PolyFacts BioSciences

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News | Views | Insights *from* Polysciences, Inc. Chemistry beyond the ordinary

IN THIS ISSUE. . .

Mohs History and Laboratory Techniques

What is Mohs?

Mohs Micrographic Surgery (MMS) is a surgical technique for the removal of cutaneous carcinomas that allows precise microscopic marginal control by using horizontal frozen sections. MMS has become the treatment of choice for basal cell carcinomas (BCCs) and squamous cell carcinomas (SCCs) at high risk for local recurrence. The advantages of this technique compared to those of other options for treating cutaneous neoplasms result from:

- Superior tissue conservation
- Trace perineural or infiltrating tumors histologically
- Negligible risk of complications from anesthesia, due to local anesthesia in Mohs surgical procedures

Frederick E. Mohs originated the technique of MMS in the early 1930s. While testing the irritant effect of an intratumoral injection of 20% zinc chloride, he observed that the microscopic detail of the tissue was retained as if the tissue had been excised and immersed in a fixative solution.

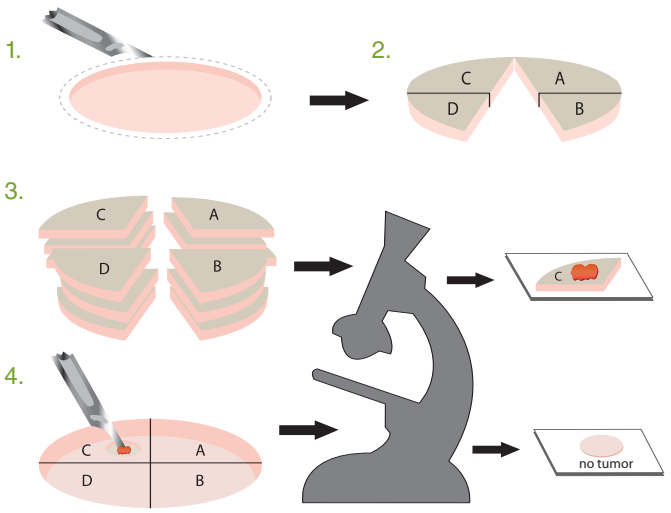
In 1953, Dr. Mohs was making a film to demonstrate his fixed-tissue technique for basal cell carcinoma of the eyelid. Dr. Mohs excised the last layers without the zinc chloride fixative paste he created in order to accelerate the surgery for the film. The horizontal frozen sections worked so well that Dr. Mohs continued the fresh-tissue technique for all eyelid carcinomas. In 1969, he reported a 5-year cure rate of 100% using the fresh-tissue technique to excise eyelid carcinomas. Wide acceptance of the fresh-tissue technique increased substantially after the publication of Tromovitch and Stegman's series in 1974 and Mohs' series in 1976.

Caveats of malignant skin tumors

Malignant skin tumors have strange as well as asymmetrical shapes. The tumor may have finger-like projections that extend across the skin or reaching down into the skin. These projections may be made up of only a few cells, they cannot be seen or felt. Excisions may miss these cells leading to the recurrence of the malignant tumor. In order to remove all malignant cells and tissue, a larger excision needs to be made. More than likely, the result is a large excision that may be in an area that is seen or exposed for all to see. Mohs surgery makes precise excisions around the entire tumor as well as associated margins without excising vast amounts of non malignant tissue. *continued, page 2*

Mohs Surgery Technique

Figure 1



1. After visible tumor is removed, excise thin layer from surrounding skin and base.
2. Map and section removed tissue, prepare slides.
3. Examine deep and peripheral margins. Any presence of tumor is mapped with inks or dyes.
4. Locate and remove any remaining tumor on wound. Repeat process until no further tumor remains.

Mohs History and Laboratory Techniques from page 1

Tech Tips for Fat, Cartilage, Bone and Nail Tissue

A small amount of Liquid Nitrogen (LNO_2) may be applied to areas that have large amounts of adipose tissue within an actual frozen tissue block, especially after facing the block. Sometimes it may take multiple applications before the adipose tissue cuts as well as the surrounding epithelial and subcutaneous layers of the tissue so you may have to be persistent. Employ a swab, gauze or sprayer to accurately target the adipose tissue in the block thus avoiding any epithelial layers. The first section taken after you apply LNO_2 will be thin and unusable because the face of the block retracts or shrinks when cooled. Continue sectioning until results are desirable.

