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UPCOMING EVENTS



17TH ANNUAL MEETING

November 17 - 21, 2010
Caribe Royale Hotel & Conference Center
Orlando, FL USA

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THE RADICAL VIEW

Joe Beckman, Ph.D.



Joe Beckman

DOT: Tell us about your background and what inspired you to pursue your Ph.D.?

Beckman: No one in my family was a scientist, but my mother (a history major) had run a chemical analytical lab at the end of WWII. She said chemistry was a lot like cooking; biochemistry turned out to be more so. I think a big factor was Sputnik. That Russian satellite scared people and there were lots of outside school activities created to encourage kids to study science. We were allowed to hang around after school with the science teachers. Teachers in high school were allowed to teach one or two advanced courses, so I had Organic Chemistry as a junior. I read about the structure of hemoglobin, which was just amazing. I also read James Watson's, *The Molecular Biology of the Gene*, which laid out how DNA could encode RNA and proteins. All of these discoveries were less than 10 years old and they were laying out the secrets of how life worked. There were no jobs or prospects of jobs in biochemistry at the time, but how could one resist being part of discovering how life works?

DOT: What was your most exciting discovery in research?

Beckman: Over the years, the most exciting discoveries came from the experiments that produced exactly the opposite of what I was absolutely convinced would be the result. These are the experiments to spend your time investigating further. The discovery with the greatest impact on my career is probably SOD-catalyzed tyrosine nitration. Late one night, I added SOD to study the reaction of hydrogen peroxide with peroxyntirite and the solution turned bright yellow (the color of peroxyntirite). I showed that the copper was needed for nitration and thought that there must be a complex with copper in the active site. But Craig Smith at UAB showed by x-ray crystallography that there was substantial electron density at the 3-position of tyrosine. A post-doc from China had left his organic chemistry book open on a bench to a figure showing the ionization of nitrophenol. Although the text was in Chinese, the figure suddenly rationalized a year's worth of experimental evidence. This was how we discovered tyrosine nitration. One never knows where the critical clue or insight will come from, so you have to really search broadly.

DOT: How has your discovery of tyrosine nitration, and development of the first anti-nitrotyrosine antibody changed your career?

Beckman: From a chemical point of view, it was obvious to me that the formation of peroxyntirite by the diffusion-limited reaction of superoxide and nitric oxide made far more sense than superoxide-driven Fenton chemistry. But this left most

SALARY SURVEY UPDATE

The Internal Marketing Committee just completed a salary survey with the goal of calculating average salaries for scientists, researchers and clinicians in the free radical and redox biology field, based on factors such as geographic location, experience and research/employment position. Survey results should provide a valuable resource to members who are interested in comparing their salary and benefits to colleagues around the world. Results will be published in early 2010.

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PRESIDENT'S MESSAGE: 2009 IN REVIEW

Victor Darley-Usmar, Ph.D.

Thanks to everyone who attended the 16th Annual Meeting in San Francisco, CA last month. Attendance was up 22% with nearly 700 people enjoying this truly wonderful city. There were many outstanding presentations and significant scientific interactions which contributed to the success of the meeting. We've made significant strides over the past year developing educational and professional development programs and resources for members - junior and senior investigators alike. The implementation of a new strategic plan and the direct participation of 125 members in these committees was the impetus behind our positive movement. My final "President's Message" of 2009 will provide a number of highlights and serve as a "State of SFRBM" if you will.



**Victor
Darley-Usmar**

Membership Report:

The Society currently has 1,723 members which is up 27% from 2008. The breakdown is: 788 Regular/Active, 111 Postdocs, 786 Students and 38 Emeritus.

