

Inside: The Society's 2006 Award Winners

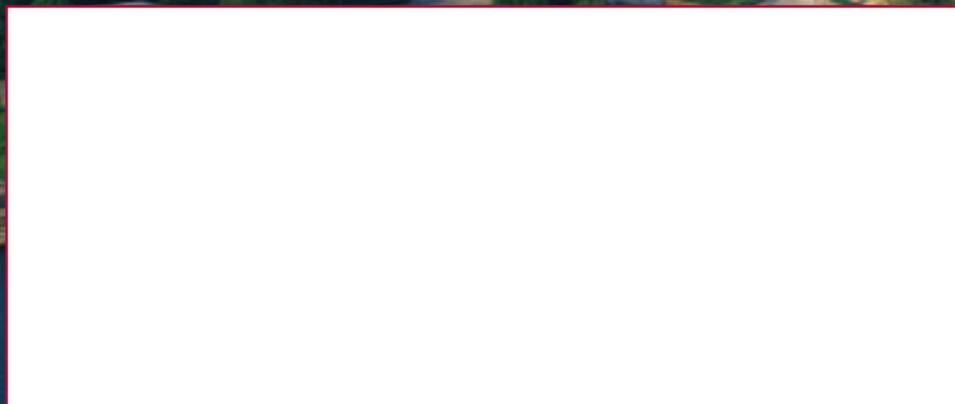
BIOMATERIALS FORUM



Second Quarter 2006 • Volume 28, Issue 2

Annual Meeting Program Highlights

Improved Dental Composites
Using Dibenzylidene



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BIOMATERIALS FORUM



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 The Society For Biomaterials announces the 2006 winners of its annual awards.

- 9 **Remembrances of and Reflections on the Early Society For Biomaterials and International Meetings**
 Former SFB President Samuel Hulbert recalls the times when Society meetings were like a large family reunion. Almost everyone knew everyone else in attendance, and if there was someone an attendee didn't know, most participants made a point to introduce themselves.

- 14 **Improved Dental Composites Utilizing Dibenzylidene**
 Dibenzylidene sorbitol (DBS) is a sugar derivative that is capable of self-organizing into a 3-D nanofibrillar network at relatively low concentrations in a wide variety of organic solvents and polymer melts to induce physical gelation. This research was aimed at determining the effect of DBS networks on vinyl conversion, polymerization shrinkage, and mechanical strength of bioactive dental composites containing zirconyl-modified amorphous calcium phosphate (Zr-ACP) and a polymer matrix derived from the photopolymerization of ethoxylated bisphenol-A dimethacrylate (EBPADMA).



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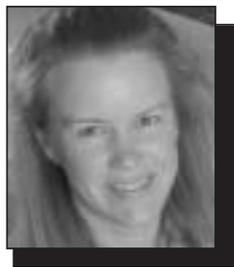
Biomaterials Community

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From the Editor

The Torch

By Karen J.L. Burg



As you prepare to travel to the 2006 SFB Annual Meeting, what are your expectations and goals, i.e., what do you expect to gain from, and what do you plan to add, to the meeting?

This year brings new and continued focus on technology translation and innovation, where translation may refer to technology moving from a

laboratory, through the hands of industrial partners, to a clinical setting. Or, it may refer to technology transfer via a student transitioning from a classroom/laboratory learning environment to a place of employment. Examples of translation-relevant events at this year's meeting include the industrial and clinical panel discussions. The former will highlight small business start-up challenges, with particular emphasis on faculty and student entrepreneurs. The latter will feature clinicians, who will discuss their experiences, good and bad, with biomaterials as well as the many opportunities. The Past Presidents of SFB will lead a tutorial on the impact of biomaterials in biology and medicine, mistakes made, the lessons learned, and the "opportunities" produced from the mistakes. Our SFB student national chapter has done a tremendous job in organizing opportunities for student professional development, including a workshop devoted to grant proposal preparation, career selection, and interview skill development. Biomaterials education will be addressed in a session devoted to innovative teaching techniques – we live in

a technology-rich world that provides our teaching toolboxes with new and interesting benefits as well as frustrating challenges. How can we leverage these new and innovative techniques to improve technology translation?

The Annual Meeting also features joint sessions with the 2006 Regenerate World Congress, highlighting cellular systems and technologies, from the "traditional" reparative devices to the evolving ex vivo tissue discovery systems. I firmly believe innovation lies at the boundary of disciplines. The Annual Meeting provides an amazing opportunity to learn something new from a different discipline or to meet a new colleague who has a very different technical perspective from your own. I challenge each of you, at this year's meeting, to speak to someone who you don't know or to attend a session that does not feature research from your own area of expertise. You may be surprised by the positive returns. The Annual Meeting is your meeting – enjoy this year's events, but please think about how you might serve to add a new dimension to future meetings. This issue of the Forum highlights the reflections of Dr. Samuel Hulbert, SFB's second President and co-founder. As we see the Society through his eyes, let us consider how we might inspire the next generation of educators and researchers.

I look forward to seeing you in Pittsburgh!

Karen J.L. Burg
Hunter Endowed Chair & Professor of Bioengineering
Clemson University

From the President

The Torch

By Michael V. Sefton



You Do The Math

You do the math: \$60 per member x 1,000 members = a very limited society.

If we didn't have the *Journal of Biomedical Materials Research* (royalty

income) and an Annual Meeting (sponsorship and exhibitor income), SFB wouldn't have any substantive existence. Remembering that we have only three meetings every four years, our existence gets pretty precarious in world congress years. (Yes, I know your dues are greater than \$60/year, but the remainder goes directly to Wiley to pay for your journal subscription.)

So it should come as no great surprise that SFB (and especially its treasurer) gets very anxious each time we have an Annual Meeting. The meeting is our single most important opportunity to influence our bottom line. It is also the single biggest reason to be a member of SFB and our single biggest "value" we deliver to the community.

You ought to be reading this brief message on your way to Pittsburgh or while you are at the meeting. So this is a good

opportunity for you to reflect on why you have come again to this meeting (or why perhaps you have chosen to skip it this year). What is good about SFB meetings (whatever happened to the Bash?) and what needs improvement (how many more times do I have to hear about _____ [insert your own pet peeve]). As is discussed elsewhere in this issue, the Annual Meeting is a prime target of the strategic planning effort that is going on behind the scenes. (BTW – volunteers are very welcome). Feel free to share your thoughts with me or anyone on Council.

In closing, I wish to take the opportunity to thank all of you for the opportunity to be your President this past year. It has been a very pleasurable experience and one that I will remember for many years to come – aided of course by SFB rules that dictate that I am part of Council for the next few years. I also want to thank John Kao for the huge responsibility of organizing the Pittsburgh meeting, Anne Meyer for the advice she gave me during the past year, and the great work done by all the members of Council – having a good team makes it easy to have a successful year. And finally, thanks to Vicky, Dan and the Association Headquarters group for all the work behind the scenes.

Staff Updates from Headquarters

The Torch

By Dan Lemyre,
Assistant Executive Director

Hello from the Society For Biomaterials headquarters! By providing a regular update of staff and membership activities, it is our sincere wish that all of the Society's members stay abreast of current Society activities, and we encourage more members to take an active role in the Society For Biomaterials!

This quarter, headquarters staff has been active in their support of the following committee activities:

Awards Ceremonies and Nominations Committee – The election of the 2006-2007 President-Elect and Member-at-Large are underway as of this writing, and the results of the election will be announced at the annual business meeting, which will be held Friday, April 28, from 10:45 a.m. to 11:45 a.m. The 2006 Award recipients are listed in this issue of the *Forum* on Page 8! Congratulations on receiving this honor!

Bylaws Committee – Staff is working to formalize the Policies and Procedures followed in Society operations so a formal process for much of the society's business is documented and agreed upon by the SFB leaders and membership. This prevents a lack of action due to confusion in processes and helps preserve the institutional memory of the organization. As always, if there are any members wishing to propose a bylaws change, please contact Tim Topoleski, SFB Bylaws Committee chair, for details.

Education and Professional Development Committee – In addition to several requests for endorsement, and the student activities at this year's annual meeting, the Education and Professional Development Committee is working with the SIGs to institute the new Student Travel Achievement Recognition (STAR) Program.

Finance Committee – The Finance Committee is beginning to review the 2005 financial statements and is working to implement the new investment policy. Secretary -Treasurer Lynne Jones is also in the process of forming a Development Task Force to investigate and develop recommendations for non-dues revenue.

Long Range Planning Committee – The Long Range Planning Committee is working with the board and headquarters staff to launch the task forces resulting from the November strategic planning meeting held in Baltimore. A summary of the strategic plan is provided in this issue of the *Forum* from SFB Executive Director, Victoria Elliott, MBA, RPh, CAE.

Meeting Committee –2007 Meeting preparations are underway (see you in Chicago), and 2009 meeting locations are being reviewed. Also under consideration are plans for programming outside of the WBC in fall 2008. Ideas for topics should be forwarded to Dr. Sefton for evaluation.

Membership Committee – Now that dues have been reduced, the Membership Committee is preparing a membership marketing campaign to increase SFB's membership, and is developing several proposals for increasing the value of membership.

Program Committee – The Program Committee has finalized arrangements for the 2006 Annual Meeting in Pittsburgh, Pa. The complete registration brochure was included in the first quarter issue of the *Forum*. Complete meeting and registration information is available at the SFB website, www.biomaterials.org.

