

Painless Particles®

Global Newsletter
Volume 14, #4, September 2001



A DIVISION OF POLYSCIENCES, INC.

B E A D S ● A B O V E T H E R E S T™

● In This Issue

AACC July 31-Aug. 2-a Slumber Party? . 1
Flow Cytometry Back-to-School Sale! ... 1
"On the Road Again!"..... 1
The Latex Course™ 2001 Book 2
Diagnostic Consultant..... 2
The Bangs Gang..... 2
Recent Presentations 2
Ask "The Particle Doctor®" 3
Mail Bonding ("Do the 'write' thing!") ... 3
Technical References and TechNotes.... 4

ISO-9002 Certification



BLI has been certified by TRA Certification as having a Registered Quality System-ISO 9002.

Voice Your Opinion on our Voicemail

We recently installed a new voicemail system to help handle your calls. We are still learning about all its possibilities and would *really* appreciate any comments and helpful suggestions for improvements. Please call or write Teresa (teresa@bangslabs.com).

WWandering on the WWWeb?

If you are *wwwondering* or *wwworrying* about the *www weird*, *wwwonderful* *wwworld* of microspheres or particles, check for information at our *new* (since February) *www*website at www.bangslabs.com.

Bargain

Bangs ^ Beads

See our online list for regular BLI beads (at www.bangslabs.com/products/bangs/guide.php) for special prices on small quantities of end-of-run, "close-outs," or left-over lots of our microspheres – all sizes, colors, and "flavors" – flow beads, too!

AACC July 31-August 2 - a Slumber Party?

It was so close to our Indianapolis home that we encouraged all employees (research, production, QC, technical service, and customer service) to make the trek to Chicago to see the biggest show in our industry and to meet customers and folks we do business with. Some of the ladies even had a slumber party (4 to a room) – the result of so many X-chromosomes working here! (*We heard about card playing in the evening, but there was no word as to how much sleep they got!*)

Ask for copies of Nathan Foushee's talk for the OEM Lecture Series, "QuantumPlex™ Beads Provide the Ideal Platform for a Variety of Multiplexing Applications." It was well received. (*OK, he didn't get a standing ovation, but nobody laughed out loud or got up and left in the middle.*)

Flow Cytometry Back-to-School Sale!

(*Since he survived his AACC ordeal [see above], we asked Nathan to write some more.*)

It's back to school time again, and you're probably planning your experiments – you know, those experiments the grant committee thought you had already planned! And, maybe you're stocking up on all those supplies you'll need for a year of fruitful research. We realize that the shiny new lunch box you've had your eye on wasn't in the budget, so we've decided to have a Back-to-School sale!

**Save 5% on any flow cytometry order over \$500 or
Save 10% on any flow cytometry order over \$1000**

Simply order from Bangs Labs' line of flow cytometry products (any items shown on the flow cytometry product pages enclosed) before October 31, 2001, and mention this offer at the time of order placement. You'll receive a 5% discount, if your order exceeds \$500, or a 10% discount if your order is over \$1000.* With the money you save, you can buy that new lunch box, and possibly have enough left over for lunch! (Or at least a cup of Java!)

* Note: Our lawyer made us stick in these weasel words: **Discount applies to single shipments totalling over \$500. Discounts cannot be combined with other offers or discounts.** You know why they call them weasel words, don't you?

"On the Road Again!"

Here is the BLI meeting/show schedule for the rest of 2001:

- **SBS, September 10-13, Baltimore, Booth 826**
- **American Society of Human Genetics, October 12-16, San Diego, Booth 318**
- **TIGR (Int'l Genome Sequencing/Analysis Conf.), October 25-28, San Diego, Booth 421**
- **Society for Neuroscience, November 10-15, San Diego, Booth 2918**
- **Clinical Cytometry Society, November 11-13, Orlando, (Booth not yet assigned.)**
- **American Society of Hematology, December 7-11, Orlando, Booth 277**

If you are attending any of these conferences, please stop by our booth to swap news with us. *Maybe we'll just get an apartment in San Diego for the month we'll be there!*