Committee Reports:

- **Awards - Junior:** Secured 200+ judges for travel award and 43 for the young investigator awards. Provided over \$25,000 in funds and registration to young SFRBM members attending SFRBM 2009.
- **Awards - Senior:** Changed format for senior awards (now alternating every other year) and selected 2009 Discovery Award winner (David Lambeth).
- **Finance/Investments:** Initiated SFRBM Foundation, supports the acceptances and distribution of charitable gifts.
- **Free Radical School (FRS):** Selected speakers for 2009 Annual Meeting and posted 2008 FRS audio and presentation files on SFRBM website. Held initial FRS Virtual Seminar in October with over 100 participants.
- **Fundraising/Sponsorships:** Developed database of potential sponsors/exhibitors, created sponsorship brochure that resulted in \$30,800 of sponsorship and increased exhibitors to 12 (up from nine in 2008).
- **Marketing- Internal:** Published four quarterly issues of the DOT and conducted a compensation and benefit survey.
- **Marketing/PR- External:** Conducted study section survey and working with NIH to involve more SFRBM members as reviewers.
- **Membership- Recruitment:** Obtained 452 new student members by granting complimentary SFRBM membership through the end of 2010 if they attended a SFRBM supported meeting.
- **Membership- Retention:** Extended postdoc membership from three to five years and established multi-year membership rates for Regular/Active members that will be offered in 2010.
- **Nominations/Leadership Development:** Developed list possible nominees for president-elect (elections to be held in summer of 2010) and developed

RESEARCH MINI-FELLOWSHIP PROGRAM

SFRBM is pleased to announce the 2010 Research Mini-Fellowship Program which will provide additional research training opportunities for young investigators in the field of free radical biology that are not available at their home institution. The program will allow young investigators to cultivate collaborative relationships with established scientists, develop novel techniques or methodologies and expand their career development and research opportunities. A total of four fellowships will be funded each year. The deadline for the first cycle is March 15, 2010.

Eligibility

1. Applicant must be a current member of the Society for Free Radical Biology and Medicine.
2. Applicant must be one (1) of the following:
 - Student, enrolled in a Ph.D. graduate school training program
 - Post-doctoral fellow
 - Clinical fellow/medical trainee
 - Investigator within five (5) years of obtaining their Ph.D. or MD
 - Junior faculty within two (2) years of their initial appointment as Assistant Professor.
3. Only one application per young investigator in each funding cycle (February-July and August through January) will be considered.

Visit www.sfrbm.org/fellowships.php for an application and more information.



2009 YOUNG INVESTIGATOR AWARD WINNERS

SFRBM recognized 15 student and postdoc members with Young Investigator Awards (YIAs) for their outstanding research at the society's 16th Annual Meeting in San Francisco. Each winner received \$500 cash and a free registration to the association's 2010 or 2011 Annual Meeting.

Sayanti Bhattacharya - Stanford University

Katarzyna Broniowska - Medical College of Wisconsin

Chiara Cipollina - University of Pittsburgh

Liuji Chen - Univ. of Texas HSC - San Antonio

Nikolai Chepelev - Carleton University

Gabor Csanyi - University of Pittsburgh

David Cox - University of Washington

Andrew Das - University of Otago

Heather Jackson - Emory University

Sajni Josson - Cedars-Sinai Medical Center

Amanda Melillo - Albany Medical College

Don-Ricardo Miller - Georgia Institute of Technology

Jennifer Streeter - The University of Iowa

Katherine Wood - National Institutes of Health

Oksana Zagorodna - The University of Iowa

Please visit www.sfrbm.org/news.php for a complete list of award winners and the title of their research abstracts.

GRANT REVIEWER SURVEY RESULTS

Several months ago the Marketing/Public Relations - External Committee conducted a survey asking SFRBM members about participation in reviewing grant applications and where their grants were reviewed. The purpose of this was to obtain information that would help the society place our members on appropriate study sections of the agencies that fund research in our field. SFRBM is currently partnering with NIH to suggest members who can serve as study section reviewers (see article at right).

