reliability—the kind that the laboratory professionals at Straub Clinic & Hospital in Honolulu, Hawaii, have come to depend on. That's where Tissue-Tek VIP Serial Number 4660-81001 was installed in 1981…and is still working today. It was a good investment then—just like today's new Tissue-Tek VIP would be an even better investment for today and the future.

So when it's time to specify the most reliable tissue processing system for *your* lab, specify Tissue-Tek VIP. A wise decision for a very long time.

Proven Reliability

SAKURA

Sakura Finetek U.S.A., Inc.
1750 West 214th Street
Torrance, CA 90501 U.S.A.
Phone: (800) 725-8723

NATIONAL SOCIETY FOR HISTOTECHNOLOGY APPLICATION FOR MEMBERSHIP

Membership Year: June 1 – May 31 (renewal each May)

(PLEASE PRINT CLEARLY)

Social Security No. _____ Lab Supervisor ☐ YES ☐ NO

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Student Membership _____
(program director's signature)

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Stepping Up to Product Manager

From Sakura Finetek U.S.A., Inc., headquarters in Torrance, California, comes word of the recently announced position of Product Manager — and an experienced Sakura hand to fill the position. For the past 3 years, **Elise Green** has been Area Sales Manager for the Michigan and Ohio territory. Elise will draw on her sales experience with Sakura and her educational background in communications and marketing to bring her energy and insights to the new position. Congratulations and good luck, Elise.

NEW! Sakura Tissue-Tek® DRS™ 2000 Slide Stainer

NEXT... NOW!

Stain multiple, *different* batches at the same time…any time

Why wait? The Tissue-Tek® DRS™ 2000 Slide Stainer works the way you do. With **Intelligent Loading,** the advanced computer lets you load and stage multiple staining protocols at the same time. Up to 11 groups of 40 slides for single methods. Select the program by name and add baskets. Then walk away.

With 27 reservoirs and one drying station, the Tissue-Tek® DRS™ 2000 Slide Stainer increases productivity and efficiency in a 6-sq-ft, space-saving, ingenious two-level design. The slide basket is totally compatible with the Tissue-Tek® SCA™ Coverslipper for even greater efficiency.

Up to 20 methods, up to 50 steps

Each protocol can be programmed to perform up to 50 different user-determined steps. Each step can be precisely controlled for timing, agitation, and wash. Even define individual program and reagent names.

With **Intelligent Loading,** theTissue-Tek® DRS™ 2000 Slide Stainer is a ***simply smarter*** instrument—and instrument decision—for unsurpassed productivity and consistency slide after slide, shift after shift.

Contact your Sakura Sales Specialist for more information.

Proven Reliability

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Visit our web site at sakuraus.com

Histo-Logic® Back Issues Becoming Available on www.sakuraus.com

Just a short note to let you know that *Histo-Logic*® is being added to the Sakura U.S.A. web site for your informational needs and convenience. We will be adding the electronic files throughout 1998 and into 1999. *Histo-Logic* began publication in 1972 and now includes over 100 back issues. See you there often at **www.sakuraus.com.**

To receive your own copy of *Histo-Logic*,® or to have someone added to the mailing list, submit home address to: Sakura Finetek U.S.A., Inc., 1750 West 214th Street, Torrance, CA 90501.

The editor wishes to solicit information, questions, and articles relating to histotechnology. Submit these to: Terri Staples, ***Histo-Logic*** Editor, 1000 16th Avenue South, Birmingham, AL 35205. Articles, photographs, etc, will not be returned unless requested in writing when they are submitted.

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