Publications Committee – SFB is excited to announce the launch of the new Surgical Video Library available on the SFB website! (It is also available directly at www.biomaterialsvideos.org). SFB would like to thank Dr. Jeffrey Karp of the Massachusetts Institute of Technology (and soon to be McMaster University) for his work in developing the site and collecting the videos! Staff is also working to develop SIG and committee web pages that should be launched early this spring.

Special Interest Groups – Working together with the Education and Professional Development Committee, the SIGs have nominated Student Travel Achievement Recognitions (STARs) to receive monetary awards at this year's Annual Meeting. Each SIG nominated abstracts that were submitted to the annual meeting to the Education and Professional Development Committee. The Education and Professional Development Committee then evaluated all of the nominations and will present the deserving students with the appropriate recognition at the Annual Meeting. SIG representative Andres Garcia continues to work with the board and SFB staff to finalize the updated SIG officer handbook, and outline new policies and procedures for the SIGs with an eye on giving them more autonomy and budgetary discretion.

If you have any questions, or require any information, or have suggestions for improved services, please feel free to contact the Society's headquarters office:

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The Annual Meeting – The Cost of Doing Business

The annual meeting is the biggest event of our Society, but few members understand what it takes to make such a large gathering happen and run smoothly. Planning for each meeting begins at least two years prior to its opening ceremonies with the selection of a meeting site and a Program Chair. And don't forget the budget! The income/expenses for the annual meeting and workshops are the largest line items in our annual budget. But what does it include and how do we get there?

Income from our meeting is a bit straightforward. It includes meeting registrations, registration of guests for social events, and sales of the meeting *Transactions*. It also includes donors/sponsors of the meeting at various levels, which are recognized by the Society in the *Transactions* and on placards. A significant source of income is related to the vendor booths in the Exhibition Hall. We, therefore, strongly encourage all meeting attendees to visit the vendor booths during the meeting to show our support of their (continuing) efforts.

As one would expect, there are a diverse number of expenses associated with organizing a quality meeting. They can be separated into advertising, abstracts, meeting, speaker, student, workshop, social, administrative, and other expenses. Advertising not only includes the various brochures and e-mails that you receive announcing the meeting, the abstract deadlines, and registration information, but it also includes the brochures and mailings to prospective sponsors and vendors. Abstract expenses relate to the cost of processing (including review) and publishing (electronic and print) all abstracts. Meeting costs encompass the site rental (if there is one), audio/visual, kiosks, poster stands, registration, and speaker costs. Student costs include a designated workshop, awards and recognitions, social activities, and reduced meeting registration. Workshops involve speaker, notebook (handouts), and refreshment costs. The social activities that the Society pays for include the opening reception, breaks, and the poster/exhibit reception.

As for the administrative costs, when we began this article we informed you that holding a meeting takes planning—a coordinated effort between Society staff, the Program Chair, the Program Committee, the Meetings Committee, the Finance Committee, the council, the board, the SIGs, and other involved society members. Many people put in lots of time and work to make our meeting run “effortlessly.”

Our goal is to produce quality meetings of value to all attendees. While you are attending this year's meeting, we ask that you critique what is going well and what can be improved so that all attendees, SFB members and guests get the most from the experience.

Advances in Tissue Engineering

Rice University

Center for Excellence in
Tissue Engineering,
Institute of Biosciences and
Bioengineering,
Department of Bioengineering

Houston, Texas

August 16-19, 2006

Fourteenth annual short course with leading scientists from Rice University, the Texas Medical Center, industry, and other institutions on advances in the science and technology of tissue engineering. Be informed on the latest technology in the world of patient-specific therapeutics, from transplantation of cells and tissues to artificial organs.

For biomaterialists, biomedical engineers, physicians, technical managers, and others involved in research in the areas of:

- Stem cell biology
- Cell and tissue culture
- Applied immunology
- Drug delivery and targeting
- Organ and cell transplantation
- Vascular surgery and medicine
- Orthopaedic surgery
- Plastic surgery
- Reconstructive surgery
- Gene therapy
- Nanobiotechnology



RICE

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Nicholas Peppas Elected to National Academy of Engineering

The Society For Biomaterials congratulates Professor Nicholas A. Peppas, Fletcher Stuckey Pratt Chair in Engineering at the University of Texas, Austin, who was recently elected to the National Academy of Engineering. Dr. Peppas was cited for contributions to the development of biomedical and drug-delivery applications of polymer networks and hydrogels.

This year, the National Academy of Engineering elected 76 new members and nine foreign associates, bringing the total U.S. membership to 2,216 and the number of foreign associates to 186.

Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature," and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education."



Introducing the Biomaterials Surgical Video Library

Recently the Society For Biomaterials launched a pilot version of a surgical video library that has the potential to bridge a difficult gap between classroom theory and clinical application.

Students and researchers who are involved in designing biomaterials for successful clinical use must be aware of not only the need for such a therapy but the various constraints and parameters involved with each implant and its proper placement. Showing video clips of surgical procedures involving biomaterials addresses this issue, and can both enhance and stimulate learning in the classroom. Through this, students and researchers will be able develop more clinically relevant biomaterials while attaining a deeper motivation and gaining a more global perspective for their area of research.

By maintaining a highly organized application and material categorized collection of videos, users will be able

to quickly locate videos by navigating through the application topics or by conducting specific keyword searches (i.e. materials used - degradable/permanent, etc). All videos are accessible via live Internet streaming while some are available for download. Numerous professors and students have already used these videos to augment their lectures or biomaterials education experience. We encourage all SFB members to harness the full potential of the site. Also, we are continually looking for new biomaterials-related surgical videos (in digital format or as links to other websites) and would appreciate your recommendations. The more feedback

we receive on the site, the better we will be able to expand and meet the needs of the SFB members. There are several features on the site for rating videos and providing feedback. Alternatively, questions and comments maybe directed to the surgical video library web site founder, Dr. Jeffrey M. Karp (jeffkarp@mit.edu).



Jim Anderson said it best: “SFB has tomorrow’s biomaterials today.” With that slogan, Jim identified the vision for the Society For Biomaterials and where it needs to be focused. This was part of SFB’s strategic planning event that was the first key step in its strategic planning process. The previous strategic plan, while functional, served more as an operational policy and procedure manual for the SFB Council. The SFB leadership considered the need for a more formalized and strategic approach to address and manage issues such as the Society’s position among other organizations in the world of biomaterials, financial means to support member services beyond dues and the annual meeting, and an organizational structure that would best suit the short- and long-term endeavors of the Society.

The planning began with an assessment of member opinions and hence some members participated in a survey e-mailed to 1,124 of them (214 members responded). A summary of some of the results can be found in the box on page 7.

With this as background, the strategic planning group met in Baltimore (at the same time as the fall Council meeting) with facilitator Laura Otten, PhD, director of the Non-profit Center at LaSalle University, Philadelphia, Pa. Participants (see list on page 7) were selected to represent various facets of the organization from new to experienced members. One of the initial tasks was to think about SFB’s impact by addressing the question of what would be lost if SFB did not exist (see box above).

The group identified qualities that make SFB a unique organization among other similar organizations in the field. These include being a mature, approachable, “bio” and “materials” organization with a rich history that successfully integrates industry and academia, and offers a cross-fertilization of ideas and applications. It was believed the SFB annual meeting strives to remain cutting-edge, while offering the opportunity for members to interact with each other and actively participate in its development. SFB successfully covers applied and basic research, focusing on biomaterials and biocompatibility. SFB “carries the torch” for the biomaterials community.

In assessing SFB’s strengths and weaknesses, the group identified a number of key areas of operation that require attention. For example, it noted that meeting revenue was decreasing and there was increasing competition for members from new and emerging professional societies. Hence, the group thought it prudent that SFB try to do a better job ensuring that it stays cutting-edge and current with the growth areas of the field. Slogans such as “No one does the role of biomaterials in growth areas better than SFB,” or “SFB has

tomorrow’s biomaterials today,” and “SFB has the vision for the future,” all identified growth areas to which SFB should be paying attention.

In addressing the question of Special Interest Groups, the group identified the strengths and weaknesses of having SIGs. In the course of this discussion, it was recognized that, for a variety of reasons, SIGs have never operated in the way they were intended. The strengths of the SIGs outweighed the weaknesses, and participants quickly recognized many of the weaknesses stem from lack of direction, little or no access to necessary funds, and the overall ineffective use of this incredible resource.

What Would be Lost if SFB no Longer Existed?

- The core idea of what biomaterials are
- History of biomaterials and what worked/didn’t would be gone; risk repeating mistakes
- The focus on biomaterials
- The annual meeting
- The journal
- Network of friends sharing technology
- Support system for student development
- Development of biomaterials would be slowed
- Key awards that focus on accomplishments and excellence



Conclusions and Next Steps

The last step in the strategic planning session was to identify the strategic initiatives—the opportunities—that must be central to the strategic and operational plans of the Society for the next three to five years. Drawing on the earlier discussion, the group reached consensus on the following key strategic areas to be addressed in the plan:

1. The SFB Annual Meeting – Making it “the place to be.”
2. Special Interest Groups – making them a central part of the organization to support the endeavors of the SFB.
3. The SFB Brand – the identity that will define how SFB is perceived in the market.
4. Strategic Alliances with other organizations/societies most relevant to the mission of the SFB that support the mission, and increase member interest and active participation in the Society.
5. Improving the financial strength of the SFB through

Selected Results—SFB Member and Lapsed-member Surveys

1. When asked what their top three reasons for joining SFB were, respondents indicated:

- Annual Meeting (n=124)
- SFB helps members keep up with advances in the field (n=111)
- SFB allows members to be active in the field of biomaterials (n=98)
- SFB is the key organization representing biomaterials research and development (n=97)
- Networking Opportunities (n=88)
- *Journal of Biomedical Materials Research* (n=87)
- Membership in Special Interest Groups (SIGs) (n=21) (note how few respondents chose this reason)

2. Other comments from the member survey included:

“SFB needs to become more expansive and inclusive.”