Cutting adipose tissue may require increasing micron thickness to 8-10 microns. You may alternate between thickness as well as cryostat chuck rotations to get the optimum fat section. If LNO_2 is not available and freeze spray is the only choice, try increasing the micron thickness to 14-18, or choose to leave the block on the rapid cooling bar for up to half an hour and then proceed cutting the fatty block with an increased micron thickness. The only caveat with cartilage is it may be hard to orient the specimen but cartilage is relatively easier to cut than fat or calcified lesions.

Mohs surgery is performed under local anesthesia for tumors of the skin. The area to be excised is washed with a disinfectant solution, and the surgeon outlines the tumor using a surgical marking pen or a dye. Lidocaine with epinephrine is injected into the area to be excised. The main portion of the tumor is debulked using a curette. To define the area to be debulked, it is accurately mapped, the surgeon marks or creates margins around the wound. These marks are noted with sutures, stitches, staples, fine cuts with a scalpel, or temporary tattoos. The skin cancer is removed in a series of steps. The first thin layer of tissue is excised, and cut into smaller sections for processing in the laboratory. If cancerous cells are found in any of the tissue sections, another thin "layer" of tissue is removed, and the process is repeated. *(See Figure 1, page 1)*

About Mohs Surgery

Mohs surgery is widely recommended for the treatment of certain basal cell and squamous cell carcinomas. Tumor physical characteristics such as size, location, margin definition, risk of recurrence and anatomic location are some of the factors in considering MMS.

During the procedure, the Mohs surgeon removes the known tumor, including a small area of surrounding normal tissue. A map is drawn, showing orientation of the excised tissue relative to the location on the patient. While the patient waits, the Mohs technician processes the tissue specimen using a horizontal sectioning method and prepares microscope slides for examination by the physician. The Mohs surgeon also acts as the pathologist in interpreting the deep and peripheral margins of the excised tumor, using the map as a reference. If additional areas of tumor are seen, the process is repeated until no further tumor involvement is noted in any of the margins. Because of the methodical manner in which the tissue is removed and examined in Mohs surgery, the cure rate is as high as 99 percent for certain skin cancers. One of the reasons for its success is the 100 percent visualization of the resection margins.

Mohs surgery laboratory essentials

Pre Cleaned and Coated Slides

Always check your slides and make sure they are clean and free of dirt, dust and other contaminants or there will be a higher risk of the tissue washing off of the slide and affect the affinity of the stain on the tissue. When using precleaned and coated frosted slides, the frosted end designates the numerical order of the first cut specimen.

Precleaned Slides

After the section is placed on a microscope slide it can be heated by using a hot plate (3 to 4 minutes), hair dryer (15 seconds) or heated in the oven on an automated linear stainer. Avoid prolonged exposure of the tissue to high temperatures, which could destroy cellular details. Heat should denature the proteins just enough to change the charges in the slide and adhere the tissue on the slide through the staining line. If tissue is not heated adequately in order to denature the proteins and change the charge, the tissue sections are at risk of washing off the slide during staining. Tissues containing cartilage, keratin, nail fragments or bone should be mounted on charged slides. These types of tissue simply do not adhere adequately to pre-cleaned slides. Often the keratinized squamous epithelial layer will lift during staining and fold over the subcutaneous layers, making the reading of slides more difficult for the Mohs surgeon.

Coated Slides

Coated or poly-l-lysine charged slides, have the ability to hold tissue sections to their surface better than that of just precleaned slides. Cartilage, nail, hair and bone tissue will adhere to the charged slides because the charges on the slide will bind to the charges in the bone, keratin or cartilage *(Polysciences, Inc. Tissue Tack Microscope Slides™- Cat. #24216)*. Placing slides with cartilage, keratin, nail and bone in an incubator at 60°C for 7 to 10 minutes will help adhere tissue to the slide. Slides should be labeled using a solvent resistant slide marking pen.

