

## College of Medicine Curriculum Vitae

**Garry R. Buettner, Ph.D.**

03/2007

### Links to specific Sections of CV

- I. [Education and Professional History](#)
- II. [Teaching Activities at The University of Iowa](#)
- III. [Scholarship](#)
  - A. [Research Papers](#)
  - B. [Books/Chapters](#)
  - C. [Abstracts](#)
  - D. [Reviews](#)
  - E. [Electronic Publications](#)
  - F. [Other Publications](#)
  - G. [Research](#)
  - H. [Invited Lectures](#)
  - I. [Pending Decisions](#)
- IV. [Service](#)
- V. [Physical Facilities](#)
- VI. [Personnel and Students Currently Supervised](#)

### I. Education And Professional History

#### Education

<u>YEAR</u>	<u>FELLOWSHIP</u>	<u>INSTITUTION</u>
1985-1987	Fulbright Scholar	GSF Research Institute - Munich, Germany
1984-1985	NRSA Senior Fellow	NIH/NIEHS – North Carolina
1976-1978	Post Doctoral Fellow	Radiation Research Lab – The University of Iowa
	<u>DEGREE</u>	
1976	Ph.D	The University of Iowa - Chemistry
1971-1972	Graduate hours	21 h physics & chemistry while on active duty with the USAF
1969	M.S.	The University of Iowa – Chemistry
1967	B.A.	University of Northern Iowa - Chemistry

#### Academic Appointments

<u>YEAR</u>	<u>APPOINTMENT</u>	<u>INSTITUTION</u>
2001-present	Professor, Radiation Oncology in the Free Radical & Radiation Biology	The University of Iowa

1999-2001	Program Professor, Radiology Free Radical & Radiation Biology Prog	The University of Iowa
1997-1999	Associate Professor, Radiology	The University of Iowa
1995-1997	Research Scientist	The University of Iowa
1993-1997	Adjunct Associate Professor	The University of Iowa
1988-Present	Director, ESR Facility	The University of Iowa
1978-1984	Assistant Professor, Chemistry	Wabash College
1982-1983	Chairman, Chemistry Dept.	Wabash College
1981 (summer)	Visiting Professor	National Biomedical ESR Center, Medical College of Wisconsin

### **Other Employment**

<b><u>YEAR</u></b>	<b><u>APPOINTMENT</u></b>	<b><u>INSTITUTION</u></b>
1988 (Jan.-Sep.)	Senior Expert	National Institute of Environmental Health Sciences - North Carolina
Sep. 1985- Dec. 1987	Guest Scientist and Fulbright Scholar	GSF Research Institute – Munich, Germany
Sep. 1969- June 1973	USAF	Active Duty – Scientific Computer Programmer at the Air Force Global Weather Central, Offutt AFB

### **Honors and Awards**

**NSF Fellowship** during graduate education;

**Fulbright Scholar** (Germany) 1985-1987;

"**Citation Classic**", selection by the Institute for Scientific Information, the publishers of Current Contents, of research paper: Buettner, G.R. and Oberley, L.W. (1978) "Considerations in the spin trapping of superoxide and hydroxyl radicals in aqueous systems using 5,5-dimethyl-1-pyrroline-1-oxide." *Biochem. Biophys. Res. Commun.* 83: 69-74. [http://dx.doi.org/doi:10.1016/0006-291X\(78\)90398-4](http://dx.doi.org/doi:10.1016/0006-291X(78)90398-4)

"**Citation Classic**", selection by the Institute for Scientific Information, the publishers of Current Contents, of research paper: Buettner, G.R., Oberley, L.W., and Leuthauser, S.W.H.C. (1978) "The effect of iron on the distribution of superoxide and hydroxyl radicals as seen by spin trapping and on the superoxide dismutase assay." *Photochem. Photobiol.* 28: 693-695.  
<http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/P&P-1978-28-693-DETAPAC.pdf>

