

Painless Particles®

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A DIVISION OF POLYSCIENCES, INC.

B E A D S • A B O V E T H E R E S T™

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Holiday Greetings to all of you
from all of us at Bangs Labs.*



* And remember...microspheres from Bangs Laboratories make a great gift for any occasion!

Final Offer!

The Latex Course™ Book "Designing Microsphere-Based Tests and Assays"

This will be the last offering of the June 2002 Indianapolis Course book. This 500+ page course book was received by all attendees of our course. Hurry or you'll have to wait for our *next* Latex Course. For speakers, topics, biographies, and order information, please visit our website.

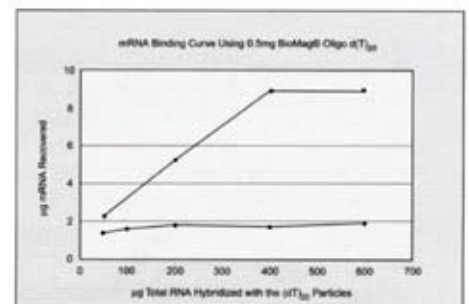
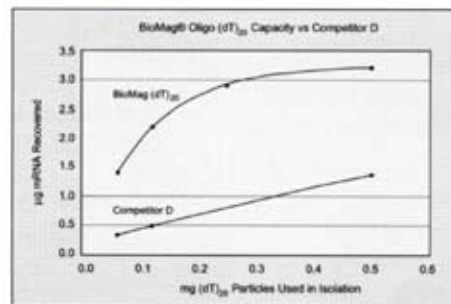
Freezin' Season is Here!

Note that as we head into winter in North America, we are taking precautions so that your orders don't freeze while in transit to you. This includes not shipping on Fridays – to avoid freezing conditions over the weekend. (So, please "bear" this in mind when you need something by a certain time.)

BioMag® Separation Solutions

We are pleased to announce that Bangs Laboratories now offers an extensive range of BioMag superparamagnetic particle products for biological separations. Our pre-coated particles and detailed protocols offer simplified solutions for the separation of cells, mRNA, and other biomolecules. Alternately, carboxyl and amine functionalized BioMag may be coated with capture molecules and utilized in specialized applications, such as solid phase immunoassays and nucleic acid assays.

BioMag are distinguished from other particle-based bioseparation products by their tremendous surface area, greater than 100 m² per gram of particles. This greater surface area translates into high binding capacities and enhanced separation performance, as illustrated by the data graphs presented below.



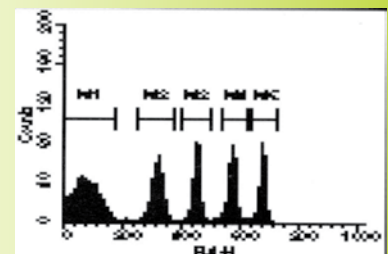
The BioMag Advantage: convenient, efficient, high-performance products. Turn the page for a summary of BioMag products and protocols, and visit our online Product Selection Guide to browse our complete line of superparamagnetic particles and separators.

Spring
2004

COMING ATTRACTION

Quantitative Flow Cytometry

Starring:
Quantum™ MESF APC Kit
QuickCal® v. 2.2



A Bangs Laboratories Production

Separation Anxiety

We can help with BioMag® particles and kits!

BioMag particles and kits offer a convenient and effective means for performing all sorts of biological separations. As the list below indicates, we have something for nearly everyone.

If you're going to pieces over cell separations, our anti-CD coated BioMag can help you pull yourself together!
Becoming unwound over mRNA purification? You'll be twirling with joy over our oligo (dT) BioMag particles!
Immunoprecipitation got you down? Our antibody-coated BioMag will surely lift your spirits!
Co-workers don't like you? Buy BioMag products from us, and we'll like you! (Kidding!! Of course we like you – or you wouldn't be receiving this smashing newsletter!)

Bangs Laboratories and BioMag – we're here for you!

Affinity Coatings:

Protein A or G, streptavidin, biotin

Secondary Antibodies:

Anti-Mouse IgG or IgM
Anti-Rat IgG or IgM
Anti-Human IgG or IgM
Anti-Rabbit IgG

Molecular Biology:

Oligo (dT)₂₀ or mRNA purification kit
Nuclease-free streptavidin

Anti-Human CD Markers:

CD2, CD3, CD4, CD8, CD11b, CD 14
CD16, CD19, CD34, CD45, CD56
CD71

Anti-Mouse CD Markers:

CD4, CD8, CD45R

T-Cell Enrichment Systems:

Human CD3+, CD4+, CD8+

Please contact us or visit our online Product Selection Guide for full product availability, including **magnetic separators**. If we don't have an ideal product for your application, our **immobilization starter kits** will allow you to coat BioMag particles with a molecule of



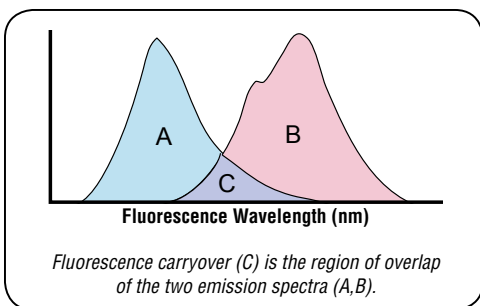
Please contact us with any questions or comments you may have. We also welcome inquiries regarding our custom coating services.