Grant Reviewer Survey Results:

- The number of panels served by SFRBM members:
 - 0 8%
 - 1 to 3 21 %
 - 4 to 10 32 %
 - 10 or more 39 %
- Funding agencies that SFRBM members have reviewed for:
 - NIH 93%
 - AHA 39%
 - NSF 22%
 - EPA 9%
 - ACS and AICR 7%
 - CDC/NIOSH 6%
 - ALA/ATS 4%
 - CFF 2%
- Which sources have supported SFRBM members research related to redox biology/chemistry?
 - NIH 95%
 - AHA 37%
 - ALA/ATS and AICR 9%
 - NSF 8 %
 - EPA 6%
 - ACS 4%
 - CFF 2%
 - CDC/NIOSH 1%
- What types of funding applications do SFRBM members have experience reviewing?
 - Single Investigator Grants 97%
 - Individual Fellowships 56%
 - Programmatic Grants 48%
 - Non-US Proposals 37%
 - Training Grants 29%

STUDY SECTION REVIEWERS FOR NIH

The NIH's Center of Scientific Review has contacted SFRBM asking for the society's assistance in identifying new reviewers that could serve on study sections. According to NIH official Toni Scarpa, they are looking for scientists who are not already a member of a study section (new reviewers), experienced senior scientists, have received major peer-reviewed support either from the NIH or an equivalent agency, understand the grant review process and are willing to serve as study section members. Current or prior RO1 funding or equivalent is required before self-nomination.

Submission of names from SFRBM to the NIH would be an ongoing process and "member activity" would be trackable – at the end of each year, the NIH would provide SFRBM with information on how many of our volunteer reviewers actually served on study sections. Scarpa emphasized that SFRBM can increase its numbers on study sections through this process since "you are ensuring that CSR's SROs (Scientific Review Officers) consider your members when they select reviewers."

Beside the prerequisite contact information, volunteers are asked to indicate area of expertise, the most appropriate study section or Integrated Review Group, if known, and recent funding sources. SFRBM has already circulated a on-line link to senior members encouraging them to submit their information for consideration. You can also contact SFRBM at info@sfrbm.org or (317) 205-9482 to indicate your interest by December 20, 2009.

SOCIETY FOR FREE RADICAL BIOLOGY AND MEDICINE FOUNDATION

SFRBM is pleased to announce the creation of the Society for Free Radical Biology and Medicine Foundation, a new non-profit organization dedicated to supporting the objectives and activities of the Society for Free Radical Biology and Medicine (SFRBM). Garry Buettner, Ph.D., The University of Iowa, is the President of the SFRBM Foundation and shared with us the Foundation's goals.



Garry Buettner

DOT: Why start the Foundation?

Buettner: Since SFRBM's inception in 1987, the association has worked to establish a strong professional network, facilitate scientific interaction, and develop resources for free radical researchers and investigators throughout the world. SFRBM is now a mature society and it is an appropriate time to focus on developing long term funding mechanisms to ensure continued support for these activities. We anticipate that the Foundation will be funded by diverse sources, including member donations, industry contributions, foundation grants and individual philanthropy.

DOT: What impact is hoped to be achieved with the Foundation?

Buettner: The SFRBM Foundation's key objectives are:

- To foster and support the SFRBM's current charitable, educational and scientific objectives and purposes, including the Society's education, training and research programs;
- To help fund new opportunities for program development in the areas of education, training and research programs.

The ultimate impact of the Foundation's achievements cannot be easily measured. Rather, it will be demonstrated through the development of scientists who benefit from SFRBM programs.

DOT: Why should someone donate?

Buettner: SFRBM has supported members for over two decades. Members will be able to donate to support a specific program or award, such as a Young Investigator/Travel Award or the Society's Mini-Fellowship initiative. They will also be able to donate to honor the memory of a colleague or leader in our field or as part of individual estate and tax planning. As one specific example, the Society has provided \$300,000 in Travel and Young Investigator Award support to scientists in the early stages of their career. The Foundation now provides a mechanism by which members can give back to the Society and support the next generation of scientists so that they may fully realize their professional goals.

DOT: How can someone donate?

Buettner: The SFRBM Foundation will provide several convenient ways in which members may contribute. Members will be able to make online donations or by sending a check. More information about this will be available in January 2010 at www.sfrbm.org/sfrbmfoundation.php.

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LITERATURE REVIEW

Readers interested in nominating a paper or providing a short editorial review (less than 150 words), should contact Ashleigh Bates at abates@hp-assoc.com.