Select materials for use in the Mohs Laboratory.

Cat. #	Description
24606	Flash Dip FNA/H.Pylori Stain Kit
24245	Harris Hematoxylin, Acidified (mercury free)
24242	Gill's Hematoxylin #1 for Cytology
24243	Gill's Hematoxylin #2, 2x strength
24244	Gill's Hematoxylin #3, 3x strength
09859	Eosin Y, 0.5% alcoholic solution
17269	Eosin Y, 1% alcoholic solution
16672	Adhesive, Tissue-Tack™
22247	Poly-L-Lysine Coated Microscope Slides (72 per box)
24772	Marking Dye for Tissue - Seven Color Kit
08379	Formalin, 10%, neutral phosphate buffer
04018	Formaldehyde, 10% methanol free Ultra Pure

For our full range of products for Mohs laboratories, including all Marking Dye for Tissue colors, please visit www.polysciences.com

New Gold Nanoparticles for Nanotherapeutics and Nanodiagnostics

From fundamental research in nanomaterials, applications in nanomedicine are beginning to emerge. Nanotechnology refers to the manipulation of single molecules via the structural control of matter at the molecular level. Nanotechnology is employing the scale of 1 billionth of a meter to yield nanodevices and nanomaterials.

Nano devices and nano machines

Nanomedicine is the science and technology of improving human health using molecular tools and molecular diagnostics by understanding how the body processes work at the molecular level. This approach implies that medical treatment can be applied at the level of single molecules or molecular components that provide structure, control, signaling, homeostasis and motility in cells.

Nanomedicine has applications for analytical techniques and diagnostic tools, nano-imaging and manipulations, nanodevices and the design of biologically active materials. These biologically active materials can be translated to active therapeutics, drug delivery systems and excipients for pharmaceutical development and clinical use.

Nanomedicine Applications

Improved antimicrobial properties and research nanomaterials with strong antimicrobial properties such as nanocrystalline Ag, which is used in wound treatment, are some of the uses for nanomedicine. Other methods related to using nanotechnology include selective laser killing of bacteria targeted with light absorbing gold nanoparticles conjugated with specific antibodies. This technology is used by selectively killing gram positive bacteria *Staphylococcus Aureus* by targeting the bacterial surface using specifically sized gold particles conjugated with antiprotein A antibodies. Nanoparticles of different sizes can label bacteria which can then be irradiated with focused laser pulses. Laser induced bacterial damage can be seen by different laser influences and nanoparticle size is verified by optical transmission, electron microscopy and conventional viability testing. *S. Aureus* is responsible for skin infections like impetigo, eczema, folliculitis, Ritter's disease, wounds, TSS, septic arthritis, endocarditis, pneumonia, meningitis, UTE and osteomyelitis. These infections are caused by bacteria that is increasingly becoming resistant to antibiotics. Physical or chemical damage to bacterium may be some of the new ways of destroying these superbugs.

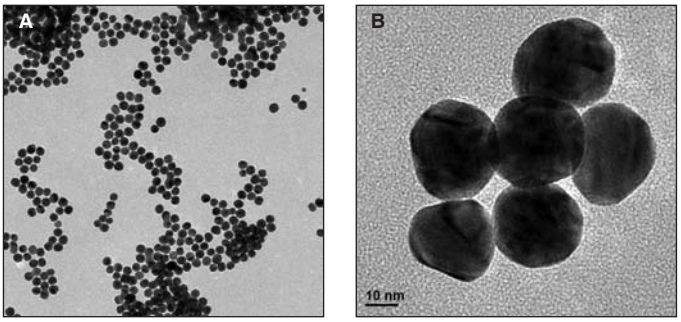


Figure 1: TEM images of gold nanoparticles. A) 15nm spheres, at 40000X B) Close up of 30nm spheres showing the monodispersity.

What makes *S. Aureus* a Superbug?

