Painless Particles®

Global Newsletter
Volume 20, #2, July 2007

Bangs Laboratories, Inc.
A DIVISION OF POLYSCIENCES, INC.

BEADS ● ABOVE THE REST™

In This Issue

Bargain Beads

See our online list of regular Bangs beads for special prices on end-of-run, "close-outs," or left-over lots. Many sizes, colors, and surface modifications are available.

On The Road Again!

AACC
July 15-19, 2007
San Diego, CA
Booth 1148
www.aacc.org

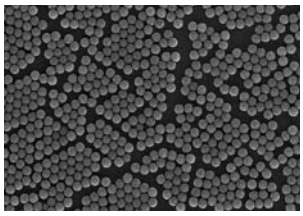
GLIIFCA
September 28-30, 2007
Windsor, Canada
Booth TBA
www.gliifca.org

CCS
October 7-9, 2007
Washington, D.C.
Booth 212
www.cytometry.org.

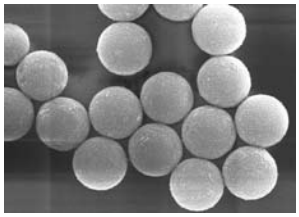
Magnetic Microspheres³:

Decisions, decisions, decisions...

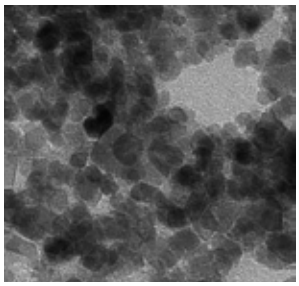
With the recent expansion of our catalog, Bangs Laboratories now offers three superparamagnetic particles lines to support applications in the life sciences. Impressive? Absolutely. Dazzling? We think so. Confusing? Maybe just a little, though we'll try to clarify things a bit right now....



ProMag™, the newest addition to our magnetic microspheres product line, support diagnostic applications that require highly uniform, high-binding beads and fast separation times. ProMag have a proprietary surface to reduce nonspecific binding in protein-based systems and they offer superior handling without the use of surfactant. For our OEM customers, ProMag will offer superior performance throughout the assay development process and in your customers' hands.



As highly uniform microspheres in diameters of 3, 6, and 8µm, **COMPEL™** are ideal for applications in flow cytometry. The beads contain a highly optimized amount of magnetite to minimize settling during incubation steps, while ensuring rapid separation times. The polymer matrix is conducive to dyeing, and standard red and green fluorescent versions are available. In fact, we like to dye them so well that we used them to develop QuantumPlex™M, our magnetic bead platform for suspension arrays.



With their tremendous surface area, **BioMag®** particles are ideal for conducting bioseparations from a range of samples. The higher density of BioMag allows them to perform even in difficult (e.g., highly viscous or complex) samples that can be problematic for polymer microspheres. A variety of surfaces are available, including secondary antibodies, protein A or G, anti-CD markers, and oligo dT, as well as functionalized versions for fully customized coatings.

Our three lines of superparamagnetic microparticles allow us to uniquely address a range of applications in the life sciences, and we welcome customer calls to discuss how we can meet your specific requirements.

For ordering information for any of these products, please see the enclosed Product Selection Guide.

Wait! We're Not Done Yet!

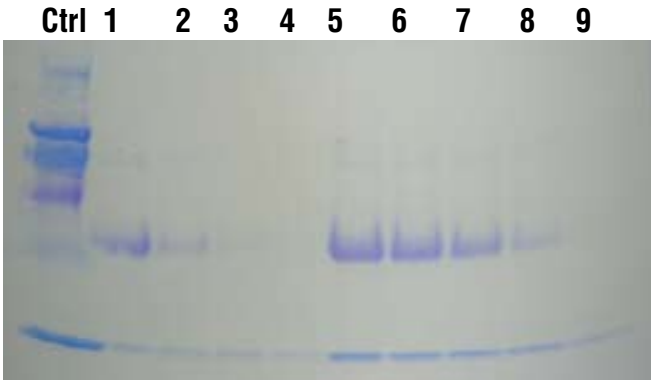
Introducing BioMag®Plus Wheat Germ Agglutinin

The unique saccharide-binding properties of plant lectins such as wheat germ agglutinin (WGA) have made them useful for study of glycosylated proteins. Lectins have additionally been used in cell adhesion studies, to effect lymphocyte activation, and to explore carbohydrate-based therapeutics.

Our new WGA-coated BioMag®Plus microparticles provide a convenient means for isolating N-acetylglucosamine-containing glycoproteins from cell lysate, or to explore other lectin/glycan-mediated processes. The BioMagPlus magnetic particle format provides high surface area, and permits easy and efficient separations.

Catalog Code	Product Description
BM530	**BioMag®Plus Wheat Germ Agglutinin**

BioMag®Plus Wheat Germ Agglutinin



4-20% Tris Glycine SDS-PAGE gel electrophoresis gels displaying staining of eluted tryspin inhibitor (Lanes 5, 6, 7, 8, and 9) using different volumes of BioMag®Plus WGA particles (1mL, 0.75mL, 0.5mL, 0.25mL, and 0.1mL). Lanes numbered 1, 2, 3, and 4 are titrated tryspin inhibitor control samples.