“The annual meeting needs to become more expansive and inclusive, improve the science and rigor of presentations.”

“SFB should consider coordinating its scheduling with other conferences and/or hold joint meetings.”

3. SFB also surveyed lapsed members. The 32 who responded (771 were e-mailed) indicated they would consider rejoining SFB if the following services were offered:

- Meeting with improved scientific rigor (n=11)
- A body of knowledge hosted on the website available only to SFB members (n=8)
- All or part of the annual meeting available on CD (n=8)

appropriate sources of non-dues revenue outside of the Annual Meeting.

6. Evaluating and reshaping the governance structure to provide needed flexibility and accountability to the membership, while providing a forum for leadership development.

Since the conclusion of the fall strategic planning session, Michael Sefton, along with President-elect Mauli Agrawal, and SFB Executive Director Victoria Elliott, have identified five specific task forces that will be appointed to carry out the strategic priorities. Lynne Jones, the SFB Treasurer, has proposed a plan for financial development to the board and council, and is currently working to establish a task force for this specific effort. A description of each of these task forces, their composition, as well as a longer version of this article will be available at www.biomaterials.org.

As 2006-07 President of the SFB, Mauli Agrawal will oversee the implementation of the strategic plan. Its success, however, is dependent on the commitment of the members to the vision for the Society. The leadership has committed to seeing the Society achieve its position as the organization that will feature tomorrow's biomaterials today; bring academics to practice and industry; serve as the interface between research and application; educate the future biomaterials scientists; and promote the health and welfare of the society at large through application of biomaterials research and technology. Members are asked and encouraged to join the leaders in their efforts to make SFB the premier bio and materials organization. Consider how you can promote the value of membership to students and colleagues, become actively involved in a committee, or participate in the implementation of the new strategic plan.

Comments on the plan are welcome and should be directed to Dr. Agrawal at mauli.agrawal@utsa.edu.

Strategic Plan Participants

Michael Sefton, *President – University of Toronto*

Mauli Agrawal, *President-elect – The University of Texas at San Antonio*

James Anderson, *Editor, JBMR-A and Past President – Case Western Reserve University*

Julie Babensee, *Publications Committee, Awards Ceremonies & Nominations Committee – Georgia Institute of Technology*

Rena Bizios, *Member-at-large – Rensselaer Polytech Institute*

Richard Gemeinhart, *Publications Committee Chair – University of Illinois*

Lynne Jones, *Secretary/Treasurer – Johns Hopkins University*

John Kao, *2006 Annual Meeting Program Chair – University of Wisconsin*

Margaret Kayo, *Membership Committee Chair – Biosensors International USA*

Alan Litsky, *Secretary/Treasurer-elect – Ohio State University*

Anne Meyer, *1st Past President – University of Buffalo*

Nicholas Peppas, *2nd Past President – The University of Texas at Austin*

Buddy Ratner, *Past President – University of Washington*

William Reichert, *Membership Committee – Duke University*

Shelly Sakiyama-Elbert, *Membership and Long Range Planning Committees (past) – Washington University*

Victoria Elliott, *Executive Director*

Dan Lemyre, *Assistant Executive Director*

2006 Award Recipients



C. William Hall Award

Buddy Ratner, University of Washington
Awardee Address: The Birth and Death of Biomaterials
Saturday, April 29, 2006
Plenary Session II – Ballroom B/C
10:55 a.m. – 11:20 a.m.



Clemson Award for Contributions to the Literature

Cato Laurencin, University of Virginia
Awardee Address: Material Things: That Matter
Thursday, April 27, 2006
Plenary Session I – Ballroom B/C
8:05 a.m. – 8:30 a.m.



Clemson Award for Applied Research

Joseph Salamone, Bausch & Lomb
Awardee Address: Advances in Ophthalmic Materials
Thursday, April 27, 2006
Plenary Session I – Ballroom B/C
8:30 a.m. – 8:55 a.m.



Clemson Award for Basic Research

Patrick Stayton, University of Washington
Awardee Address: Biomaterials That Talk and Listen
Thursday, April 27, 2006
Plenary Session I – Ballroom B/C
8:55 a.m. – 9:30 a.m.



Student Award for Outstanding Research - Undergraduate

Matthew Blewitt, Saint Louis University
Awardee Presentation: The Effect of Soluble Peptide Sequences on Neurite Extension in Three-dimensional Collagen Gels
Thursday, April 27, 2006
Concurrent Session I: Biomimesis in Drug Delivery I: Scaffolds & Implants - Ballroom B/C
11:00 a.m. - 11:15 a.m.



Student Award for Outstanding Research - PhD Candidate

Mahesh Chandra Dodla, Georgia Institute of Technology
Awardee Presentation: Anisotropic Hydrogels for Peripheral Nerve Regeneration Across Long Nerve Gaps
Friday, April 28, 2006
Poster Sessions I & II - Poster # 263
9:30 a.m. – 10:45 a.m.
& 5:45 p.m. – 7:15 p.m.



Student Award for Outstanding Research - PhD Candidate

Gazell Mapili, The University of Texas at Austin
Awardee Presentation: A Digital Micro-Mirror Device (DMD)-based Stereolithography System for the Microfabrication of Complex, Spatially-Patterned Tissue Engineering Scaffolds
Friday, April 28, 2006
Concurrent Session IV: Stem Cells: Source, Culture and Application Symposium II – Meeting Rooms 303-304
4:30 p.m. – 4:45 p.m.



Technology Innovation and Development Award

Shalaby Shalaby, Poly-Med Inc.
Awardee Address: Tailoring the Properties of Polymeric Implants
Saturday, April 29, 2006
Plenary Session II – Ballroom B/C
10:30 a.m. – 10:55 a.m.



Young Investigator Award

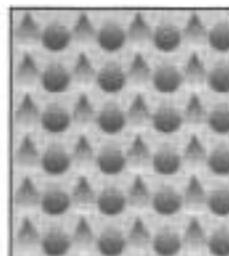
Richard Gemeinhart, University of Illinois
Awardee Address: Synthetic Hydrogels as Therapeutic Materials
Saturday, April 29, 2006
Plenary Session II – Ballroom B/C
11:25 a.m. – 11:50 a.m.

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Remembrances of and Reflections on the Early Society For Biomaterials and International Biomaterials Symposium Meetings



The meetings were like a large family reunion. Almost everyone knew everyone else in attendance, and if there was someone you didn't know, most participants made a point to introduce themselves. Like family reunions, there were lively discussions and disagreements. Jim Anderson, Bob Baier, Jonathan Black, and Jack Lemmons always asked very provocative questions of the speakers. There were

excellent student presentations, Jerry Klawitter, for example; but most of the presentations were made by the senior investigator.

I personally looked forward to the annual meeting with a great deal of anticipation, for it was a chance to discuss research and socialize with some of my new friends like Bill Hall, Larry Hench and Jack Bokros. I also had the opportunity to meet and interact with some of my greatest heroes, like Michael DeBakey, Sir John Charley and William Kolff. There was a chance to discuss LTI carbon with Jack Bokros, Bioglass with Larry Hench and hydroxyapatite with Michael Jarcho.

At the early meetings there were no parallel sessions so I was able to listen to every paper. To make sure I paid attention I always sat at the front of the room. There were wonderful orators like Norman Cranin and Larry Katz. The presentation times were usually at least one-half hour and most of the great researchers were also wonderful teachers, people like Sol

Pollack, Dennis Smith, Alan Hoffman, George Winters, Bob Pilier, Dave Williams, Gunther Heimke and, of course, many others. The meetings were where Paul Ducheyne, Linda Lucas, Ann Myers and Fred Schoen made some of their first presentations.

The Clemson Team—Frank Cooke, Jerry Klawitter, Barry Sauer, Myron Spector and Alan Weinstein—always played a major role in organizing the meeting. The social events, including The Bash and banquet, were very well attended and an important part of the meeting. The Clemson Awards were announced at the banquet and a great attempt was made to keep the recipient's name confidential until they were announced. Many an individual was seated at the head table at the banquet believing they were giving a report or introducing someone, only to find out they were one of that year's recipients of a Clemson Award. The introductions were elegant. The participants represented a Who's Who in biomaterial research in America and it wasn't long until it was a Who's Who in the world. The meetings were where I first met Gunther Heimke, Dr. Oonishi, Dr. Yamamuro, Pierre Descouts and Antonio Ravagilo.

I don't pretend to know all the secrets of happiness, but one of them certainly is knowing when the good times are occurring and enjoying them. I enjoyed the early meetings so much the only meeting I have missed to date was the World Congress in Sydney. As long as my health holds, I plan to participate in more meetings.