- Surface proteins that enable the colonization of host tissues
- Bacterial invasins that spread in tissues for example: leukocidin, kinases and hyaluronidases
- Surface factors that inhibit phagocytosis for example: Capsule and Protein A
- Biochemical properties that enhance their survival in phagocytes for example: carotenoids and catalase production
- Immunological mimicking of various enzymes and proteins (Protein A, factor VIII and coagulase)
- Cytotoxins that lyse eukaryotic cell membranes: (hemolysins, leukotoxin, leukocidin; SEA-G, TSST, ET)
- Resistance to antibiotics

continued, page 6

Future directions of colloidal nanoparticles including new Gold Nanoparticles:	
Drug delivery	Polymeric nanoparticles engineered to carry anti-tumor drugs across the blood brain barrier, reducing the size of drug particles to 50-100nm • Pharmaceutical coatings to improve the solubility of drugs • Layer by layer poly-electrolyte coatings, 8-50nm • Anti microbial nano-emulsions • Micellar nanoparticles for encapsulation of drugs • Proteins and DNA(PCR/RT-PCR) this is accomplished by determining the surface coverage of dithiol-capped oligonucleoides bound onto gold nanoparticles • Polybutylcyanoacrylate nanoparticles coated with drugs and then with surfactant that can go across the blood-brain barrier • Acticoat bandages use nanocrystal silver that is highly toxic to pathogens.
Bio-pharmaceutical	Biodegradable polymeric nanoparticles for drug delivery, nano barcodes for bioanalysis, respirocytes (artificial red blood cells), antimicrobial nano emulsions.
Membrane filtration	Nanoporous ceramic materials for endotoxin filtration, orthopaedic and dental implants, DNA and protein separation.
Tissue engineering, implants, drugs & gene delivery, biofiltration	Exploiting material properties of nanostructured porous silicone.
Luminescent biomarkers	Bioconjugated semi conductor quantum dots.
Gold biomarkers	DNA barcode attached to each nanoprobe for identification purposes, PCR used to amplify signals, catalytic silver deposition to amplify using plasmon resonance, gold nanoparticles bioconjugates for TEM and/or fluorescent microscopy, nanoscale cantilevers to detect molecules produced by cancerous tumors.
Tracking and separation of different cell types	Magnetic beads with coatings, beads with magnetic cores, cores surrounded by a polymeric layer and coated with antibodies to capture cells.

New SRfluor™ Dyes

What are they?

SRfluor™ dyes belong to the family of squaraine rotaxane dyes which exhibit absorption and emission properties in the far-red region of the spectrum.

What do SRfluor™ dyes offer?

- 5-20 times brighter compared to Cy5, Alexa® and Atto dyes
- More photostable compared to Cy5, Alexa® and Atto dyes
- Sharp absorption and fluorescence emission profiles
- Available with a range of functionalities to allow conjugation with biomolecules for *in vitro* and *in vivo* imaging
- Other analogs with ability to label the intracellular lipid regions of cells or bind to metal ions also available

Selected Applications

♦ SRfluor™ 680 Phenyl: This lipophilic SRfluor™ dye rapidly accumulates in lipid regions inside living cells. For example, probe localization with Chinese Hamster Ovarian (CHO) cells is primarily in the ER (Figure 1A) whereas in human lung carcinoma (A549) cells uptake is mainly in the lipid droplets (Figure 1B).

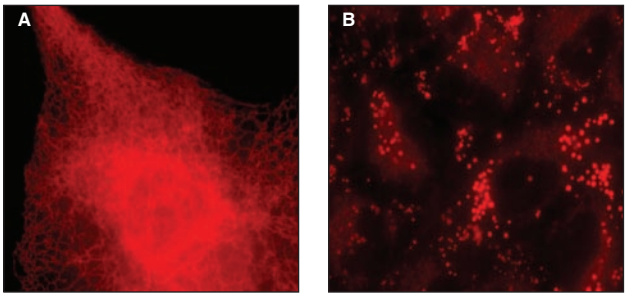


Figure 1: Fluorescence microscopy images of live mammalian cells treated with SRfluor™ 680 Phenyl. A) Endoplasmic-Reticulum staining of a single CHO cell. B) Lipid droplet staining in A549 cells.