← **BioMag: the face only a parent (or researcher) could love!**
Please contact us or visit us online for more information regarding 1.5µm BioMag and 10µm iron oxide BioMag microparticles. **BEADS • ABOVE THE REST™**
(Cartoon reprinted with special permission from Sidney Harris <SHarris777@aol.com> and www.sciencecartoonsplus.com.)

Ask "The Particle Doctor"®

Q : What is compensation and why is correct compensation important?

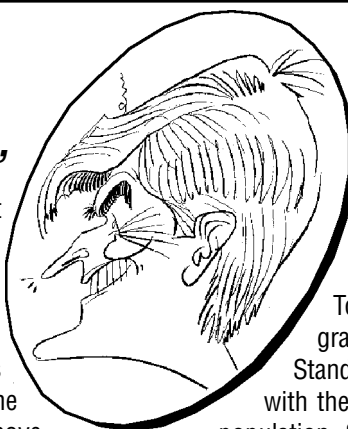
A : Flow cytometers are designed to have a primary detector for each fluorochrome label, e.g. FL1 - FITC, FL2 - PE, FL3 - Cy5, etc. Fluorescent signals emitted by fluorochromes can bleed or overlap into the secondary fluorescence detectors. In order to remove this overlap, the proper amount of signal must be subtracted from the secondary detector as a percentage of fluorescence intensity measured in the primary detector. This subtraction is performed by the electrical circuits prior to collecting sample data or by software when analyzing the list mode files. When the mean fluorescence of two populations of labeled standards are adjusted such that they have equal intensities in the secondary fluorescence detectors, then the data from the samples will be accurately compensated.



Q : What's the difference between the two compensation kits that you offer? Is there a way I can check to see if my instrument's compensation is correct?

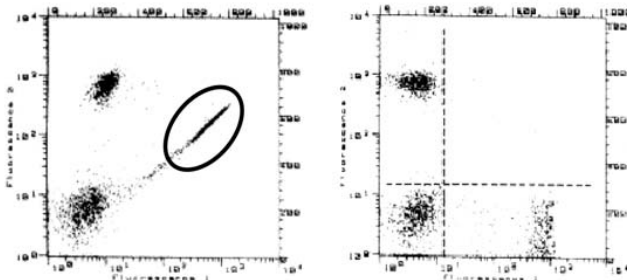
A : (Trying to sneak in a second question, huh?) We offer two products for color compensation of your cytometer. The **FITC/PE Compensation Standard** (Catalog Code 820) consists of four different bead populations: one labeled with FITC, one labeled with PE, one labeled with both FITC and PE, and an Autofluor™ population exhibiting a level of fluorescence similar to that of unstained cells. The beads come pre-labeled and ready to use. The product provides a simple means of setting two-color (FITC/PE) compensation.

The **Simply Cellular® Compensation Standard** (Catalog Code 550) consists of two populations of microspheres with goat anti-Mouse (GAM) IgG surfaces. The two populations have the ability to bind different amounts of mouse monoclonal IgG antibody. The user stains these beads with their fluorescently-conjugated mouse monoclonal antibody. The resulting stained beads exhibit "dim" and "bright" levels of fluorescence. One drop of beads is stained for each



fluorescent antibody, which may then be analyzed together on the cytometer.

To address your second question, take a look at the graphics. These are dot plots of the FITC/PE Compensation Standard. The one on the left was acquired on a BD FACScan with the compensation circuits turned off. (Note the circled population. See how the fluorescence carry-over from the FITC makes the FITC bead pull away from the axis and appear to have some PE fluorescence?) The dot plot on the right was acquired on the same instrument after the compensation was set.



Q : I'm planning the development of an immunoassay using BioMag, but I've never worked with the particles before. Where do I begin?

A : You might consider working with one of our **BioMag® immobilization kits**. These include most of the things that you'll need to get started, such as **BioMag®** particles, chemical crosslinkers, buffers and, in some instances, a reaction vessel and magnetic separator. You will also be supplied with a detailed protocol providing step-by-step instructions for coupling the biomolecule of choice to the particles, and for determining coupling efficiency.

Once you have exhausted the supply of reagents provided with the kit, you may buy the components on an individual basis.



Mail Bonding

(Subscribers "do the 'write' thing!")