Society For Biomaterials 2006 Annual Meeting

April 26 - 29, 2006

David L. Lawrence Convention Center
Pittsburgh, Pennsylvania, USA

"Biomaterials: The Enabling Technology"

PROGRAM OVERVIEW

The Annual Meeting of the Society For Biomaterials has a long tradition of excellence in showcasing advances and cutting-edge technologies related to implant materials and devices. In recent years, the field of biomaterials represents the **enabling technology** necessary to propel the progress of emerging strategies such as tissue engineering, nanotechnology, and the delivery of bioactive agents for treating, repairing, and restoring function of tissues. Attendees of the Society For Biomaterials meeting reflect the multidisciplinary nature of our field, and work every day to advance these topic areas by applying many of the lessons learned at the SFB meeting to new clinical approaches. These new and challenging topics are not only related to basic and applied biomaterials research, but also to the education and recruitment of new biomaterials scientists, engineers, and clinicians, and the continued growth and development of the biomedical industry.

To address the need for this multidisciplinary approach and expand on the success of past joint sessions with other professional societies, our 2006 meeting will have significant scientific and social overlaps with the Regenerate Meeting of the Tissue Engineering and Regenerative Medicine International Society (TERMIS) and PTEI. Both Program Committees are working hard to identify sessions of mutual interest and both societies are providing registration discounts and other incentives to promote cross-fertilization of these conferences. Our goal is to reflect and enhance the diverse expertise and value of our membership. In short, more science, more networking, and more fun for your conference dollar and time.

GENERAL INFORMATION

All sessions of the meeting, including exhibits, posters, and oral presentations will take place in the David Lawrence Convention Center in Downtown Pittsburgh, Penn.

Transportation To and From the Airport

The Greater Pittsburgh International Airport is located 25 miles from the Convention Center with an approximate taxi fare of \$35 each way. Shuttle service is available at the airport.

Final Program, Certificates of Attendance, and Visa

Certificates of attendance will be available for all registrants at the on-site registration desk. Badges will be required to be worn at all functions of the meeting. Participants are expected to make their own travel arrangements, and procure their own visas. The final program will be distributed at the meeting.

The official language of the meeting is English.

Dress Code

Business casual is the recommended dress for the meeting.

EXHIBITORS

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Transactions Book

All of the abstracts being presented at the meeting, both oral and poster will be on CD-ROM, which is included in your meeting registration. A printed *Transactions Book* will be available for purchase upon registration.

Special Needs

The Society For Biomaterials wishes to take steps to ensure that no disabled person is excluded, denied services, segregated, or otherwise treated differently than other individuals because of the absence of auxiliary aids and services. If you require any auxiliary aids or services identified in the Americans with Disabilities Act, please indicate so on your registration form.



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MEETING HIGHLIGHTS

KEYNOTE ADDRESS

SYNTHETIC BIOLOGY AND SYSTEMS BIOLOGY: ENGINEERING GENE NETWORKS FOR BIOMEDICAL APPLICATIONS

J. J. Collins PhD, Center for BioDynamics and the Department of Biomedical Engineering, Boston University

This address will highlight recent advances in designing and constructing synthetic gene networks (synthetic biology) and reverse engineering and analyzing endogenous gene networks (systems biology). We present a number of case studies, and discuss potential applications of these developments in biomedicine and biomaterials research.

SYMPOSIA

BIONANOTECHNOLOGY: THE FUTURE OF BIOMATERIALS

“Towards Multifunctional Nanoparticle-based Therapeutics”

Invited Speaker:
Sangeeta Bhatia, Massachusetts Institute of Technology, Cambridge, MA

The objective of the symposium will be to examine the impact of nanoscale science and engineering on the biomaterial field. In recent years, nanoscale science and engineering has provided new avenues for engineering materials with macromolecular and even down to molecular scale precision. The resultant biomaterials have been demonstrated to have enhanced properties and applicability, and these materials are expected to be enabling technologies in the successful development and application of nanomedicine. For example, nanoengineered tissue scaffolds and nanostructured coatings for implants and prostheses are leading to better solutions in tissue design, reconstruction, and reparative medicine. Nano- and microarrays are accelerating drug discovery and assessment of drug candidates. Self-assembly and other nanofabrication methods are facilitating the creation of new biomaterials with well-ordered structures at the nanoscale such as nanofiber peptide and protein scaffolds. Also, nanoparticle systems are enabling a wide range of materials for imaging and/or therapeutic purposes to be easily introduced or injected in the body. This symposium will highlight the unlimited

potential of nanoscale science and engineering in biomaterials science and engineering, and it will give a glimpse into the future of biomaterials.

MODELING BIORESPONSE TO BIOMATERIALS

Organized by the Biomaterial/Cell Organ Therapy SIG

“Rational Computer-aided Design of Biomaterials”

Invited Speaker:
William Welsh, UMDNJ, Piscataway, NJ

The advent of High Throughput Combinatorial Synthesis (HTCS) has led to the creation of burgeoning libraries of potential biomaterials. Conventional methods such as Design of Experiments (DOE) are inadequate to fully assess the in vitro performance of these large libraries, leaving little hope for a comprehensive evaluation of their in vivo behavior. Computational modeling of bioresponse to biomaterials offers the potential for dramatically reducing the cost and time required to effectively characterize a typical library of biomaterials (e.g., polycarbonates) by combining experiment and simulation in a synergistic fashion similar to the approach now commonplace in the pharmaceutical industry. A wide range of modeling techniques can be utilized to build models ranging from atomistic simulation (e.g., Molecular Dynamics (MD) simulation) to Quantitative Structure Property Relations (QSPR). The symposium solicits contributed papers on all aspects of computational modeling of bioresponse to biomaterials.

ORGANIC/INORGANIC HYBRID BIOMATERIALS

Organized by the Dental /Craniofacial SIG and the Tissue Engineering SIG

This symposium will address key issues related to the design, synthesis, characterization and utilization of organic/inorganic hybrid materials to control biological functions. Biomaterial function depends on processing, composition and structure, at multiple levels of hierarchy, as well as on the hierarchical relations inherent to biology. One approach to enhance biomaterial function is to control composition and structure via the use of hybrid materials consisting of organic and inorganic phases interacting across dimensional scales, ranging from the molecular level to the

whole material level. Such composite materials mimic biological materials designed by Nature and can fulfill different design criteria and function depending upon the size/scale of the organic/inorganic interactions. Nature, has used these same principles to achieve higher complexity and allow adaptation, with a minimal expenditure of energy. This symposium will serve as a forum to present the latest developments in organic/inorganic hybrid materials for biomedical use.

NEW CONCEPTS AND CHALLENGES FOR THE DELIVERY OF THERAPEUTIC NUCLEIC ACIDS

Organized by the Drug Delivery SIG

“Response of Human Embryonic and Adult Mesenchymal Stem Cells to Nanotopography”

Invited Speaker:
Kam Leong, Duke University, Durham, NC

This symposium will cover current challenges and new advances in the delivery of therapeutic nucleic acids including plasmid DNA, genetic vaccines, RNA, siRNA and oligonucleotides. The talks will focus on biological barriers for nucleic acid delivery and new biomaterials that are designed to overcome these barriers. In addition pre-clinical and clinical results on nucleic acid delivery as well strategies for combinatorial delivery will be addressed.

CELLULAR SIGNAL TRANSDUCTION

“Signaling Downstream of S1P, VEGF, Shear Stress and Platelet Poor Plasma”

Invited Speaker:
Donald L. Elbert, Washington University, St. Louis, MO

Response to implants by tissue cells is critically dependent on their ability to recognize the chemical and physical structure of the implant material. Moreover, the type and magnitude of response is modulated by their biomechanical environment. Cellular recognition of material attributes in context of biomechanical forces involves the transduction of signals that results in the alteration of cell survival, proliferation, differentiation, metabolism and function. This symposium addresses the different genes, molecules and pathways that play a role in signal transduction from material to tissue cells through quantitative modeling.



It focuses on the state-of-the-art experiments and quantitative models to evaluate signal transduction mechanisms and predict cell response to biomaterials.

STEM CELLS: SOURCE, CULTURE AND APPLICATION

Organized by the Biomaterial/Cell Organ Therapy SIG

“Developing Human Embryonic Stem Cell for Use in Cell and Tissue Therapies”

Invited Speaker:
Steve Stice, University of Georgia,
Athens, GA

This symposium will overview state-of-the-art research on the isolation, propagation and differentiation of stem cells and their culture on various biomaterials. Basic stem biology will be addressed, including methods for characterizing cells based on various cell surface and genetic markers as well as current challenges and new advances in culturing both adult and embryonic stem cells. Particular focus will be on maintenance and differentiation of stem cells on various biomaterials, 3D culture, and bioreactor-based cultures.

A TUTORIAL SYMPOSIUM BY THE LEADERS OF BIOMATERIALS

Organized by the SFB Presidents Advisory Committee

The objective of the Tutorial Symposium is to examine the impact of biomaterials in biology and medicine. All featured invited speakers of this two-day symposium will be Past Presidents of SFB. In recent years, there has been considerable work in preparing materials and finding new uses for hybrid structures based on biomaterials. Uses such as modified surfaces, stents, carriers for controlled and targeted drug delivery, and microdevices have shown the versatility of these biomaterials. Why do we observe such an explosion of interest in the field? Medical devices now have reached a stage of dimensions comparable to those of biological macromolecules. This raises exciting possibilities for combining microelectronics and biotechnology to develop new technologies with unprecedented power and versatility. While molecular electronics use the unique self-assembly, switching, and dynamic capabilities of molecules to miniaturize electronic devices, nanoscale biosystems use the power of microelectronics to design ultrafast/ultrascale biocompatible devices—including implants—that can revolutionize the field of bioengineering. For example, polymer surfaces in contact with biological fluids, cells, or cellular components can be tailored to provide specific properties or to resist binding depending on the intended application and environment. The design of surfaces for cellular protection or adhesion and surface passivity encompasses a number of techniques such as surface grafting (ultraviolet radiation, ionizing radiation, electron beam irradiation). Certain

techniques can change the chemical nature of surfaces and produce areas of differing chemistry as well as surfaces and polymer matrices with binding regimes for a given analyte. In addition, biomimetic methods are now used to build biohybrid systems or even biomimetic materials (mimicking biological recognition) for drug delivery, drug targeting, and tissue engineering devices. This symposium will concentrate on molecular assemblies and complex polymer structures that exhibit structure, control, recognition and signal transmission of biological properties.