♦ SRfluor™ 680 Carboxylate: This dye readily undergoes conjugation to various biomolecules via free amino groups. For example, Prof. Bradley Smith and coworkers at the University of Notre Dame have shown that by conjugating a carboxyl functionalized SRfluor™ dye with a bacteria targeting Zn-dipicolyl amine ligand, they could perform fluorescence imaging experiments that were previously impossible with the corresponding cyanine dye based probes. Figure 2 shows a montage of images at various time points from a 30 minute movie monitoring binary fission of *E. coli* cells stained with an SRfluor™ probe.

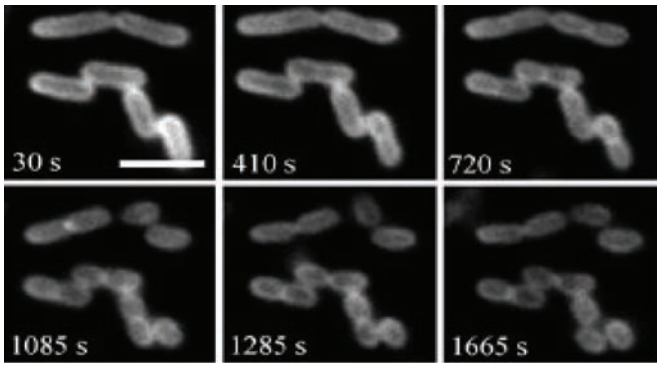


Figure 2: Binary fission of E. coli cells stained with SRfluor™ probe. The cells were imaged every 5 seconds for 30 minutes by fluorescence microscopy. The times stated in each panel correspond to the movie time point and the scale bar represents 2 µm.

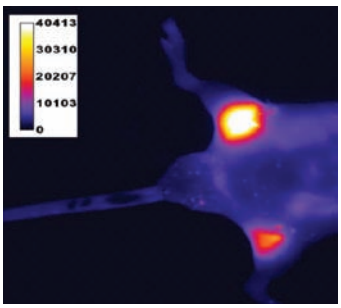


Figure 3: Optical image of a live mouse with subcutaneous injections of *S. aureus* and *E. coli* that were prelabeled with SRfluor™ probe. The entire animal was irradiated with filtered light at λ = 625 ± 40 nm and an image with emission intensity at λ = 670 ± 20 nm was collected by a CCD camera during a 5 second acquisition period.

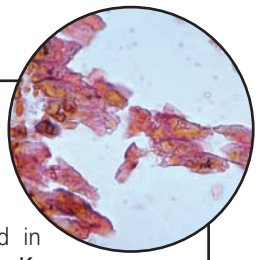
Image courtesy of Professor Bradley Smith, University of Notre Dame, Indiana, USA.

♦ Researchers at the University of Notre Dame have also demonstrated the imaging properties of SRfluor™ dyes in a live mouse. They labeled *E. coli* and *S. aureus* bacteria with SRfluor™ dyes and injected them subcutaneously near the posterior thigh muscles of a living nude mouse. Fluorescence image of the entire animal was subsequently acquired using a Kodak 4000MM fluorescence-imaging station. As illustrated in Figure 3 both sites of bacterial inoculation were very apparent, because fluorescence emission intensities are about 100 times greater than the background signal from other anatomical parts of the mouse.

Cat. #	Description	Size
24862	SRFluor™ 680 Phenyl	1mg
24863	SRFluor™ 680 Carboxylate	1mg
24864	SRFluor™ 680 Crown	1mg
24865	SRFluor™ 680 Maleimide	1mg
24866	SRFluor™ 680 NHS Ester	1mg

New

Von Kossa Method for Calcium Kit



Abnormal deposits of calcium may be found in any area of the body. Polysciences' new **Von Kossa Method for Calcium Kit** demonstrates calcium phosphate and calcium carbonate salts.

Use as a bone stain to indicate osteomalacia, or in other paraffin embedded tissues to stain calcium deposits seen in metabolic diseases, such as: Paget's disease, renal osteodystrophyand hyperparathyroidism, necrotic areas associated with TB, infarction (Gandy Gamna bodies), atheroma in blood vessels and Malakoplakia in the bladder (Michaelis-Gutman bodies).

