Polysciences, Inc.
Chemistry beyond the ordinary

PolyFacts
News | Views | Insights
Life Sciences
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IN THIS ISSUE

New! TMD Biopsy Station Kit

Polysciences' Tissue Marking Dye (TMD) Biopsy Station Kit is designed to make marking tissue specimens and small biopsy samples **easy and convenient**. The kit contains five opaque pigments that are designed to have excellent adherence to tissue surfaces. The colors have been chosen to avoid confusion with routine histological stains. The viscosity of the dyes is formulated to give a thin, even coating of pigment that gently penetrates tissue samples, allowing them to remain visible through processing.

The TMD Biopsy Station Kit puts necessary consumables in a single location, eliminating the need to locate biopsy sponges, bags, dye applicators, swabs, etc. It also keeps tissue marketing dye bottle caps in place so that they do not get lost or mixed between colors.

Visit **polysciences.com/tmdkit** to learn more

The kit includes a compact holder, applicator sticks, biopsy sponge container and five tissue marking dyes (2 oz. each of Red, Green, Blue, Yellow and Black). Cotton tipped applicator sticks not included. Biopsy foam pads can be purchased separately.

Cat. # 25602

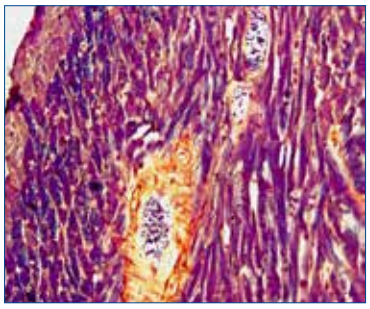
Muscle and Connective Tissue Stains

Diagnostic evaluation of tissue is primarily based on the examination of sections stained with hematoxylin and eosin (H&E). However, special stains are used to identify features that are not easily seen by routine H&E stains. For example, there are a number of genetic disorders that are important for the formation and function of muscle and connective tissue. Special stains can provide the visualization of such abnormalities in the tissue. The use of high quality, reliable and repeatable special stains are essential in allowing the pathologist to provide proper diagnosis.

There are three types of muscle tissue: ***skeletal*** (attached to bones by tendons), ***cardiac*** (found in wall of the heart) and ***smooth muscles*** (found in walls of "hollow" internal organs, for example: stomach, urinary bladder, and intestines). Traditionally in skeletal muscle, the PTAH stain is used to show cross striations, imparted by the arrangement of the proteins actin and myosin.

Connective tissue consists of three components: *fibers, cells* and *amorphous ground substances*. Most commonly, special stains focus on the *fibers or cells* of the connective tissue, including collagen fibers, elastic fibers and reticular fibers.

NEW! Rapid Phosphotungstic Acid Hematoxylin (Rapid PTAH) - *Cat. #25715*



Rapid Phosphotungstic Acid Hematoxylin Stain kit (Rapid PTAH) is used to demonstrate cross-striations of skeletal muscle as well as fibrin and collagen. Rapid PTAH is mercury free, and is used on formalin fixed, paraffin embedded (FFPE) tissue. Muscle striations, fibrin and nuclei are stained various shades of blue while collagen, reticulum, basement membranes and cartilage are stained various shades of red to red-brown. The Rapid PTAH is available in kits of 250 ml and 500 ml.

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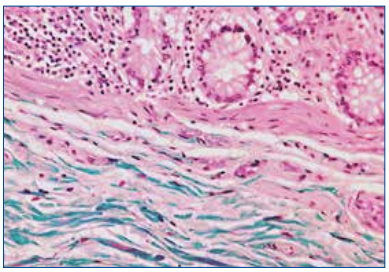
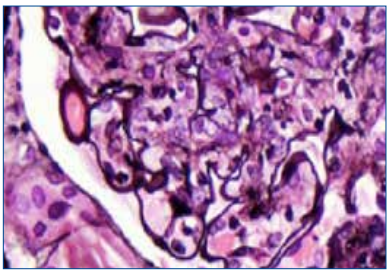
Muscle and Connective Tissue Stain Kits *Continued*



Gomori's Trichrome Stain Kit - *Cat. #24205*

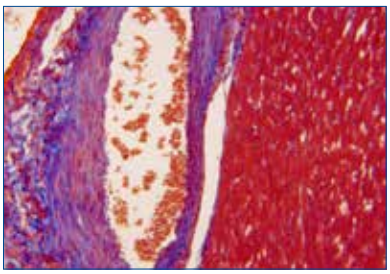
Gomori's Trichrome Stain Kit is used for the visualization of collagenous connective tissue fibers. The kit is particularly useful for distinguishing collagen from smooth muscle tissue. Nuclei stain black; cytoplasm, keratin and muscle fibers stain red, while collagen and mucus stain green or blue. Gomori's Trichrome stain is available in kits of 250 ml.