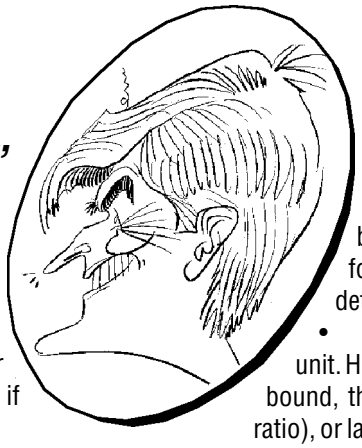
Cartoon reprinted with special permission from Sidney Harris <SHarris777@aol.com> and www.sciencecartoonsplus.com.

Mail Bonding

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

- *By the way, I feel obliged to make the following observation: I did not start off my original message with praise to prompt your, ahem, prompt response. I truly like your products, but equally importantly, my interaction with Bangs Labs tech and customer support has been the most positive of all my experiences with any scientific supplier. Thank you for doing such a great job. O.A., CA*
- *I wish everything was as straightforward as this. Cheers for your help! J.W., UK*
- *I have always been pleased with the products and support I have received from Bangs in the past and I look forward to continuing to work with all of you. T.F., MA*

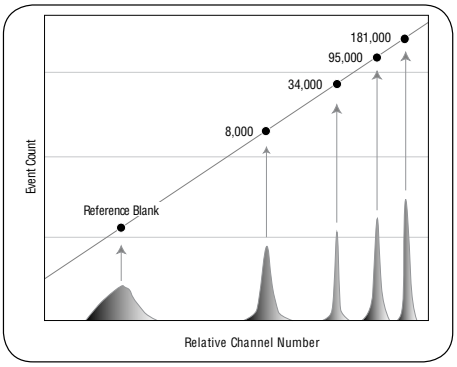
Ask *"The Particle Doctor®"*



Q: I am gathering information on ZAP-70 staining of CCL samples and would like information on which quantification product to select. I have spoken to other labs using ABC binding beads that they are staining with ZAP-70 antibody. Is this preferable over a particle using MESF? What advantages are there, if any, of one over the other?

A: Both **Quantum™ MESF** and **Quantum™ Simply Cellular® (QSC)** kits would be suitable for use, although there are some differences that may lead you to prefer one approach over the other.

Beginning with similarities, both kits include five bead populations: one blank and four populations labeled with increasing amounts of fluorophore (MESF) or antibody (QSC, calibrated in terms of their Antibody Binding Capacity [ABC]). The MESF beads are run as-is; the QSC beads are labeled with the same antibody that is used to stain cells. The fluorochrome-labeled microspheres are run on the cytometer at the same instrument settings as cells. Their channel values are then used to generate a standard curve relating fluorescence intensity to standardized MESF or ABC values from the beads. The MESF or ABC values of the labeled cell samples may be determined by measuring their fluorescence intensities, and "reading" the corresponding MESF or ABC values from the standard curve using the QuickCal® analysis template that is provided with the kit.



Some differences are as follows:

Quantum™ MESF

- Kits are available in FITC, PE, PE-Cy™5 and APC versions.
- Prelabeled beads are very convenient to use, and are not subject to the same variation that could be introduced through staining (different technicians, antibody lots, etc.).
- There is no mAb consumed to stain the beads.
- Quantum MESF kits are not limited to antibody-based systems. For example, they have been used for DNA-based applications, such as telomere length determination.
- The MESF unit is a standard fluorescence intensity unit. However, if you wish to report the number of antibodies bound, the effective Fluorophore:Protein ratio (effective F/P ratio), or labeling density of the antibody conjugate, would need to be determined. This may be accomplished by staining our single population **Simply Cellular** product (calibrated in terms of ABC) with the antibody conjugate, and determining its MESF value by running it against the appropriate MESF kit. The MESF value is then divided by the ABC value to obtain the effective F/P ratio of the conjugate.

Quantum™ Simply Cellular®

- Kits are available in anti-Mouse, anti-Rat and anti-Human versions, for use with mouse, rat, and human monoclonals, respectively.
- Beads are calibrated in terms of ABC. For cellular analyses, if you presume monovalent binding of antibody to the cell surface receptor, then ABC (# antibodies bound) = marker density. This circumvents the need to determine the effective Fluorophore: Protein ratio of the conjugate.
- Antibody conjugates with any type of fluorescent label may be used, including less-standard fluorochromes and quantum dots.
- Beads are labeled by the user with the same antibodies that are used to stain cells. This presents the benefit of having the identical conjugate on beads and cells. Please note that it is advisable to titrate the antibody conjugate to ensure that the beads are stained at saturation, and it is imperative that standardized staining protocols are used to ensure consistency of results.

Catalog Code	Description
824	**Quantum™ FITC (low level)**
824p	**Quantum™ FITC (low level) premixed**
825	**Quantum™ FITC (high level)**
825p	**Quantum™ FITC (high level) premixed**
826	**Quantum™ FITC (medium level)**
826p	**Quantum™ FITC (medium level) premixed**
827	**Quantum™ R-PE**
828	**Quantum™ PE-Cy™5**
823	**Quantum™ APC**
815	**Quantum™ Simply Cellular® anti-Mouse IgG**
816	**Quantum™ Simply Cellular® anti-Human IgG**
817	**Quantum™ Simply Cellular® anti-Rat IgG**

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"You cannot have science without measurement." – Richard Wesley Hamming

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 steptavidin, 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).
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 Jenski, *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.

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.