Kit Components:
3% Silver Nitrate, 5% Sodium Thiosulfate, Nuclear Fast Red

Cat. #	Description	Size
24633	Von Kossa Method for Calcium	1kit

Photo: Calcified Necrotic Kidney, 4µm

New Immobilized Steroid Beads

Accelerate Your Life Sciences Research with Immobilized Steroid Beads

What are they?

Sepharose® 6B affinity chromatography beads covalently modified with steroids or other ligands such that ligand binding to receptors is not compromised resulting in high receptor-binding specificity.

What can they be used for?

- Efficient isolation and purification of receptor proteins (nuclear and others)
- Ligand binding affinity studies
- Preparation of receptor-ligand complexes for crystallography studies
- Assisting in the structure-based design of receptor selective ligands *(e.g. see Manas et al)*

How do they work?

Beads can be added "batchwise" to the crude protein extract and then packed into a glass column and unbound material eluted away by gravity flow. Alternatively, the beads can be pre-packed into a column and the crude receptor protein mixture applied to the column for purification. After elution of unbound material, the bound receptor is eluted by treating the beads with a solution of a ligand with comparable or greater affinity for the receptor. The final step is usually size exclusion chromatography to remove excess ligand from the protein.

FAQs

Q. *Can the beads be reused?*

A. Yes, see reference *Salman et al.* for a procedure for Nortestosterone Sepharose® bead. This procedure should also be applicable for the Dexamethasone Sepharose® bead. In the case of Estradiol and Androstan beads these can be cleaned by washing first with 4-6M urea in tris buffer (pH around 8) and then following the same procedure for Nortestosterone Sepharose®. All beads should be stored in 20% aqueous ethanol at 4-8°C until further use.

Q. *Why is carboxymethylation with iodoacetic acid sometimes performed before eluting the protein from the column?*

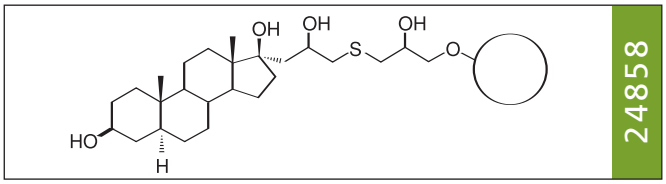
A. To derivatize exposed cysteines in the protein and prevent formation of cross-linked dimer artifacts. This is not necessary however if the protein is stored with a reducing agent. See reference, *Hegy et al.*

Q. *How much receptor can be bound to the bead?*

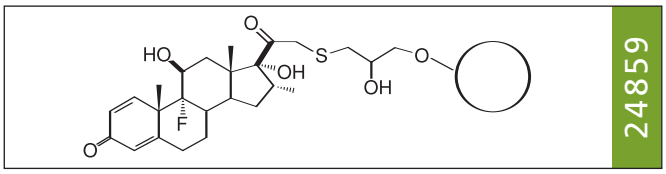
A. This depends upon the structure of the receptor of interest. As a guide, it is known that ~7mgs of ER (MW ~30,000) can be bound and eluted from 1.0 ml of the Estradiol Sepharose® beads.

Q. *How can non-specific binding of proteins to the beads be reduced?*

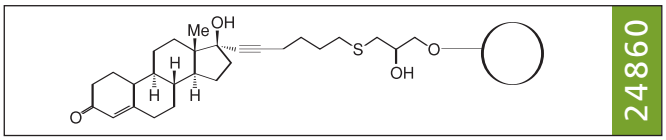
A. One option is to coat the bead with bovine serum albumin (BSA). Try both defatted and non-defatted BSA using a concentration of 0.1-0.2mg/ml in buffer for washing the bead. Finally, wash with buffer containing salt to remove unbound BSA. Another option for blocking non-specific binding which has been found to have worked well with the Dexamethasone Sepharose® beads *(personal communication, Dr. Andreas Schmid, Technical University of Munchen)* is to wash with buffer containing the detergent, Nonidet-P40 (5mM in PBS).