Piróg K, Jaka O, Katakura Y, Meadows R, Kadler K, Boot-Handford R, Briggs M. A mouse model offers novel insights into the myopathy and tendinopathy often associated with pseudoachondroplasia and multiple epiphyseal dysplasia. Human Molecular Genetics. 2010; 19(1): 52-64.



Jones Periodic Acid Schiff Methenamine Silver (PAS-M) Stain Kit - *Cat. # 25091*

The Jones PAS-M Silver Stain Kit is used to identify glomerular and tubular basement membranes in 2 µm sections of renal tissue. This kit utilizes an enhancer to accelerate the reaction of methenamine silver with the glomerural basement membranes, reducing the time required to achieve results. The basement membranes stain black, while the background stains red. Jones PAS-M is available in kits of 100 ml and 500 ml.

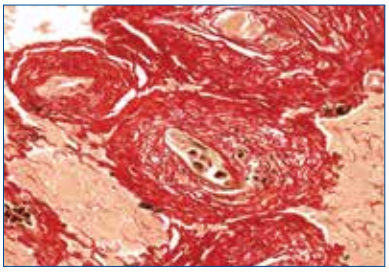


Masson's Trichrome Stain Kit - *Cat. #25088*

Masson's Trichrome Stain Kit is used for the detection of collagen fibers in tissues such as skin, heart and muscle on formalin-fixed, paraffin-embedded sections. It may be used for frozen sections as well. Collagen fibers stain blue, cytoplasm, keratin and muscle fibers stain red, while nuclei stain black. Masson's Trichrome stain is available in kits of 100 ml and 500 ml.

Thomas A, Kubilius M, Holland S, Seidlits S, Boehler R, Anderson A, Cummings B, Shea L. Channel density and porosity of degradable bridging scaffolds on axon growth after spinal injury. Biomaterials. 2013; 34: 2213-2220.

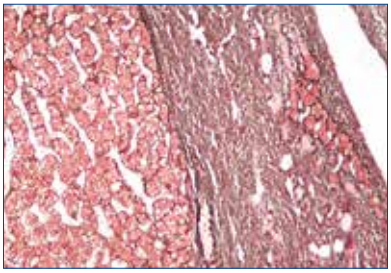
Schmidt B, Horsley V. Intradermal adipocytes mediate fibroblast recruitment during skin wound healing. Development. 2013; 140: 1517-1527.



Picrosirius Red Stain Kit - *Cat. #24901*

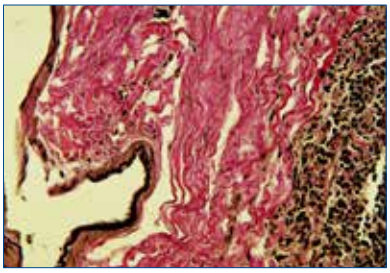
The Picrosirius Red Stain Kit binds to collagen fibrils of varying diameter, thus distinguishing collagen Type I from Type III. Structures that are difficult to identify with hematoxylin and eosin, such as dentinal tubules and Sharpey's fibers, can be distinguished with Picrosirius Red. Under polarized light, Type I collagen appears yellow or red, while Type 3 collagen appears green. The Picrosirius Red Stain Kit is useful for the examination of normal or pathologic dental specimens. Picrosirius Red is available in kits of 250 ml or 500 ml.

Berendsen A, Pinnow E, Maeda A, Brown A, Nancy M, Kram V, Owens R, Robey P, Holmbeck K, Castro L, Kilts T, Young M. Biglycan modulates angiogenesis and bone formation during fracture healing. Matrix Biology. 2014; 35, 223-231.



Reticulin Stain Kit - *Cat. #25094*

The Reticulin Stain Kit identifies reticulin fibers in tissue sections of the liver, kidney, lymph nodes, spleen and bone marrow. Reticulin is a type III collagen found in the basement membrane of these organs, where it provides structural integrity. Reticular fibers are stained black while nuclei are stained red. Reticulin Stain is available in kits of 250 ml or 500 ml.