Prdx1 inhibits tumorigenesis via regulating PTEN/AKT activity. *Cao, J.; Schulte, J.; Knight, A.; Leslie, N.R.; Zagozdzon, A.; Bronson, R.; Manevich, Y.; Beeson, C.; Neumann, C.A. EMBO J. (2009) 28:1505-1517.*

Phosphatase activity of the tumor suppressor protein PTEN is inhibited by oxidation resulting in increased Akt activity which is critical for transformation via both ErbB-2 and Ras. In this study, Cao et al. characterize an interaction between peroxiredoxin1 (Prdx1) and PTEN which conserves its tumor suppressive function that is otherwise lost in response to oxidation. The interaction was subsequently mapped via mutational analysis to the C2 domain of PTEN and both termini of Prdx1. Prdx1-deficient cells increase their levels of oxidized PTEN as well as Akt activity. Correspondingly, recombinant Prdx1 protects PTEN from oxidation and preserves its phosphatase activity. The importance of reactive oxygen species to the tumorigenesis is well established and this manuscript mechanistically highlights how Prdx1's peroxidase activity is coupled to the preservation of tumor suppressor function. *Review by Nicole L. Flaherty and J. Andres Melendez, Albany Medical College.*

Nitrite protects against morbidity and mortality associated with TNF or LPS-induced shock in a soluble guanylate cyclase-dependent manner. *Cauwels, A., Buys, E.S., Thoonen, R., Geary, L., Delanghe, J. Shiva, S., and Brouckaert, P., J. Exp. Med., Nov. 23, 2009 (ahead of print, www.jem.org/cgi/doi/10.1084/jem.20091236).*

Nitrite (NO₂⁻) has gained much-deserved traction in recent years as a critical NO reservoir and thus vasodilatory precursor and cytoprotective agent for hypoxic and I/R injury. Nitrite reduction to NO occurs enzymatically under low O₂ tension by deoxy-hemoglobin, deoxymyoglobin, XOR, mitochondrial complexes, or NO synthase (NOS). Yet, the relative contribution of these sources to overall NO formation is currently unclear. Addressing this issue, the authors utilize a murine model of shock induced by TNF and reveal protective effects of NO₂⁻ administration (attenuation of hypothermia, mitochondrial damage, oxidative stress, tissue infarction, and mortality) while demonstrating exacerbation of these parameters upon global NOS inhibition with L-NAME. They conclude NO₂⁻-induced protection is not mediated by mitochondrial complex I, but rather dependent upon sGC α 1 as knockout of this gene abolished the salutary effects of NO₂⁻ administration. *Review by Eric E. Kelley, University of Pittsburgh.*

Manganese import is a key element on the OxyR response to hydrogen peroxide. *Adi Anjem, Shery Varghese and James A. Imlay. Molecular Biology 2009, 72, 844-858.*

Previous studies have shown that SOD-deficient *E. coli* (sodAsodB) can grow aerobically only if the growth medium is supplied with MnCl₂. The data have thus far been discussed with respect to superoxide-dismutating activity of Mn²⁺, bound to low molecular weight ligands (such as carboxylates). This SOD-like ability of manganese has already been reported by several different groups. If not removed, superoxide would attack Fe/S clusters leading to the release of Fe and consequent Fenton chemistry. This paper offers a challenging explanation regarding the strategy for how *E. coli* utilizes manganese to fight oxidative stress imposed by hydrogen peroxide. The study showed that Mn does not protect peroxide-stressed cells by scavenging peroxide. Rather, it appears that under oxidative stress and when the Mn transporter MntH is induced, *E. coli* incorporates Mn (rather than Fe) into otherwise Fe-bearing enzymes, which blunts further oxidative stress (Fenton chemistry). *E. coli* could not tolerate the oxidative stress if the Mn transporter gene, MntH, was deleted. *Review by Ines Batinic-Haberle, Duke University.*