ADVANCES IN BIOMATERIALS SCIENCE: WHAT'S IN THE FUTURE OF BIOMATERIALS ...ADDRESSING BIOLOGICAL PROBLEMS AGAIN!

“The Marriage of Biomaterials and Biological Science: A Required Alliance”

Invited Speakers:
Jim Burns, Genzyme Corp., Waltham,
MA

“Tissue Engineering in Orthopaedic Surgery: Understanding the Clinical Parameters”

Stuart Goodman, Stanford University,
Stanford, CA
Allan Hoffman, University of
Washington, Seattle, WA

ADVANCES IN BIOMATERIALS SCIENCE: WHAT WE HAVE LEARNED FROM OUR MISTAKES

“Protein and Cellular Interactions with Biomaterials: Perspectives for Nanotechnology and Tissue Engineering;”

Invited Speakers:
Jim Anderson, Case Western Reserve
University, Cleveland, OH
Jack Lemons, University of Alabama
at Birmingham, Birmingham, AL

“Nanostructured Surface Modification and Coatings for Orthopaedic and Dental Implants;”

Bob Baier, University at Buffalo,
Buffalo, NY

“The ‘Theta Surface’ for Biocompatibility: Minimizing Protein Denaturation”

Buddy Ratner, University of
Washington, Seattle, WA

“Engineered Biomaterials via Molecular (Nanoscale) Surface Modifications”

The Program Committee extends its deepest appreciation for the dedication of our past Presidents in organizing and donating their time and energy to this very special session.

GENERAL SESSIONS

BIODEGRADABLE HYDROGELS FOR TISSUE ENGINEERING

Organized by the Tissue Engineering SIG

Injectable, biodegradable scaffolds have immense clinical significance in soft tissue reconstruction (including cartilage regeneration) and bone repair. The development of a scaffold (such as a hydrogel) that gels in situ and is biodegradable is a challenge that several researchers have undertaken. The research efforts for biodegradable, injectable scaffolds (both native and synthetic) are increasing each year. As such, the number of researchers, including graduate students and post-doctoral fellows, involved in this field also increases. Additionally, the inclusion of cells within scaffolds is facilitated by development of techniques that allow gelation to proceed in a mild manner, resulting in cell-laden materials formed in situ in a desired target shape. With the advent of stem cell therapies, the need for appropriate cell delivery venues also intensifies.

FIBRIN SEALANT AND ITS APPLICATION IN TISSUE ENGINEERING

Organized by the Tissue Engineering SIG

The need to effectively manage hemostasis in vascular procedures; control air leaks in pulmonary procedures; seal cerebrospinal fluid leaks in spinal or neurological procedures; or prevent leaks in gastrointestinal procedures has led to the development of several sealants and adhesives to address the clinical need. The aim of this symposium is to:

1. Present the clinical experience with some of these devices highlighting the materials challenges faced in developing effective sealants and adhesives for these applications.
2. Elucidate future opportunities to develop materials and devices that could effectuate wound care (wound closure, wound healing, tissue regeneration etc..) using sealant and adhesive delivery platforms.
3. The use of these biomaterials to deliver cells or bioactive substances such as peptides or growth factors to treat various diseases such as chronic wounds, bone defects, Alzheimer, Parkinson diseases, etc.

The symposium will be a forum for scientists from academia and industry to present their research, exchange ideas and potentially identify new opportunities to develop new materials and devices to address the clinical need and improve surgical outcome.

ORTHOPAEDIC BEARING SURFACES

Organized by the Orthopaedic SIG

Total joint replacement is one of the most



common surgical procedures performed worldwide. However, wear of joint replacements has been identified as one of the major factors currently limiting the life of the implants. The design and development of implants with improved performance and durability requires the development of assays that will enable the accurate determination of wear performance of materials, the development of appropriate in vitro models, and development of a deeper insight into the factors that contribute to implant wear. The symposium will bring together leading researchers from academia and industry to discuss recent research on developing novel testing methods and/or conditions to accurately determine implant wear in vitro under simulated body conditions and the factors that contribute to implant wear.

SYNTHETIC ORTHOPAEDIC MATERIALS

Organized by the Orthopaedic SIG

Metallic and polymeric biomaterials play a central role in current orthopaedic treatments. Even though these biomaterials combine unique bulk and surface properties that are critically important for their satisfactory performance, further refinements in material properties and the fabrication processes are needed to develop ideal implants. The aim of the symposium is to highlight the current state of the art advancements in metallic and polymeric orthopaedic biomaterials. These include fundamental studies on the properties of the tissue to be replaced, new polymeric and metallic biomaterials, surface modification of existing biomaterials and current understanding of the performance of biomaterials including mechanical behavior.

BIOMIMESIS IN DRUG DELIVERY

Organized by the Drug Delivery SIG

Biomimetic materials and systems are exceptional candidates for various controlled drug delivery applications and have enormous potential in medicine for the treatment of disease. This session will highlight recent activities in the field of biomimetic systems and their application in controlled drug delivery. Biomimesis is the process of coordinating molecular recognition and interactions to design biological, biohybrid, and artificial materials that can be structurally similar to and/or function in similar ways as biological structures. In particular, the focus of this session is on current clinical significance for systems that mimic processes where the underlying molecular principles are well understood. We invite topics with emphasis in drug delivery that involve materials consisting of (i) natural biological molecules such as proteins, oligonucleotides and polynucleotides, and/or unnatural biomolecules that have been assembled/synthesized by biological systems; (ii) hybrid structures of synthetic

(e.g., polymeric chains, metal particles, etc.) and natural biological molecules (i.e., conjugated biomaterials); or (iii) materials consisting of man-made and in-vitro building blocks, such as synthetic polymers, unnatural amino acids, aptamers, helical coiled coils, materials from configurational biomimesis or molecular imprinting methods, polymerosomes, micelles, etc.

DENTAL AND ORTHOPAEDIC IMPLANT COATINGS AND MATERIALS: CHARACTERIZATION, IN VITRO, IN VIVO AND CLINICAL ASSESSMENTS

Organized by the Dental Craniofacial SIG and the Implant Pathology SIG

Dental and orthopaedic materials have become widely successful for use in implants to replace/restore teeth and joint function. Their success has resulted from 30+-year improvement in material design and selection, surface modifications for enhancement of tissue integration, patient selection and clinical protocols. As our understanding of dental and orthopaedic implant science has become more sophisticated, implants have become easier to use, time to completion of treatment has been shortened, biomechanical stability has been improved and aesthetic results have become more predictable. This symposium presents information on the physicochemical properties of novel surface coatings for dental and orthopaedic implants, in vitro and in vivo evaluations of implant-host tissue/cell interactions, and clinical and pathological assessments of implant devices. This program will begin highlight importance of material selection and design and surface modifications on biological and clinical outcomes, and new directions for future designs and strategies for improved patient care.

INNOVATIVE TECHNIQUES IN BIOMATERIALS EDUCATION

Organized by the Biomaterials Education SIG

Quality teaching is the backbone of biomaterials education and research. The objective of this symposium is to affect the quality of biomaterials education through providing a forum for educators to share innovative teaching techniques. In the past, these sessions have sparked thoughtful and practical discussions. We believe that those in attendance will have the opportunity to reflect on their own teaching styles. Attendance at this session shows a commitment to effective biomaterials education and helps to foster a proactive culture within the SFB. Topics may include: techniques for teaching to large classes, providing effective mentorship, different learning styles, distance learning, internet courses, and undergraduate research experiences.

MECHANOBIOLOGY OF SKIN AND BONE

Organized by the Tissue Engineering SIG

The reciprocal interactions during wound healing between cells, components of extracellular matrices (ECM), cytokines, and other soluble mediators are incompletely understood. Although the overall phenomenology of repair, and correlative patterns of interactions between ECM and cell growth/differentiation, are emerging, the detailed mechanisms that govern cell-ECM interactions await elucidation. Specifically, how do the structural features and mechanical properties of the ECM govern cell behavior during repair? Despite clinical success of engineered tissues to treat patients with cutaneous injury, fundamental questions remain unanswered about the manner in which matrix and structure determine, influence and predict the performance of these materials. In this symposium, studies on the mechanobiology for hard and soft tissues will be presented.

OPHTHALMIC DRUG DELIVERY

Organized by the Ophthalmological Biomaterials SIG

The need to provide therapy for multifactorial diseases such as glaucoma, retinal diseases, and cataracts, and for surgical complications such as ocular inflammation and infection, represent growing opportunities for ophthalmic drug delivery. Strategies for specific localized and effective delivery of therapeutic and regenerative agents to the various segments of the eye must address barriers to drug delivery such as tissue, blood-aqueous, and blood-retina barriers and ultimately improve the ocular penetration of drugs. The scope of this symposium is to present clinical needs along with industrially relevant strategies for improving ophthalmic drug delivery. Emphasis will be placed on drug delivery to the posterior segment of the eye.