Verhoeff Van Gieson Elastin Stain Kit - *Cat. #25089*

The Verhoeff Van Gieson Stain is commonly used to identify elastic fibers and any pathological changes within the elastic fibers. The kit is useful in demonstrating atrophy, thinning, splitting and loss of elastic fibers. These changes as well as other pathological changes can result from various vascular diseases, such as atrophy and arteriosclerosis. Elastic fibers stain blue-black to black, Nuclei stain blue to black, collagen stain red, while other tissue elements stain yellow. The Verhoeff Van Gieson stain is available in kits of 250 ml.

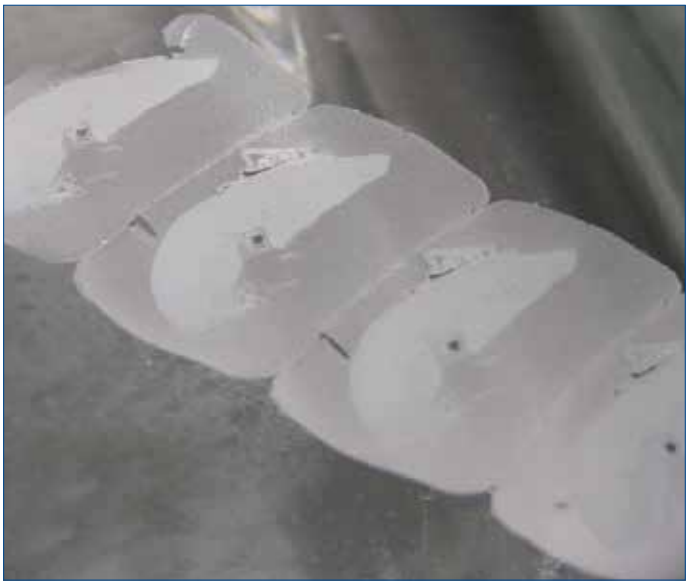
Solutions for Common Microtomy Problems

The art of microtomy requires a great deal of skill from the histologist. Ribbons, levels and recuts are easy to produce with a good quality specimen block, but unfortunately the histologist does not always have this luxury. Polysciences has a range of solutions for times when the histologist has no control over the quality of the specimen block. These solutions address common problems that arise from bloody specimens, calcification and keratinized samples, as well as wrinkles during slide preparation.

Wrinkle Out Solution - *Cat. #25383*

Wrinkle Out Solution is used in place of tap or DI water in the flotation bath for paraffin sectioning. The solution is formulated to have a surface tension more suitable than water, causing tissue sections to spread evenly across the surface of the bath producing wrinkle free tissue sections. This solution also eliminates prolonged stretching of the tissue, reducing the amount of cracks and tears that can occur.

Wrinkled and compressed paraffin ribbon in DI water bath.



Paraffin ribbon in Wrinkle Out Water Bath Solution.

Tissue Flotation Bath - *Cat.# 25389*

The Tissue Flotation Bath makes sample preparation easy and efficient. A removable glass dish rests in a chemical resistant plastic housing, and an LED lighting array provides a high contrast background for optimal viewing. Electronics allow for digital temperature control and timing. The bath also includes a HISTO/Orientator™ for eliminating wrinkles, and a convection slide dryer for convenience.

Total Cutting Solution Kit - *Cat. #25388*

The Total Cutting Solution Kit provides the histologist with five tools that help with the sectioning of difficult blocks. The kit addresses problems with bloody samples, hard tissues, keratinized hair/skin and samples that require decalcification. Adding this kit to a workstation can improve the quality of tissue sections. **The Total Cutting Solution Kit is essential for every efficient workstation.**

Kit includes the following:

Histoheme – An ammonia based emollient that alleviates problems and mess caused by bloody specimens such as placental fragments, liver and spleen

Soft Block – A softener for difficult to cut paraffin embedded tissue, such as bone and nails

Soft Nail – A softener for keratinzed hair, and skin samples that are common in Mohs histology laboratories

Super Decalcifier I: **Delicate** – A decalcifying agent for use with delicate specimens that require fast diagnostic results such as IHC and cytochemistry specimens

Super Decalfier II: Heavy Duty – A decalcifying agent used for safe, long term decalcification of hard compact bone

10 Multi-Well Block Holders – Included for convenient treatment of blocks at the microtomy station

Cut Difficult Tissue with Ease!