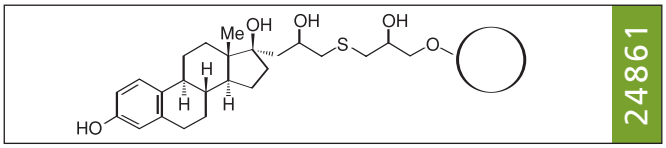
Androstan Sepharose® 6B Typical ligand loading 10-14 µmoles/ml bead.



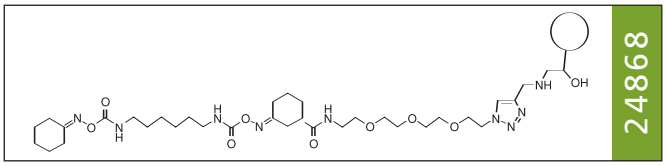
Dexamethasone Sepharose® 6B Typical ligand loading 10-14 µmoles/ml bead.



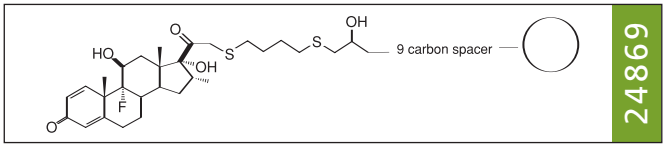
Nortestosterone Sepharose® 6B Typical ligand loading 10-14 µmoles/ml bead.



Estradiol Sepharose® 6B Typical ligand loading 10-14 µmoles/ml bead.



RHC-80267 (U-57908) Sepharose® 6B Typical ligand loading 12-15 µmoles/ml bead.



Long Spacer Arm Dexamethasone Sepharose® 6B
Typical ligand loading 10-14 µmoles/ml bead.

Cat. #	Description	Size
24858	Androstan Sepharose® 6B	1ml
24859	Dexamethasone Sepharose® 6B	1ml
24860	Nortestosterone Sepharose® 6B	1ml
24861	Estradiol Sepharose® 6B	1ml
24868	RHC-80267 (U-57908) Sepharose® 6B	1ml
24869	Long Spacer Arm Dexamethasone Sepharose® 6B	1ml

References:

Manas ES et al. Structure-based Design of Estrogen Receptor- Beta Selective Ligands. *J. Am. Chem. Soc.*, **126**, 15106-15119 (2004).
Salman M et al. A Progesterone Receptor Affinity Chromatography Reagent: 17α-Hexynyl Nortestosterone Sepharose®. *J Steroid Biochem.*, **26**, 3, 383-391(1987).
Hegy GB et al. Carboxymethylation of the human estrogen receptor ligand-binding domain-estradiol complex: HPLC/ ESMS peptide mapping shows that cysteine 447 does not react with iodoacetic acid. *Steroids*, **61**:367-373 (1996).

New Gold Nanoparticles for Nanotherapeutics and Nanodiagnostics from page 3

Gold nanoparticles are photostable, non toxic and easily conjugated to antibodies and or proteins. Laser energy in combination with gold nanoparticles has been successfully used in killing cancer cells. Selective PT tumor ablation has been demonstrated in animal models. By using a continuous wave near infrared laser, thermal energy may be targeted at nanoparticles that in turn target tumor growth and or proliferation with selective nanophotothermolysis of CA cells in real time. Other uses include PT antimicrobial therapy.

Biopharmaceutics

Nanoparticles can be used in drug applications and drug delivery systems as coatings and functional carriers. These materials include liposomes, polymers used as microscale particles that create capsules around drugs and permit timed drug release. As the drug diffuses through the encapsulation material or as the body breaks down polymers like polylactide and lactide-co-glycolide this improves diffusion and degradation to deliver controlled doses. Materials may also carry specific drugs that target damaged cells or cancer cells. They can also inhibit the immune response to certain events, like autoimmune disease or transplant therapy. Applications of nanomedicine also have the potential to cross the blood brain barrier and deliver medicine to patients suffering from Alzheimer's, ALS, Parkinson's, Huntington's and ophthalmic conditions like macular degeneration, diabetic retinopathy, glaucoma and retinitis pigmentosa.