CELL RESPONSE TO MICRO/NANOPATTERNED BIOMATERIALS

Organized by the Proteins and Cells at Interfaces SIG and the Surface Characterization and Modification SIG

Nanopatterning of biomaterial surfaces has emerged as promising surface modification strategy to manipulate protein activities, cellular functions and tissue responses. A key characteristic of these approaches is that the nanoscale features elicit different or enhanced responses compared to smooth and micropatterned substrates. By focusing on the nanopatterning theme, this symposium will cut across different biomedical applications to concentrate on fundamental issues related to nanoscale interactions.

Improved Dental Composites Utilizing Dibenzylidene Sorbitol Networks

Feature

By Elizabeth A. Wilder and Joseph M. Antonucci, Polymers Division, National Institute of Standards and Technology

Summary

Dibenzylidene sorbitol (DBS) is a sugar derivative that is capable of self-organizing into a 3-D nanofibrillar network at relatively low concentrations in a wide variety of organic solvents and polymer melts to induce physical gelation. This research was aimed at determining the effect of DBS networks on vinyl conversion, polymerization shrinkage, and mechanical strength of bioactive dental composites containing zirconyl-modified amorphous calcium phosphate (Zr-ACP) and a polymer matrix derived from the photopolymerization of ethoxylated bisphenol-A dimethacrylate (EBPADMA). Flexural strength was enhanced while polymerization shrinkage and its associated stress development were both significantly reduced by the incorporation of DBS into the composites, suggesting BS may be a useful additive for dental composites.

Introduction

Low-molecular mass organic gelators (LMOGs), a class of organogelators, have garnered significant attention due to their ability to self-assemble and promote gelation in a variety of organic solvents and polymer melts.¹⁻³ Dibenzylidene sorbitol (DBS), shown in Figure 1, is a LMOG capable of inducing physical gelation in a wide variety of organic solvents and polymer melts by forming rigid three-dimensional networks.⁴⁻¹⁶ DBS is a relatively benign material that is already in use in cosmetic applications.^{17,18} Recent efforts in this laboratory have found that DBS is capable of gelling a wide variety of dental monomers including monofunctional monomers such as methyl methacrylate, benzyl methacrylate and 2-hydroxyethyl methacrylate, as well as difunctional monomers including 2,2-bis[p-(2'-hydroxy-3'-methacryloxypropoxy) phenyl] propane (BisGMA), ethoxylated bisphenol-A dimethacrylate (EBPADMA), poly(ethylene oxide) dimethacrylate and 1,6-hexamethylene dimethacrylate. This research was aimed at determining the effect of DBS networks on vinyl conversion, polymerization shrinkage, and the mechanical strength of bioactive dental composites filled with zirconia-modified amorphous calcium

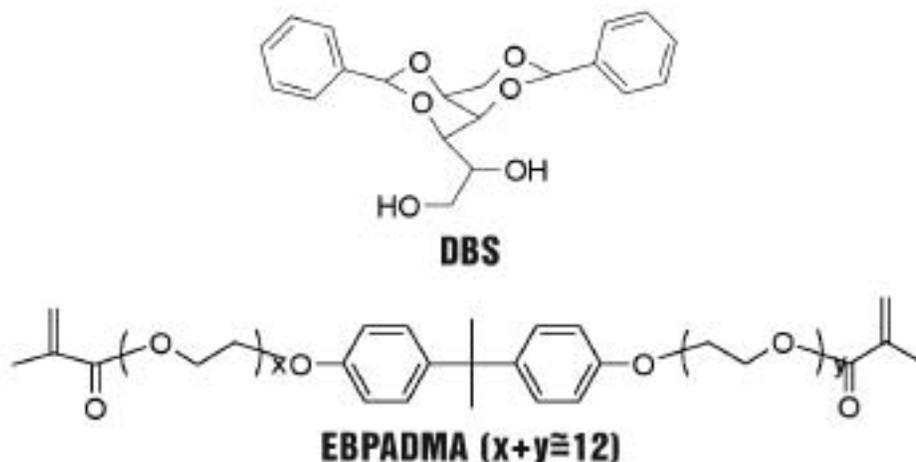


Figure 1. Structures of 1,3:2,4-dibenzylidene-D-sorbitol and ethoxylated bisphenol-A dimethacrylate.

Sample Name	% filler in sample (DBS + Zr-ACP)	% DBS in sample	% DBS in EBPADMA	% EBPADMA in sample	% Zr-ACP in sample
1-a	0	0	0	100	0
1-b	5	5	5	95	0
1-c	10	10	10	90	0
2-a	40	0	0	60	40
2-b	40	3.1	5	60	36.9
2-c	40	6.6	10	60	33.4
3-a	40.0	0	0	60.0	40
3-b	43.0	3.0	5	57.0	40
3-c	44.8	4.8	8	55.2	40
3-d	45.9	5.9	10	54.1	40
4	45.8	2.8	5	54.2	43
5	47.7	2.7	5	52.3	45

Table 1. Sample compositions in percent by mass fraction; standard uncertainty is ± 0.05 percent.

phosphate (Zr-ACP) in a matrix derived from the photocuring of an EBPADMA (Figure 1), a common dental monomer that is capable of dissolving up to 10 wt. percent DBS.

Materials and Methods

Sample Preparation

To prepare the organogel-modified samples, DBS (Milliken Chemicals, Spartanburg, S.C.) was dissolved in ethoxylated bisphenol-A dimethacrylate (EBPADMA, Lot. No. 535-32, Esstech, Essington, Pa.) by heating the mixture in an oven at 100°C for 2 hours. The mass average molecular mass of the EBPADMA was 888 g/mol as determined by Matrix-Assisted Laser Desorption/Ionization (MALDI) time-of-flight mass spectrometry and the degree of ethoxylation was approximately 11.6. Upon cooling, the DBS self-assembled causing gelation of the monomer.

To activate the EBPADMA for visible light

photopolymerization, 0.2 percent by mass fraction of camphorquinone (Sigma-Aldrich Corp., St. Louis, Mo.) and 0.8 percent by mass fraction of ethyl 4-N,N-dimethylaminobenzoate (Sigma-Aldrich Corp., St. Louis, Mo.) were added to the EBPADMA or the EBPADMA/DBS solutions (prior to gelation) and heated at 60°C for approximately 30 minutes to dissolve the photoinitiators. Composite specimens containing Zr-ACP were prepared by mixing the activated EBPADMA or EBPADMA/DBS gels with 30 percent to 45 percent by mass fraction Zr-ACP.

Three main sets of samples as well as two additional formulations were prepared and are summarized in Table 1. The first set of samples consisted of EBPADMA with 0 percent, 5 percent or 10 percent by mass fraction DBS, the second set contained a constant filler (DBS + Zr-ACP) loading of 40 percent and the third set contained a constant Zr-ACP loading of 40 percent. Samples 4 and 5 had 43 percent and 45 percent Zr-ACP, respectively, and 5 percent DBS, and were used in the shrinkage and stress measurements to isolate the effect of filler loading.

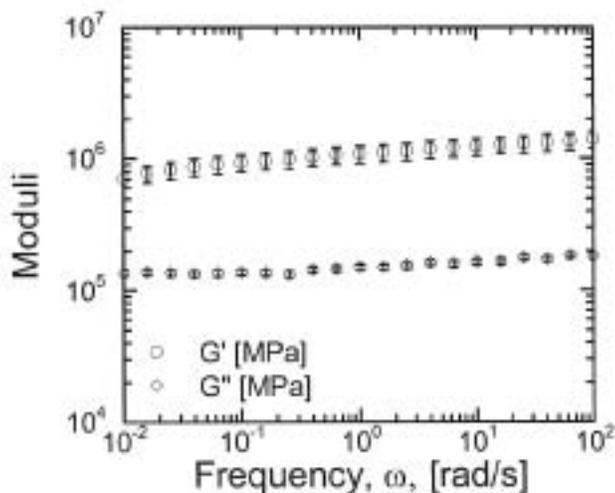


Figure 2. Frequency sweep of EBPADMA with 5 percent by mass fraction DBS.

Conversion Measurements

Vinyl group conversion was measured using mid-FTIR19 by monitoring the reduction in the C=C vinyl band (1637 cm⁻¹) in comparison to an unchanged aromatic band (1583 cm⁻¹) used as an internal standard.

Volumetric Shrinkage

To measure volumetric shrinkage, approximately 0.9 mg to 1.0 mg of the composite specimen (three or more specimens per sample) was placed on a 1 mm thick glass slide and positioned so that the specimen was centered inside the socket rim of a glass joint of a computer-controlled mercury dilatometer.²⁰ A thermistor attached to the socket of the glass joint was used to measure temperature changes while the linear variable displacement transducer (LVDT) monitored any changes in the height of the mercury. After the LVDT reached steady state, the specimen was cured for 60 seconds (Max Lite; Caulk/Dentsply, Milford, Del.) and the thermistor and LVDT measurements were taken for 60 minutes. The curing light was

Sample	0 h conversion	24 h conversion
1-a	88.9 (0.9)	90.8 (0.7)
1-b	93.0 (1.6)	95.4 (0.8)
1-c	92.4 (1.2)	94.4 (0.8)
2-a	74.6 (0.7)	77.6 (0.3)
2-b	78.2 (0.9)	80.2 (1.0)
2-c	81.7 (1.3)	83.3 (1.8)
3-a	74.6 (0.7)	77.6 (0.3)
3-b	73.2 (1.0)	76.2 (0.5)
3-d	73.2 (1.7)	76.4 (2.2)

Table 2. Vinyl group conversion percentage of EBPADMA and EBPADMA/Zr-ACP composites 0 hour post-irradiation and 24 hour post-irradiation (standard deviations shown in parentheses).

then triggered for an additional 30 seconds. Volumetric shrinkage corrected for temperature fluctuation was plotted as a function of time and the overall shrinkage due to curing was determined based on the mass and density of the composite specimen.