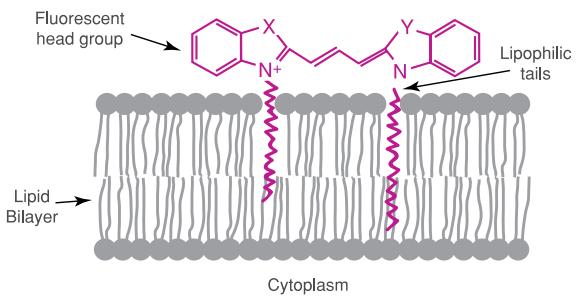
Visit polysciences.com/tcs for more information on the Total Cutting Solution Kit

Before Histoheme

After Histoheme

Tools for Fluorescent Labeling

In fluorescent labeling, fluorophores are attached to specific cellular structures, allowing them to be visualized through the use of fluorescence microscopy or flow cytometry. Polysciences offers four types of fluorescent labelers: **CellVue®, PSVue®, NeuroVue®** and **SRfluor®**. This family of products can be used to visualize apoptotic cells, cancers, bacterial infections and neuronal connections.



CellVue®

CellVue® Dyes are fluorescent probes that irreversibly label the plasma membranes of live cells. A fluorescent dye with aliphatic tails is incorporated into the lipid region of a cell membrane, causing a bright fluorescence that emits from the ultraviolet to near infrared range, depending on the color of the dye. Cellvue® dyes are versatile, as they can be used with any cell type or bioparticle that has a membrane, making them ideal for cell tracking and proliferation studies. The labeling vehicle (Diluent C) is designed to maintain cell viability while maximizing dye solubility and staining efficiency. Each dye is available as a mini (small) or midi (medium) sized kit.

Cat. #	Description
24840	CellVue® Maroon Mini Kit For Membrane Labeling
24847	CellVue® Maroon Kit For Membrane Labeling - MIDI Kit
24841	CellVue® Lavender Mini Kit For Membrane Labeling
24851	CellVue® Lavender Kit For Membrane Labeling - MIDI Kit
24842	CellVue® Plum Mini Kit For Membrane Labeling
24848	CellVue® Plum Kit For Membrane Labeling - MIDI Kit
24843	CellVue® Burgundy Mini Kit For Membrane Labeling
24850	CellVue® Burgundy Kit For Membrane Labeling - MIDI Kit
24844	CellVue® Claret Mini Kit For Membrane Labeling
24849	CellVue® Claret Kit For Membrane Labeling - MIDI Kit

Cat. #	Description
24845	CellVue® NIR780 Mini Kit For Membrane Labeling
24852	CellVue® NIR780 Kit For Membrane Labeling - MIDI Kit
24846	CellVue® NIR815 Mini Kit For Membrane Labeling
24853	CellVue® NIR815 Kit For Membrane Labeling - MIDI Kit
24902	Diluent C
24904	CellVue® Jade Mini Kit For Membrane Labeling
24905	CellVue® Jade Kit For Membrane Labeling - MIDI Kit
25567	CellVue® Red Mini Kit for Membrane Labeling
25682	CellVue® Red MIDI Kit - **New!**
25568	CellVue® Lilac Mini Kit for Membrane Labeling

Krānkel N, Kuschnerus K, Müller M, Speer T, Mocharla P, Madeddu P, Bader M, Lüscher T, Landmesser U. Novel Insights into the Critical Role of Bradykinin and the Kinin B2 Receptor for Vascular Recruitment of Circulating Endothelial Reapir-Promoting Mononuclear Cell Subsets. Circulation. 2013; 127: 594-603.

PSVue®

PSVue® reagents are a family of fluorescent probes containing a bis(zinc^{2+} dipicolylamine) group (Zn-DPA), which has been found to bind with high affinity to surfaces enriched with anionic phospholipids, especially phosphatidylserine (PS) exposed on cell membranes. The fluorescent part of the probe is a reporter element that provides a means of detecting the probe once it is bound to the membrane of interest. PSVue® probes bind to a variety of cell types such as apoptotic, necrotic, Gram+ and Gram- bacteria, activated, tumor vascular endothelial, and viruses. PSVue® reagents are available in a range of detection wavelengths from long UV to near IR.