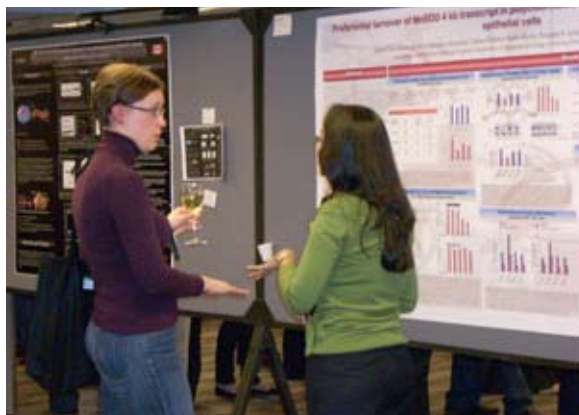
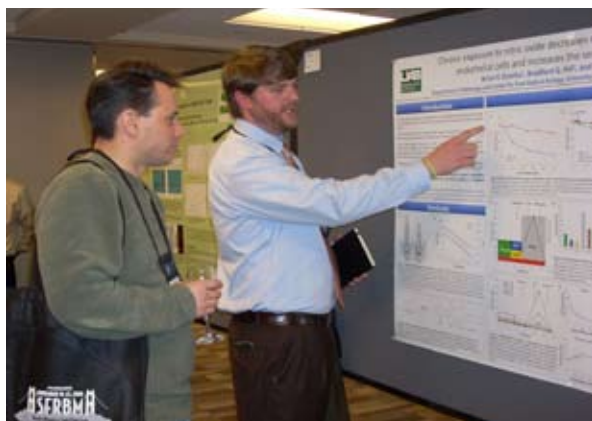
WIS: MENTORING PROGRAM

The mentoring program, organized by the Women in Science Committee (WIS), has now completed its first year. This program is designed for all members of SFRBM, men and women, to facilitate networking and mentoring between the established scientists in the Society and young scientists at the student, post-doctoral or junior faculty level. The participation increased dramatically this fall, with an additional 33 mentees and about 15 mentors joining the 22 current mentor-mentee pairs. Many of the participants met at the recent meeting and we are recruiting additional mentors to meet the enthusiastic response. Brief surveys will be sent semi-annually to participants to evaluate the program and provide feedback to continue to improve this well-received program. For more information contact Eva Nozik-Grayck, MD, University of Colorado Health Science Center at Eva.Grayck@ucdenver.edu or Maureen Gwinn, Ph.D., US EPA at gwinn.maureen@epa.gov.

PRESENTATIONS ON SFRBM WEBSITE

Annual Meeting presentations are now on SFRBM's website, www.sfrbm.org, including:

- **FRBM 2009 Editorial Report**
<http://www.sfrbm.org/pdf/FRBMEdReport2009.pdf>
- **Publishing a Highly Cited, High Impact Manuscript -**
 - *Anthony Newman, Elsevier & Bruce A. Freeman, Ph.D., University of Pittsburgh*
<http://www.sfrbm.org/members/login.php>
- **2009 Sunrise Free Radical School -**
 - What are Free Radicals? - *Garry R. Buettner, Ph.D., The University of Iowa*
 - ABCs of Reactive Nitrogen Species and their Scavengers - *Ohara Augusto, Ph.D., F.O.S., University of São Paulo*
 - Oxidatively Generated Damage to DNA: From Model Studies to the Cell - *Jean Cadet, Ph.D., INaC/SCIB/LAN*
 - Methods for Detecting Mitochondrial DNA Damage - *Scott Ballinger, Ph.D., Univ. of Alabama at Birmingham*
 - Flavonoids as Dietary Antioxidants: What are They? Do We Need Them? - *Balz B. Frei, Ph.D., Oregon State University*
 - Pro-Oxidants or Antioxidants - *Christine Winterbourn, Ph.D., University of Otago*
<http://www.sfrbm.org/SRFS2009.php>