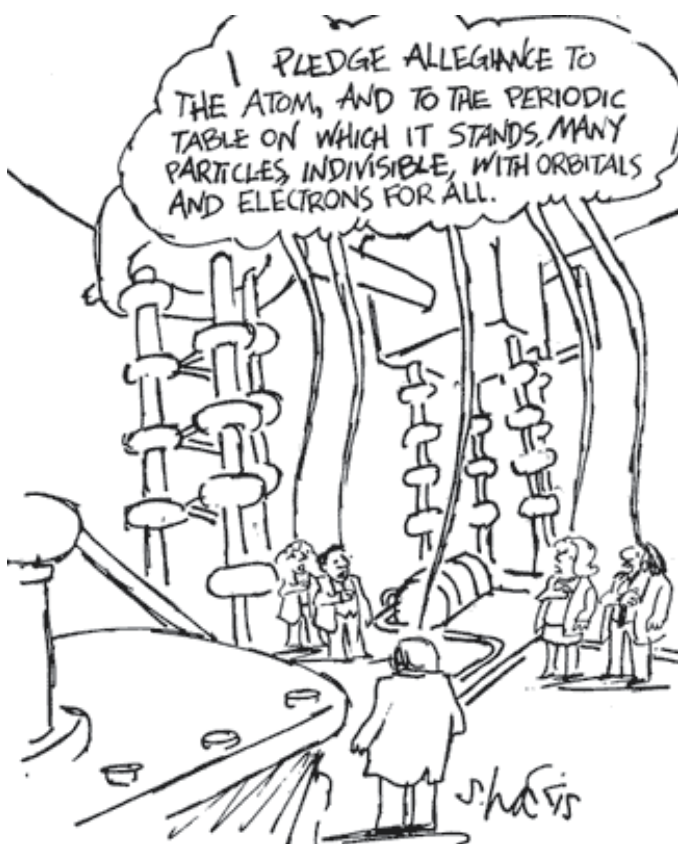
The Latex Course™ 2001 Book

Few Copies Left: Were you interested in our annual course (last given in May 2001 in San Diego), or maybe you just want the book from the course? We still have a few copies of the >500 page course book, "*Designing Microsphere-Based Tests and Assays*," which you can purchase for \$350 + shipping. For details of speakers, their biographies, and topics, see our website at www.bangslabs.com/support/latex.php and ask about purchase details.



Diagnostic Consultant

Our good friend and co-organizer of The Latex Course, Dr. Geoffrey Seaman is available for consulting work in the area of diagnostic test development and trouble shooting. He has recent experience in strip test development and writing SBIR grant proposals. Please contact him directly at 541-686-5989 (Fax: 541-431-0658).



The Bangs Gang

More News of our Employees

Gina Hoover was warmly welcomed into the Materials Department in June as our shipping technician, responsible for the daily dispensing and packaging of our microspheres. She also purchases all of our lab supplies. We are so glad to have her on board and expect to keep her busy as the company grows and orders continue to increase in number and items per order.

Ming Peng joined the Bangs Team in July with a strong accounting background. She is taking care of all of our accounting functions. A tangible asset to the company, she is already making an impact.

Denise Beemster: We are happy and proud to announce her promotion to Materials Manager. Since joining us in February, she has already proven to be a very valuable employee and has made numerous improvements in our methods of operation.

Robert Anglea: Bob joined the Bangs crew in August as our QA/QC Technician, a position created just for him. He has lots of ISO experience and is responsible for updating and maintaining our ISO program, the daily QC testing of all our products, and the operational checks on our instruments. Bob has a pivotal role on the Bangs team, as he continually makes sure we are compliant and well-regulated – a busy guy!

Kyle Kimble: "The New(est) Guy," he also joined us in August to manufacture our in-house products. He comes to us from Indiana University with a M.S. in Analytical Chemistry. Kyle's background will nicely balance the strong biology backgrounds of our other scientists.



Recent BLI Presentations

- ❖ **QuantumPlex™ Beads Provide the Ideal Platform for a Variety of Multiplexing Applications** – N Foushee, 2001 AACC OEM Lecture Slides, August 1, 2001.
- ❖ **Microsphere Characterization for Rapid Test Development**– M Meza, Diagnostic Support 2001, Chicago, April 24-25, 2001.
- ❖ **ProActive® Streptavidin Coated Microspheres and their Binding Capacity for Biotin and Biotinylated Oligonucleotides**– K Turner, 2000 AACC OEM Lecture Slides, July 26, 2000.

See also our recently up-dated listing of articles citing use of Bangs beads (www.bangslabs.com).

← **And we at Bangs Labs pledge allegiance to providing you with the best particles or microsphere products and services in the world!** Please challenge us to fulfill that pledge. Just ask us! (Cartoon reprinted with special permission from Sidney Harris.)

Ask "The Particle Doctor"®

Measuring Beads

Q : Can you please advise how to use our new HIAC / Royco instrument to measure your microspheres?

A : *What's the matter? Don't you trust our numbers?*

We use an Accusizer 770 (Particle Sizing Systems), which depends upon the same methodology, i.e. photozone method, as the HIAC/Royco. It is at its best with very dilute samples. For the Accusizer 770, we use ~100-500 microspheres/mL. (*Note: We used much more dilute suspensions than the manufacturer recommends.*) The use of dilute suspensions lowers coincidence (multiple particles in the chamber) for instruments that are intended to measure single particles, thereby ensuring more accurate results.

Once you have had an opportunity to review the user manual for your instrument, and perhaps speak with Particle Technology Laboratories in Chicago (our expert guide in this area), please feel free to contact us for the selection of standards that are suitable for your instrument.

Beads "out on a limb" in Antarctica?

Q : I want to send some microspheres to a colleague in Spain for a limnology project in Antarctica. Can they withstand 3-4 days without refrigeration?