Maximum Stress

Maximum curing stress was measured using a cantilever-beam tensometer.²¹

Results and Discussion

The EBPADMA monomer had a viscosity of (0.529 ± 0.001) Pa·s as determined through a steady rate sweep. Addition of 5 percent DBS resulted in physical gelation with G' > G'' and both G' and G'' considered to have little dependence on frequency²² as shown in Figure 2.

FTIR results, shown in Table 2, indicate that adding DBS to EBPADMA resulted in a statistically significant increase in vinyl group conversion of samples without Zr-ACP (samples 1-a, 1-b and 1-c). By causing physical gelation of the monomer, DBS may have induced a "Trommsdorff" effect^{23,24} where polymerization kinetics increase at high viscosities due to a reduction in chain termination accompanying the decreased mobility of the polymer radicals. Differences in vinyl conversion between samples with 5 percent (1-b) and 10 percent DBS (1-c), however, were insignificant. This may be due to the presence of air voids within the high-viscosity EBPADMA/DBS gels as well as reduced clarity at higher DBS loadings, both of which may inhibit photo-curing. Results for composite samples with constant filler loadings of 40 percent by mass fraction (samples 2-a, 2-b and 2-c) show a statistically significant increase in conversion upon addition of DBS, but this may likely be attributed to the relative decrease in the amount of Zr-ACP as systems containing Zr-ACP had consistently lower conversions than samples without Zr-ACP. In samples with a constant Zr-ACP loading of 40 percent (samples 3-a, 3-b and 3-c), there were no significant differences between samples with and without DBS. This could be due to disruption of the DBS gel structure during mixing with the Zr-ACP filler, or it may be that the high viscosity of the EBPADMA/Zr-ACP composites masks any effect of the DBS network.

continued on page 16

Sample	BFS [MPa]
1-a	160 (16)
3-a	59.5 (5.7)
3-b	83.0 (3.7)
3-c	74.6 (5.1)
3-d	69.6 (4.4)

Table 3. Biaxial flexural strength of dry, cured EBPADMA and EBPADMA/Zr-ACP composites (standard deviations shown in parentheses).

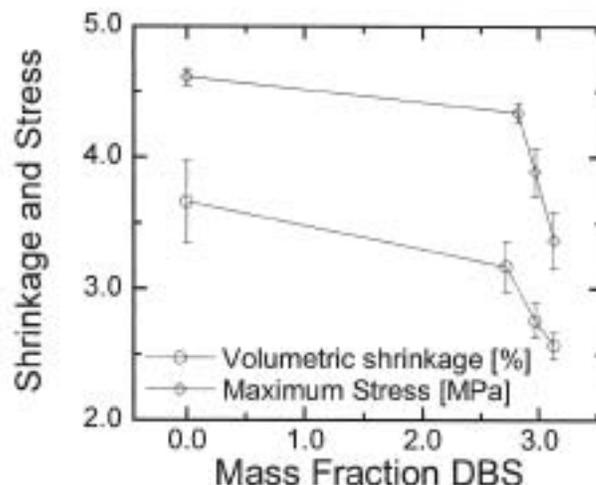


Figure 3. Volumetric shrinkage and maximum polymerization stress of EBPADMA/Zr-ACP composites containing various levels of DBS (as indicated).

Results from the mechanical testing (Table 3) reveal that the biaxial flexure strength (BFS) of the cured EBPADMA is significantly reduced upon addition of Zr-ACP as sample 3-a had a much lower BFS than sample 1-a. This is expected due to the inherently brittle nature of the Zr-ACP and the lack of strong interactions between Zr-ACP and the EBPADMA matrix. Addition of 5 percent by mass fraction DBS (sample 3-b) to the EBPADMA/Zr-ACP composites resulted in an almost 40 percent increase in BFS compared to the sample without DBS (3-a). Adding 8 percent or 10 percent by mass fraction of DBS (3-c and 3-d, respectively), however, caused a relative decrease in the BFS. Fractographic analyses (not shown) indicate that the reduction in BFS at higher loadings is due to the nature of the air voids incorporated into the resin during mixing of the EBPADMA/DBS gels with Zr-ACP.

Mercury dilatometry and tensometer results for EBPADMA/Zr-ACP composites are given in Figure 3 as a function of DBS concentration calculated with respect to the composition of the entire sample. Volumetric shrinkage ranged from (3.7 ± 0.3) percent for the Zr-ACP composites without DBS (sample 2-a) to (2.6 ± 0.1) percent for the composites containing 3.1 percent by mass fraction DBS (sample 2-b), suggesting that the DBS network may act to reduce shrinkage during polymerization.

Results from the stress measurements complement the shrinkage results and show that the maximum stress decreases with increasing DBS concentration. Surprisingly, the shrinkage stress and volumetric shrinkage do not appear to be affected by the total filler loading, which is highest in the samples with 2.8 percent DBS (sample 4; 45.8 percent filler) and 2.7 percent DBS (sample 5; 47.7 percent filler) and which rules out the possibility that the reductions in both shrinkage and stress are actually due to higher filler loadings.

Conclusions

The work presented here reveals that while DBS has little effect on the vinyl conversion of EBPADMA/Zr-ACP composites, it may act to increase the biaxial flexural strength and reduce polymerization shrinkage and stress. At this point it remains unclear whether the improvements are due to the DBS network or some other unknown effect of the DBS. However, these results suggest that organogelators may be useful additives for improving many of the critical properties of polymeric dental composites and related polymeric materials.

Acknowledgements

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Disclaimer

Certain commercial materials and equipment are identified in this work for adequate definition of the experimental procedures. In no instance does such identification imply recommendation or endorsement by the National Institute of Standards and Technology or the American Dental Association Foundation or that the material and the equipment identified is necessarily the best available for the purpose.

Keywords

Dental composites; dental polymers; gelation; shrinkage; strength.

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References

1. P. Terech, R. G. Weiss, *Chemical Reviews* **1997**, 97, 3133.
2. O. Gronwald, E. Snip, S. Shinkai, *Current Opinion in Colloid & Interface Science* **2002**, 7, 148.
3. D. J. Abdallah, R. G. Weiss, *Journal of the Brazilian Chemical Society* **2000**, 11, 209.
4. S. Yamasaki, H. Tsutsumi, *Bulletin of the Chemical Society of Japan* **1994**, 67, 906.
5. S. Yamasaki, H. Tsutsumi, *Bulletin of the Chemical Society of Japan* **1994**, 67, 2053.
6. S. Yamasaki, H. Tsutsumi, *Bulletin of the Chemical Society of Japan* **1995**, 68, 123.
7. S. Yamasaki, Y. Ohashi, H. Tsutsumi, K. Tsujii, *Bulletin of the Chemical Society of Japan* **1995**, 68, 146.
8. D. J. Mercurio, S. A. Khan, R. J. Spontak, *Rheologica Acta* **2001**, 40, 30.
9. D. J. Mercurio, R. J. Spontak, *Journal of Physical Chemistry B* **2001**, 105, 2091.
10. M. Fahrlander, K. Fuchs, C. Friedrich, *Journal of Rheology* **2000**, 44, 1103.
11. M. Fahrlander, K. Fuchs, R. Mulhaupt, C. Friedrich, *Macromolecules* **2003**, 36, 3749.
12. J. R. Ilzhofer, B. C. Broom, S. M. Nepa, E. A. Vogler, S. A. Khan, R. J. Spontak, *Journal of Physical Chemistry* **1995**, 99, 12069.
13. J. R. Ilzhofer, R. J. Spontak, *Langmuir* **1995**, 11, 3288.
14. E. A. Wilder, C. K. Hall, R. J. Spontak, *Journal of Colloid and Interface Science* **2003**, 267, 509.
15. E. A. Wilder, M. B. Braunfeld, H. Jinnai, C. K. Hall, D. A. Agard, R. J. Spontak, *Journal of Physical Chemistry B* **2003**, 107, 11633.
16. E. A. Wilder, C. K. Hall, S. A. Khan, R. J. Spontak, *Langmuir* **2003**, 19, 6004.
17. R. B. Kasat, W. Lee, D. R. McCarthy, N. G. Telhan, *United States Patent* 5,490,979 **1996**.
18. T. Schamper, M. Jablon, M. H. Randhawa, A. Senatore, J. D. Warren, *Journal of the Society of Cosmetic Chemists* **1986**, 37, 225.
19. J. W. Stansbury, S. H. Dickens, *Dental Materials* **2001**, 17, 71.
20. D. Skrtic, J. M. Antonucci, F. C. Eichmiller, J. W. Stansbury, *Journal of Dental Research* **2000**, 79, 366.
21. H. Lu, J. W. Stansbury, S. H. Dickens, F. C. Eichmiller, C. N. Bowman, *Journal of Materials Science-Materials in Medicine* **2004**, 15, 1097.
22. G. M. Kavanagh, S. B. Ross-Murphy, *Progress in Polymer Science* **1998**, 23, 533.
23. C. E. Schildknecht, in *Polymer Processes*, Vol. X (Ed.: C. E. Schildknecht), Interscience Publishers, Inc., London, UK, **1956**, pp. 31.
24. K. Matyjaszewski, in *Handbook of Radical Polymerization* (Eds.: K. Matyjaszewski, T. P. Davis), John Wiley and Sons, Inc., Hoboken, NJ, **2002**, pp. 361.