### **Citation Classic Commentary:**

"**Citation Classic**", selection by the Institute for Scientific Information, the publishers of Current Contents, for: Oberley, L.W. and Buettner, G.R. (1979) "The role of superoxide dismutase in cancer: A review." *Cancer Research* **39**: 1141-1149.  
<http://www.medicine.uiowa.edu/esr/completepublications/GRB-Papers-pdf/CancerRes-1979-39-1141-SOD.pdf>

**Invited Review** for *Arch. Biochem. Biophys.* (1993). "The pecking order of free radicals and antioxidants: Lipid peroxidation,  $\alpha$ -tocopherol, and ascorbate." **300**:535-543.  
<http://dx.doi.org/10.1006/abbi.1993.1074>

As a result of my work with Drs. Sharma and Kerber, Dr. Mukesh Sharma won the **1992 Young Investigator Award** competition of the American College of Cardiology for the work, "Ascorbyl free radical, a real-time marker of oxidative myocardial stress: An electron paramagnetic resonance study". This response is an indication of the new and novel approaches we've developed as well as the exciting findings resulting from our collaborative research.

James A. North (Ph.D. 1993, Department of Biochemistry) won the **Honored Student Award** from the American Oil Chemists Society at the April, 1993, annual meeting in Anaheim, CA. This research award was presented for his work that resulted from the ESR Facility.

Ms. Beth Jurkiewicz received the **Young Investigator Travel Award** from the Symposium organizers to attend the 4th International Symposium on Spin Trapping and Organic EPR Spectroscopy held in Oklahoma City, OK, October, 1993. She presented: "UV Light-Induced Free Radical Formation in Intact Skin." B.A. Jurkiewicz and G.R. Buettner.

Ms. Beth Jurkiewicz won the **Oxygen Society Young Investigator Award** to attend the Annual Meeting of the Oxygen Society in Charleston, SC, November, 1993. She presented: "UV Light-Induced Free Radical Formation in Skin: An EPR Study." B.A. Jurkiewicz and G.R. Buettner.

Ms. Beth Jurkiewicz has received a **Travel Grant Award** to attend the upcoming American Society for Photobiology meeting to be held in Scottsdale, AZ, June 25-29, 1994. She will present her work on "The role of iron in UV light-induced free radical formation in intact skin." B.A. Jurkiewicz and G.R. Buettner.

Dr. Beth Jurkiewicz won the **Oxygen Society Young Investigator Award** at the 1995 meeting in Pasadena, CA, for her work "Mouse and Man: UV radiation-induced free radical formation in human skin." B.A. Jurkiewicz and G.R. Buettner.

Mr. Yue (Steven) Qian won a **Radiation Research Society Young Investigator Award** to attend the annual meeting in April 1996 to present "Iron in free radical oxidations." by Y. Qian and G.R. Buettner.

Mr. Yue ((Steven) Qian received the **Oxygen Society Young Investigator Award** at the 1996 annual meeting in Miami, FL, for his work "Iron-oxygen complexes may be more important than the Fenton reaction in initiating biological free radical oxidations: An EPR spin trapping study." by Yue Qian and Garry R. Buettner

Mr. David Hall received the **Oxygen Society Young Investigator Award** at the 1996 annual meeting in Miami, FL, for his work "Whole body hyperthermia stimulates ROS generation and produces splanchnic endotoxin *in vivo*: involvement of xanthine oxidase." by DM Hall, TD Oberley, LW Oberley, GR Buettner and CV Gisolfi.

Hong Wang (Graduate Student), Yue Qian (Graduate Student) and Dr. Freya Schafer (Postdoctoral Fellow) all received **travel awards** to attend and present their data at the annual meeting of the American Society for Photobiology in St Louis, MO July 5-10 1997

Hong Wang (Graduate Student), Yue Qian (Graduate Student), Eric Kelley (Graduate Student) and Dr. Freya Schafer (Postdoctoral Fellow) all received **travel awards** to attend and present their data at the annual meeting of the American Society for Photobiology in Snowbird, UT July 11-15, 1998

Mr. Eric E. Kelley received an **Oxygen Society Young Investigator Award** at the 1998 annual meeting in Washington, D.C., for his work "Nitric oxide inhibits iron-induced lipid peroxidation in HL60 cells" at the Oxygen Society Annual meeting, November 20-23, 1998

**Master Teacher Award** from The Oxygen Society/Free Radical Research Society, November 1999. The award was given for outstanding teaching and the overwhelming success of the *Sunrise Free Radical School* that is now an integral part of the Society's annual meeting.