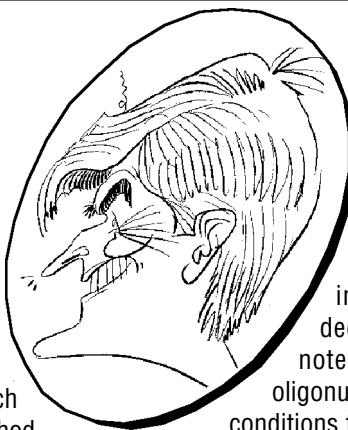
A : The short answer is "Yes, but..." The longer answer is, "It depends." And the more correct and complete answer is that to minimize any microbial growth, we always recommend that beads be stored refrigerated (at 2-8°C), in conjunction with the use of preservatives, such as sodium azide or merthiolate. Room temperature storage is acceptable, too. If uncoated beads are stored properly and handled by aseptic techniques, they should have a shelf-life of more than 5 years. Anyway, it should be possible to ship from the US to Spain without refrigeration, but you could add some ice to the package to ensure cooler travel.

In Antarctica's harsh climate, the bigger hazard will be freeze damage to the beads. Plain, singly-dispersed beads can be turned into badly clumped beads resembling cottage cheese if they are frozen. *So, don't sweat the bugs down there, but do guard against freezing!*

ProActive™ SA-Beads: Best Buffer for Biotin Binding?

Q : What's the best way to optimize binding of biotinylated oligos to your streptavidin-coated beads, while minimizing NSB?

A : A customer recently advised us about his use of a bicarbonate buffer for the binding of biotinylated oligonucleotides to our SA-coated microspheres, which (in his hands) effectively eliminated NSB (nonspecific binding). For buffer and binding conditions, see Bianco, P.R., L.R. Brewer, et al. 2001. Processive translocation and DNA



unwinding by individual RecBCD enzyme molecules. *Nature*, 409: 374-378. Many thanks to Piero Bianco for his help.

Other conditions that have been said to reduce nonspecific binding include increased salt concentration, increased pH, decreased probe concentration (or decreased streptavidin binding on the bead). Please note that we do not routinely work with (biotinylated) oligonucleotides in house, and thus have not optimized binding conditions for such. Call us for a list of seven other references we found on this topic – with PubMed ID numbers. KT

PEG-Coated Beads to Prevent Protein Adsorption

Q : How do I attach PEG to microspheres to deter/prevent adsorption of cytoplasmic extracts or other protein adsorption?

A : There appear to be several articles in the literature about attaching PEG via covalent coupling or adsorption to inhibit protein adsorption. Here are two articles that might be of particular interest:

- Satulovsky, J., M.A. Cargnano, I. Szleifer. 2000. Kinetic and thermodynamic control of protein adsorption. *PNAS*, 97(16): 9037-9041.
- Szleifer, I., J. Satulovsky. 1999. Kinetic and thermodynamic control of protein adsorption by grafted polymer layers. *Polymer Preprints-America*, 40(2):89-90. (Some of their work pertains directly to the attachment of PEG to surfaces to prevent protein adsorption; if these articles are not of direct relevance to your work, their 'references' sections may prove to be helpful.)

Note that both of these articles are available for purchase through www.thescientificworld.com.



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

- ❖ "The >45% higher reactivity of your P(S/MAA) microspheres vs. [competitor's] beads allowed us to make a sale with an important Asian customer, due to reduced reagent cost." (Anon.) Thanks for the good news. Uh, perhaps we should raise our prices?
- ❖ "Thanks for the package of info I just received. It was fascinating to read. Especially coating protocols and anti-flocculation tips. And plenty more ideas for new assays." (RB, Netherlands)
- ❖ "Excellent site, information...etc.!!" (DS, Loughborough, UK)
- ❖ "I always enjoy reading your newsletter: information with a smile! I also picked some info (pdf-files) from your website. With all of your recent acquisitions and cooperations, BLI has become my 'one-stop shopping' place for particles." (TB, Netherlands) Keep coming back!

"Duct tape is like 'The Force'; it has a light side and a dark side; and it holds the universe together."

– Anonymous

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. Includes confocal microscopy standards.
104. **Silica Microspheres** – For immunoassays, nucleic acid capture, velocimetry (LDV, PIV), flat panel display spacers, and others.
105. **Microsphere Size Standards** – Data for 9 sizes (0.2-20µm), available singly or in kits, with certificates of analysis.
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.

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.

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:

401. **Estapor® "Microspheres" Booklet** – 1995 revision: Information on fluorescents, encapsulated and narrow magnetics, nanoparticles (<50nm), NIST-traceable standards; many handling tips; >60 references.
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 Janski, *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).

BLI Presentations See our website for copies of the latest public presentations by the technical people at BLI.

Ask us for help to find... cleaning equipment, big beads, slides, membranes for strip tests, etc. (Or see the "Hot Links" page at our website.)

Free Literature for you! What information do *you* need? We freely share our library: >1000 papers about microspheres, cross referenced, so we can search for types of particles, coupling methods, uses, author, etc. New papers are added as we get them.
Help from you? Please tell *us* about good papers which we should have as you find them. And please send us any good bead art that you find – photos, drawings, etc. showing microspheres or their applications.