Cat. #	Description
25101	PSVue® 794 Reagent Kit
25102	PSVue® 380 Reagent Kit
25103	PSVue® 480 Reagent Kit
25683	PSVue® Biotin - **New!**
25684	PSVue® 550 - **New!**
25685	PSVue® 643 - **New!**

Hanshaw RG, Lakshmi C, Lambert TN, Johnson JR, Smith BD. Fluorescent detection of apoptotic cells by using zinc coordination complexes with a selective affinity for membranes surfaces enriched with phosphatidylserine. ChemBioChem. 2005; 6: 2214-2220.

Smith BA, Akers WJ, Leevy WM, Lampkins AJ, Xiao S, Wolter W, Suckow MA, Achilefu S, Smith BD. Optical imaging of mammary and prostrate tumors in living animals using a synthetic near infrared zinc(II)-dipicolylamine probe for anionic cell surfaces. Journal of the American Chemical Society. 2010; 132(1): 67-69.

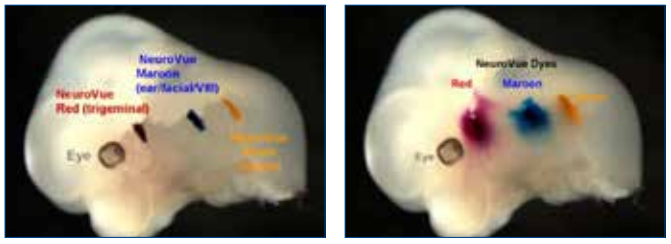
Leevy WM, Johnson JR, Lakshmi C, Morris, J, Marquez M, Smith, BD. Selective recognition of bacterial membranes by zinc(II)-coordination complexes. Chemical Communications. 2006; 15: 595-1597.

Leevy WM, Gammon ST, Jiang H, Johnson JR, Maxwell DJ, Marquez M, Piwinica-Worms D, Smith BD. Optical imaging of bacterial infection in living mice using a fluorescent near-infrared molecular probe. Journal of the American Chemical Society. 2006; 128: 16476-16477.

Leevy WM, Gammon ST, Johnson JR, Lampkins AJ, Jiang H, Marquez M, Piwinica-Worms D, Smith BD. Noninvasive optical imaging of Straphylococcus aureus bacterial infection in living mice using a bis-dipicolylamine-zinc (II) affinity group conjugated to a near infrared fluorophore. Bioconjugate Chemistry. 2008; 19: 686-692

NeuroVue®

NeuroVue® Dye Filters can be used for tracing neuronal connections in animal tissues that are fixed in formaldehyde. Like other lipophilic tracers, they readily transfer into fixed tissue plasma membranes and diffuse laterally within, eventually labeling the entire cell body as well as the axonal and dendritic branches. This allows visualization of neuronal processes up to several millimeters away from the point of dye insertion. Insertion of small dye coated filter segments have been shown to be a simple, reliable method for labeling well defined tissue regions, avoiding known artifacts associated with labeling via high pressure microinjection or insertion of dye crystals on a dissecting needle. NeuroVue® Dye Filters can be selected such that they exhibit minimal bleed through into filter windows typically used for other fluorescent probes, making them an excellent choice for multicolor neurotracing studies in sections and/or whole-mount preparations. NeuroVue® Dyes can be visualized by light or fluorescence microscopy.



Left: Placement of NeuroVue® micro-strips for multicolor neurotracing. Lateral view of murine head (embryonic day 12.5); with micro-strips placed to obtain central projections of NeuroVue® Red labeled trigeminal nerve, NeuroVue® Maroon labeled facial nerve and NeuroVue®green labeled glossopharyngeal nerve. The eye is visible as a brown spot at left (anterior). Magnification ~25X. NeuroVue® Jade is currently recommended for such studies because it can be visualized over substantially longer distances than NeuroVue® Green.

Right: Monitoring diffusion distance using NeuroVue® dye absorbance. After incubation for 36 h at 37°C, diffusion in all directions from the point of micro-strip insertion is readily visualized using a dissecting microscope (same specimen as left photo) Magnification ~25X

Photos courtesy of Drs. Bernd Fritzsch and Lucy Feng (Creighton University)

Cat. #	Description
24834	NeuroVue® Maroon - Filter Square for Neuronal Tract Tracing
25569	NeuroVue® Maroon Solid
24835	NeuroVue® Red - Filter Square for Neuronal Tract Tracing
24836	NeuroVue® Orange - Filter Square for Neuronal Tract Tracing
24838	NeuroVue® Burgundy - Filter Square for Neuronal Tract Tracing
24837	NeuroVue® Jade - Filter Square for Neuronal Tract Tracing
25687	NeuroVue® Jade Solid - **New!**
24906	NeuroVue® Red Plus - Filter Square for Neuronal Tract Tracing
24907	NeuroVue® Red Solid - For Neuronal Tract Tracing