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*Come listen to the leaders of our profession!
Learn what our failures taught us about biomaterials!
Hear the vision of our field!*

Hello everyone! I know this is a busy time of the year, but I wanted to take this opportunity to update all of you on the exciting venue for students at the upcoming 2006 SFB meeting in Pittsburgh. One student workshop will focus on helping graduate students choose between a career in academia or industry. The workshop is divided into three sections. The first section will focus on the differences between academia and industry and will be led by individuals who started their career in one venue and switched to the other. The second section will focus on developing interviewing skills. The third section will focus on budget development for a winning project proposal.

A career fair will also be held at the meeting, so get your resumes ready. I am still waiting to hear from a few more companies, but currently the companies that have confirmed participation include Integra Life Sciences Inc., WL Gore, Baxter Biosurgery, Smith & Nephew, Genzyme Corp., Cook, Medtronic, Wright Medical, Poly-Med Inc., and Boston Scientific. I hope all of you are able to attend and take advantage of these exciting opportunities. I am sure it will be an enriching experience for all.

Health Care Accessibility Workshop Held

Government News

By Christine A. Kelley,
Government News Contributing Editor

The National Institute of Biomedical Imaging and Bioengineering (NIBIB), in partnership with the National Science Foundation (NSF), organized a workshop to address the topic of "Improving Health Care Accessibility Through Point-of-Care Technologies." The meeting, held April 11-12, 2006, in Washington, D.C., brought together a diverse group of technology developers, clinicians, and clinical researchers to assess the technological developments required for advances in point-of-care testing and to identify high-priority clinical applications that can benefit from a point-of-care approach. Specifically, advances in several technology areas were considered, including sensors and lab-on-a-chip devices, noninvasive patient monitoring, low-cost imaging, health informatics, and telehealth. Clinical needs were addressed in the areas of primary care, emergency medical services, home and community-based health care, and health care in developing countries. Additionally, representatives from the *in vitro* diagnostics, patient monitoring, imaging, and telehealth industries provided their perspectives on commercializing technologies for point-of-care use. The impact of regulatory and reimbursement issues were addressed, as were various

topics relevant to the manufacturing of low-cost devices. Attendees learned about the challenges and opportunities associated with the development and adoption of point-of-care technologies from a "systems" perspective, and discussed, with experts in the field, their concerns about establishing programs in this area. The meeting highlighted successful collaborations and provided opportunities to network with clinicians and technology developers to begin building interdisciplinary teams. Additionally, the meeting presented an opportunity to inform the National Institutes of Health, NIBIB, and NSF about the role that these agencies can play in bridging the technology/clinical gap.

Please visit the workshop Web site (www.capconcorp.com/nibib2006) for more information about the technologies and clinical settings discussed, and for future announcements.

This activity was approved for American Medical Association Physicians Recognition Award credit.

Advanced Bio-Surfaces Inc., Minneapolis, Minn., announced it has received from the Food and Drug Administration 510(k) clearance to market its OrthoGlide Medial Knee Implant. The OrthoGlide implant is composed of a cobalt-chrome alloy and is intended to replace some of the cartilage functions that are lost due to osteoarthritis. The implant's engineering design provides positional stability without the use of rigid fixation methods. In addition, the specially contoured geometry of the implant provides an open glide path, allowing the unconstrained motion of the femoral condyle.

Ceragenix Pharmaceuticals Inc., Denver, Colo., a development-stage biopharmaceutical company, announced that it has entered into a Cooperative Research and Development Agreement (CRADA) with the Centers for Disease Control and Prevention (CDC) to evaluate the efficacy of Ceragenix's Ceracide™ antimicrobial coating for the prevention of bacterial biofilm growth on medical devices. The research plan will evaluate Ceragenix's Ceracide antimicrobial coating using the CDC's Biofilm Reactor, a specially designed device that is able to reproducibly grow biofilms in an environment mimicking the body conditions under which bacteria form such films, including fluid turbulence.

Hoffman Laboratories LLC, Chatsworth, Calif., announced the U.S. market launch of a wearable continuous positive airway pressure (CPAP) device, BreatheX. The product was approved by the FDA on December 31, 2005, for the treatment of obstructive sleep apnea in adults weighing 30 kg or more. The lightweight device is made of a computer-controlled motorized blower assembly that provides positive airway pressure ranging from 5 to 12 cm H₂O according to preprogrammed parameters. It is compatible with most masks and nasal pillow systems, and contains a built-in rechargeable battery capable of providing one to two nights of therapy (10 hours at 12 cm H₂O or 12 hours at 10 cm H₂O) on a single charge.

Kensey Nash Corp., Exton, Pa., announced Food and Drug Administration approval of their aspiration catheter, QuickCat, for the removal of fresh soft emboli and thrombi from vessels in the arterial system. According to a company

news release, the fully disposable extraction catheter combines a high level of deliverability and ease of use with rapid and reliable thrombus removal. The device will be launched on the U.S. market shortly and is expected to complement the company's ThromCat thrombectomy catheter system, a more powerful mechanical device that uses proprietary technology to remove more organized thrombi. The thrombectomy device is currently under review for FDA approval.

MediSpectra Inc., Lexington, Mass., announced Food and Drug Administration approval of their cervical imaging system, LUMA, for use as an adjunct to colposcopy for the early detection of high-grade cervical cancer precursors in women with a Papanicolaou (Pap) test result of atypical squamous cells, low-grade squamous intraepithelial lesion, high-grade squamous intraepithelial lesion, or cancer. According to a company news release, recent studies have shown that colposcopists miss up to one third of high-grade cervical cancer precursors in women with abnormal Pap tests. The noncontact optical imaging device scans tissue with a combination of fluorescence spectroscopy, white light diffuse reflectance spectroscopy, and video imaging. Because a complete scan is performed in only 12 seconds, clinicians are able to review findings during a typical patient examination.

Microbia Inc., Cambridge, Mass., announced that its precision engineering business unit has entered into a research collaboration with A*STAR's Bioprocessing Technology Institute (BTI) in Singapore to improve the efficiency of secondary metabolite production from actinomycete bacteria. Under the terms of the agreement, BTI scientists will combine Microbia's proprietary profiling and informatic methods with complementary metabolic engineering technology and approaches to construct a set of genetic tools designed to improve actinomycete-based pharmaceutical production systems. The initial target is to more efficiently produce specific cytotoxic metabolites under development for use in cancer therapeutics. Longer term, the partners' objective is to identify genes that facilitate rational strain improvement for a broad spectrum of pharmaceutical products made by taxonomically related microbes.

Community Calendar

Regenerate 2006

April 24-27, 2006
Westin Convention Center
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www.regenerate-online.com

Society For Biomaterials Annual Meeting & Exhibition

April 26-29, 2006
Pittsburgh, PA
www.biomaterials.org

Association for Research in Vision and Ophthalmology Annual Meeting

April 30-May 4 2006
Greater Fort Lauderdale/
Broward County Convention Center
Ft. Lauderdale, FL
www.arvo.org

Wound Healing Society 16th Annual Meeting & Exhibition

May 14-17, 2006
Double Tree Paradise Valley
Scottsdale, AZ
meetings@woundheal.org
www.woundheal.org

2nd International Symposium on Interface Biology of Implants

May 17-19
University of Rostock and Johannes Gutenberg University
Rostock, Germany
www.uni-rostock.de/ibi

American Society for Artificial Internal Organs 52nd Annual Conference

June 8-10, 2006
Palmer House Hilton
Chicago, IL
www.asaio.com

Controlled Release Society 33rd Annual Meeting & Exposition

July 22-26, 2006
Austria Center
Vienna, Austria
www.controlledrelease.org

World Congress on Medical Physics and Biomedical Engineering 2006

August 27-September 1, 2006
International Union for Physical and
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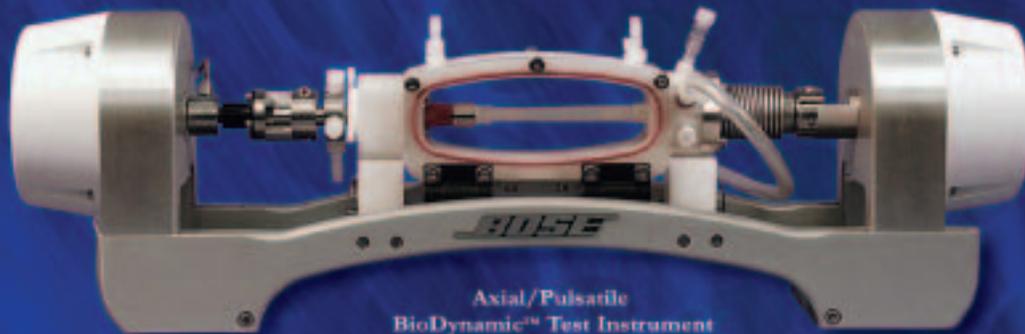
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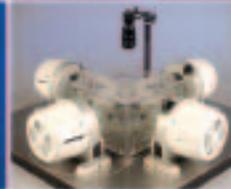
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