**Staples Distinguished Lecturer**, University of Maine, September 21-22, 2000. This is a great honor as previous Staples Distinguished Lecturers include Nobel Laureates and National Academy of Sciences members.

**President of the Society for Free Radical Biology and Medicine**, 2004-2006. This Scientific Society is the leading scientific organization for researchers in the new and emerging field of free radical and redox biology. <http://www.sfrbm.org>

**Society for Free Radical Research International, 2002-2008.** Executive committee member. <http://www.sfrr.org>

**Distinguished Service Award, Society for Free Radical Biology and Medicine, 2006.**

## II. Teaching Activities at The University of Iowa

<u>Year</u>	<u>Course Title</u>	<u>Reg. No.</u>	<u>Length</u>	<u>% Responsible</u>
1992	<i>Free Radicals in Biology and Medicine</i> New subject matter; more than 50% of material presented was from the recent primary literature.	77:308	1 semester 3 credit hours	50%
1994	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester(3 h)	50%
1994	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	33%
1995	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester (4 h)	50%
1995	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	33%
1996	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	33%
1996	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	33%
1997	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	33%
1997	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester (4 h)	50%

1997	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
1998	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%
1998	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
1999	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester (4 h)	50%
1999	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%
1999	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
2000	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%
2000	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
2001	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester (4 h)	60%
2001	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%
2002	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
2003	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester (4 h)	60%
2003	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%
2004	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
2005	<i>Free Radicals in Biology and Medicine</i>	77:222	1 semester (4 h)	60%
2005	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%
2006	<i>Current Topics in Free Radical Biology and Medicine</i>	77:545	1 semester (1 h)	50%
2006	<i>Current Topics in Free Radical Biology and Medicine</i>	77:546	1 semester (1 h)	50%

#### **Other Teaching Activities at The University of Iowa**

1989-1991	Free radical seminar series	Monthly
1988-1994	Workshops on EPR	4 h/semester
1988-1999	Informal teaching on free radicals and ESR	8 h/week
June 1993	Free Radicals, Oxidants and Tissue Injury: The University of Iowa Symposium (organized and presented)	1 Day Symposium
June 1993	Free Radicals in Toxicology and Medicine University of Kentucky, Lexington	TOX780:022 10 lectures
1994 - present	Free Radical Journal Club	Weekly
June 1995	Free Radicals in Toxicology and Medicine University of Kentucky, Lexington	TOX780:022 10 lectures

Oct. 1995                      Nitric Oxide: A new frontier in free radical                      1 Day Symposium  
research. (Organized and presented.)

### **Masters' and Ph.D. Theses Directed and Postdoctoral Fellows Supervised**

Beth A. Jurkiewicz Ph.D. Radiation (and Free Radical) Biology, 1995  
Ph.D. Thesis title: "The role of free radicals, iron, and antioxidants in ultraviolet radiation-induced skin damage." Nominated by the Department for the Spriestersbach Dissertation Prize, 1997.

Yue Qian, M.S. Radiation (and Free Radical) Biology, 1996  
M.S. Thesis title: "The role of iron in free radical oxidations: EPR spin trapping studies on the initiation of chemical, biochemical, and cellular oxidations."

Kelley, Eric, M.S. Radiation (and Free Radical) Biology, 1999  
M.S. Thesis title: Nitric oxide can inhibit photodynamic therapy-induced lipid peroxidation of cancer cells

Yue (Steven) Qian, Ph.D. Free Radical and Radiation Biology, 1999  
Ph.D. Thesis title: Detection of lipid-derived radicals from PUFA, LDL, and cell oxidations: An EPR spin trapping study.