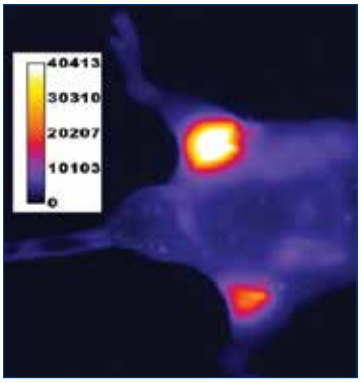
Iwano T, Masuda A, Kiyonari H, Enomoto H, Matsuzaki F. Prox1 postmitotically defines dentate gyrus cells by specifying granule cell identity over CA3 pyramidal cell fate in the hippocampus. Development. 2012; 139: 3051-3062.

SRfluor®

SRfluor® dyes are squaraine rotaxane dyes that emit in the far red region of the spectrum. Useful for *in vitro* and *in vivo* imaging, SRfluor® dyes have a range of functionalities that allow conjugation with biomolecules. These dyes have been successfully used to visualize endoplasmic reticulum, lipid droplets and metal ions. They have also been used to identify bacterial cells and infections in mice.

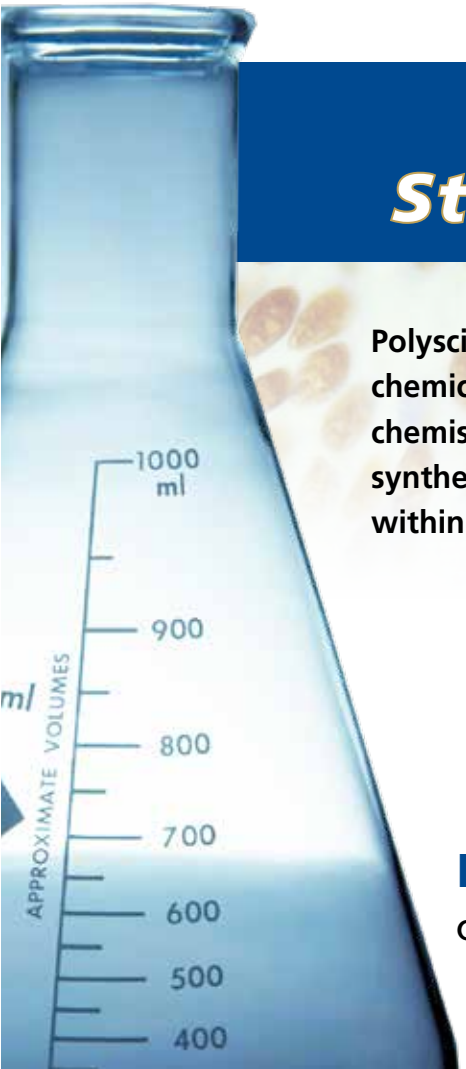
Cat. #	Description
25688	SRfluor® 680 Azide - **New!**
25689	SRfluor® 680 Alkyne - **New!**
25690	Duramycin-LC-Biotin - **New!**
24862	SRfluor® 680 Phenyl
24863	SRfluor® 680 Carboxyl
24865	SRfluor® 680 Maleimide
24866	SRfluor® 680 NHS Ester

SRfluor® is a trademark of Molecular Targeting Technologies, Inc. Distributed by Polysciences, Inc. under agreement from MTTI.



Optical image of a live mouse with subcutaneous injections of *S.aureus* and *E. coli* that were prelabeled with SRfluor® probe. The entire animal was irradiated with filtered light at λ=625 ±40 nm and an image with emission intensity at l=670 ±20 nm was collected by a CCD camera during a 5 second acquisition period.

Image courtesy of Professor Bradley Smith, University of Notre Dame, Indiana, USA.



Private Label Capabilities for
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Polysciences, Inc. is an established supplier of custom, specialty and fine chemicals for customers in the medical devices, biotechnology and analytical chemistry industries. We have an experienced staff of Ph.D. production and synthesis chemists that can assist you in accomplishing your goals on time and within budget.

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- Paraffins
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Vol. 9, No. 3 | July 2014

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