❖ "Firstly, I would like to commend Bangs Labs on its fantastic website – it makes a nice change to not only be able to readily find lots of relevant information on a scientific website, but also the humour and informal attitude is very much appreciated." (BS, Imperial College London)

"The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them." –Sir William Bragg

Technical References – See our website (www.bangslabs.com) for "downloadable" TechNotes and Product Data Sheets or ask for copies by mail or fax. We continually update and add new TechNotes and Product Data Sheets to our website.

Product-Specific TechNotes:

101. **ProActive® Microspheres** – Handling tips plus protocols for streptavidin, Protein A, and goat anti-Mouse coated microspheres.
102. **Magnetic Microparticles** – Characteristics, handling tips, and applications for superparamagnetic particles.
103. **Fluorescent/Dyed Microspheres** – Applications, fluorescence spectra, and product descriptions. Plus QuantumPlex™ microspheres for multiplexing, flow cytometry, and confocal microscope standards.
104. **Silica Microspheres** – For immunoassays, nucleic acid capture, velocimetry (LDV, PIV), flat panel display spacers, and others.
105. **Microsphere Size Standards** – Beads for cell size estimation, filter challenge, and instrument checks and calibrations. NIST-traceable standards from 0.27µm to 25µm.
106. **Confocal Standards** – Using our three, bright, single-label 60nm fluorescent beads in confocal microscopy.

Handling-Specific TechNotes:

201. **Working with Microspheres** – Choosing, cleaning, characterizing, coating beads, etc.
202. **Microsphere Aggregation** – Preventing, detecting, and reversing aggregation. Chemicals and equipment sources.
203. **Washing Microspheres** – Variety of methods for cleaning microspheres; advantages/disadvantages of methods; suppliers of equipment.
204. **Adsorption to Microspheres** – Adsorbing protein onto particles; use of "surface diluents" (blockers); recipes and references.
205. **Covalent Coupling** – Chemical attachment of proteins, nucleic acids, etc. to various types of surface-functionalized microspheres; recipes for buffers, blockers; miscellaneous coupling ideas, vendor information, and references.
206. **Equations** – For calculating particles/mL, area/g, "parking area", settling velocity @ 1G and in centrifuge, etc.
208. **Microsphere Sizing** – Various manual and automated methods are described and discussed, with references and supplier list.

Application-Specific TechNotes:

301. **Immunological Applications** – Review of commercial applications of microspheres.
302. **Molecular Biology** – Overview of purification and solid phase separation methods.
303. **Lateral Flow Tests** – Putting dyed particles on membranes so they will move properly.
304. **Light-Scattering Assays** – Turbidimetric and nephelometric applications of microspheres.

Reprints:

402. **Microspheres, part 1: Selection, cleaning, and characterization, and part 2: Ligand attachment and test formulation** – LB Bangs & Mary Meza, *IVD Technology (in Medical Device & Diagnostic Industry)*, **17**, #3, 18-26, March, and #4, 20-26, April, 1995. (Note that you can download these papers at the IVDT website: www.devicelink.com/ivdt/archive/95/03/009.html and [.../95/04/006.html](http://www.devicelink.com/ivdt/archive/95/04/006.html)).
403. **New Developments in Particle-Based Immunoassays** – Leigh B. Bangs, *Pure & Appl. Chem.*, **68**, #10, 1873-1879 (1996). Review of 40 years of diagnostic uses of microspheres – from LATs to biosensors.
405. **Applications of Magnetic Particles in Immunoassays** – Mary Meza, Ch. 22 (pp. 303-309) in *Scientific and Clinical Applications of Magnetic Carriers*, U. Häfeli, *et al*, Eds., Plenum Press, New York, 1997.
406. **Measuring Microsphere Binding Capacity** – JM Duffy, JV Wall, MB Meza, LJ Jenki, *IVD Technology*, **4**, #7, 28-34 (1988). (No reprints are available; you can download from our website.)
407. **Bead-based HTS Applications in Drug Discovery** – MB Meza, *Drug Discovery Today: HTS Supplement*, **1**, #1, 38-41 (2000).

Flow Cytometry Standards? See the "flow" portion of our website for lots of technical information about flow cytometry standardization in general and our expanding line of flow cytometry standards products in particular.

NEWEST TECHNICAL INFO AVAILABLE ON WEBSITE:

We now have more than 45 Technical Data Sheets available in support of our more than 50 new **BioMag®** products. Feel free to browse!

BLI Presentations and References See our website for copies of the latest public presentations by the technical people at BLI and for publications that cite use of Bangs Beads or were authored by BLI personnel.

If you aren't able to locate answers to your microsphere application or handling/use questions (within our TechNotes, Product Data Sheets, FAQs, References, or Product Brochures), we invite you to call us directly, or to contact "The Particle Doctor®" through our website.