2009 ANNUAL MEETING SUPPORT

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Radical View *continued from page 1*

biological and medical audiences asleep as they tend to believe that chemistry arguments don't apply in vivo because there is always some enzyme to catalyze the reaction. After Yaozu Ye (following on early work done by Harry Ischiropoulos) developed the first nitrotyrosine antibodies, we were amazed to see all of the different human disease states where tyrosine nitration showed up. At the time, the conventional wisdom in study sections at NIH was that humans do not make enough nitric oxide to be toxic. Yet, we found so much nitration that the first impressions of pathologists using our antibodies was to dismiss the antibody as nonspecific. Fortunately, there are several unique controls one can do with the antibody that can verify the specificity of nitrotyrosine. The nitrotyrosine antibodies were important for free radical biology because one could now visualize the remnants of oxidative damage in human diseased tissues. There is a new chapter emerging about nitration, now that Ryan Mehl (Franklin and Marshall University) has worked out methods to incorporate nitrotyrosine by genetic engineering into recombinant proteins. In the next few years, we will see multiple examples of how tyrosine nitration affects particular proteins and can directly participate in disease processes.

DOT: What do you feel were the most important factors that shaped your career?

Beckman: I was never a good student, and usually got something backwards that led to the wrong answer. I also read a lot in many different areas (rarely in what I was supposed to be studying) and was not afraid to make mistakes and spent a lot of time daydreaming. While usually wrong, this did allow me to find relationships that others had overlooked. I also found that scientists will almost never say your new idea is brilliant, but rather will suggest a hundred reasons why you must be wrong. You just have to grind away and watch for the unexpected result that will lead you in the right direction eventually.

DOT: How is working at Linus Pauling Institute different than working at a university? How does Oregon State University (OSU) compare to the University of Alabama (UAB)?

Beckman: All of the faculty in the Linus Pauling Institute have appointments in traditional university departments. What is great about being part of an Institute is that it forms connections between the silos that exist within departments and colleges and creates many new opportunities for cross-disciplinary research. OSU is a traditional land grant university in a state with a very small population, only half that of Alabama. UAB is a major medical center and the largest employer in Alabama, with ten times the budget of OSU. Being focused on medicine, it also is about ten times more focused on medical and translational research. One loses sight of how many other major problems the world faces and how many interesting questions remain that are not related to solving a human disease. Although I myself am trying to find a cure for ALS, I would rather find a way to prevent it. That is the broader push at OSU and within the Linus Pauling Institute.

DOT: How do you achieve balance between your personal and professional life?

Beckman: My work is my hobby. I feel lucky to be paid to study biology and enjoy the flexibility in time that academics offers. I take frequent breaks during the day to walk across campus to do some mundane administrative chore (and stop at the coffee shop), to go exercise or to take a nap. This profession offers many chances to travel and taking a day or two at the end of each trip can really help clear the head. I sometimes stay for several days longer to start writing a grant or major paper, which helps me focus on the task while also leaving free time to go explore. Finally, it is important to take real vacations with no work. I have to do something active like rafting or skiing to shut off my thinking about work. That was the other advantage of coming to Oregon.

President's Message *continued from page 2*

database of 35 people who may be approached to run for council in 2010.

- **Publications:** Conducted elections for FRBM Associate Editors and Editorial Board members whose terms end at the end of the year. Produced 24 issues of FRBM (print and on-line). The FRBM Impact Factor now at 5.399 (up from 4.813 in 2008) with 22,871 citations (an increase of 1,500).
- **Website:** Re-established members only section on website, worked with FRS committee to post 2008 FRS files on website and moved website to more robust server.
- **Strategic Alliances & Outreach:** Developed an educational session with the Society of Toxicology for their March 2010 meeting and provided financial support for four meetings.
- **Women in Science (WIS):** Continued developing mentoring program that has more than 30 participants, organized 2009 Opening Doors Workshop and merged WIS website into SFRBM website.
- **Young Investigators/Trainees:** Programmed a grantmanship workshop at SFRBM 2009 and developed a mini-fellowship program.

Financial Report:

The projected 2009 year-end figures for SFRBM are as follows: \$612,637 in revenue and \$630,373 in expense for a \$17,736 loss. Current fund balance will be about \$304,000. The 2009 budget was \$602,950 in revenue and \$613,462 in expense for a \$10,512 loss. The projected 2010 budget is \$755,000 in income and \$705,000 in expense for a \$50,000 profit.