Nanomedicine can be used to improve implantable materials for tissue repair and regeneration. Tissue such as bone and teeth may be replaced by biocompatible material to increase their adherence improving the lifespan of implants, decreasing rejection of the host and responding to environmental conditions and biochemical processes in the body.

In vivo, nanoparticles may be used as a monitoring mechanism by employing biosensors and microfluidics to monitor heart rhythm, pulse, blood pressure flow, glucose levels, body temperature, oxygenation and DNA tests as well as detecting pathological agents or toxins and to diagnose cancer.

Nanomedicine can employ implantable sensors that can be worn to provide continuous information of a patient, diagnose disease, transmit information, drug dispensing pumps, restore vision and hearing. They can monitor homeostatic conditions like temperature or pH and deliver appropriate physical chemical and pharmaceutical responses, such as monitoring diabetes blood sugar levels.

The motivation behind some of these technologies is to maximize the accumulation of nanoparticles for optimum delivery of drug therapy, imaging and for studies on toxicity. The concentration of the nanoparticles is monitored by light absorption, gel electrophoresis, FTIR and protein assays. Cellular uptake of these materials depends on both size and shape of the nanoparticle. For colloids, 50nm is the optimum size for cellular uptake. The uptake of shorter nanorods is higher in comparison to longer nanorods.

Polysciences, Inc. offers new gold nanoparticles suitable for use in many molecular labeling applications.

Gold nanoparticles are characterized by their size, shape and monodispersity, along with their surface reactivity. These properties are important in the fields of molecular labeling, particularly in diagnostics such as lateral flow, resonance light scattering (RLS), and surface enhanced Raman scattering (SERS).

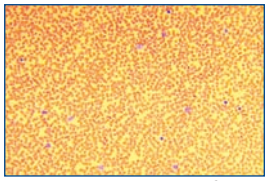
Cat. #	Description	Size
24870	Carboxyl PEGylated Gold Nanoparticles 15nm	1.25ml
24871	Carboxyl PEGylated Gold Nanoparticles 20nm	1.25ml
24872	Carboxyl PEGylated Gold Nanoparticles 30nm	1.25ml
24873	Streptavidin PEGylated Gold Nanoparticles 15nm	1.25ml
24874	Streptavidin PEGylated Gold Nanoparticles 20nm	1.25ml
24875	Streptavidin PEGylated Gold Nanoparticles 30nm	1.25ml
24876	Amino PEGylated Gold Nanoparticles 15nm	1.25ml
24877	Amino PEGylated Gold Nanoparticles 20nm	1.25ml
24878	Amino PEGylated Gold Nanoparticles 30nm	1.25ml
24879	Methyl PEGylated Gold Nanoparticles 15nm	1.25ml
24880	Methyl PEGylated Gold Nanoparticles 20nm	1.25ml
24881	Methyl PEGylated Gold Nanoparticles 30nm	1.25ml

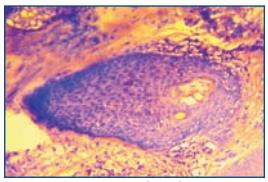
FLASH DIP FNA/H. PYLORI STAIN KIT = RAPID RESULTS

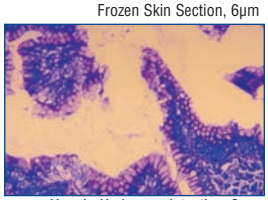
ADVANTAGES:

- Interpret results in 15 seconds
- Easy to visualize nuclear and cytoplasmic staining
- Differential stain designed to show metachromasia in most dermatopathology cells
- Optimal as a hematology stain
- Excellent cytological detail
- Consistent reliable results

- Fine Needle Aspirations
- Frozen Sections
- Blood Smears
- Cytological Specimens
- Cytopreps, Touch Preps
- Bone Marrow Biopsies
- Microorganism Detection


Blood Smears


Frozen Skin Section, 6µm


H. pylori in human intestine, 3µm

Photos courtesy of: Sakina Sadiq, HTI(ASCP), HTL(ASCP)

Cat. #	Description	Size
24606	Flash Dip FNA/H. Pylori Stain Kit	1 Kit

70107

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