Hong Wang, Ph.D. Free Radical and Radiation Biology, 2000.  
Ph.D. Thesis title: The Role of Mitochondrial PhGPx in Cancer Therapy

Lingjie Zhao, M.S. Free Radical and Radiation Biology, 2001.  
M.S. Thesis title: Decreasing PhGPx expression by antisense oligodeoxynucleotides sensitizes MCF-7 Cells to photofrin photosensitization.

Kelley, Eric, Ph.D. Free Radical and Radiation Biology, 2002  
Induction of endogenous nitric oxide production sensitizes human breast cancer cells to Photofrin®-photosensitization.

Dr. Freya Schafer, 1/97-7/99. Postdoctoral Associate: Research project - the mechanism of antioxidant-action in photodynamic therapy.

Dr. Sujatha Venkataraman 3/1999 – 2004. Postdoctoral Associate: Research project - the mechanism of hyperthermia as an adjunct to cancer therapy as well as the basic biological chemistry of nitric oxide.

Min Wang, Ph.D. Free Radical and Radiation Biology, 2004.  
Ph.D. Thesis title: Manganese superoxide dismutase suppressed the accumulation of hypoxia inducible factor-1 $\alpha$  and the induction of vascular endothelial growth factor under hypoxia.

Dr. Galina Kramarenko, 7/2004-6/2006 Postdoctoral associate, research project addressed the role of H<sub>2</sub>O<sub>2</sub> and ascorbate in PDT.

### **Other contributions**

Tithing?

### **Course Materials**

Developed and continue to develop a comprehensive set of notes for the class *Free Radicals in Biology and Medicine*, 77:222. The goal is to prepare a textbook for this area of science.

Developed the Sunrise Free Radical School and Virtual Free Radical School web sites. These are the most widely used learning and teaching aides in the world on free radical biology.

### III. Scholarship

#### Bibliography

##### A. Research Papers

1. Buettner GR, Coffman RE. (1977) EPR determination of the Co(II)-free radical magnetic geometry of the doublet species arising in a coenzyme B(12)-enzyme reaction. *Biochim Biophys Acta* **480**: 495-505. [http://dx.doi.org/doi:10.1016/0005-2744\(77\)90042-0](http://dx.doi.org/doi:10.1016/0005-2744(77)90042-0)
2. \*Buettner GR, Oberley LW. (1978) Considerations in the spin trapping of superoxide and hydroxyl radicals in aqueous systems using 5,5-dimethyl-1-pyrroline-1-oxide. *Biochem Biophys Res Commun* **83**: 69-74. **\*\*Citation Classic\*\***  
[http://dx.doi.org/doi:10.1016/0006-291X\(78\)90398-4](http://dx.doi.org/doi:10.1016/0006-291X(78)90398-4)
3. \*Buettner GR, Oberley LW, Leuthauser SWHC. (1978) The effect of iron on the distribution of superoxide and hydroxyl radicals as seen by spin trapping and on the superoxide dismutase assay." *Photochem Photobiol* **28**: 693-695. **\*\*Citation Classic\*\*** pdf @ <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/P&P-1978-28-693-DETAPAC.pdf>
4. Buettner GR, Oberley LW. (1979) Superoxide formation by protoporphyrin as seen by spin trapping. *FEBS Lett* **98**: 18-20. [http://dx.doi.org/doi:10.1016/0014-5793\(79\)80141-6](http://dx.doi.org/doi:10.1016/0014-5793(79)80141-6)
5. Oberley LW, Buettner GR. (1979) The production of hydroxyl radical by bleomycin and Fe(II). *FEBS Lett* **97**: 47-49. [http://dx.doi.org/doi:10.1016/0014-5793\(79\)80049-6](http://dx.doi.org/doi:10.1016/0014-5793(79)80049-6)
6. Buettner GR, Oberley LW. (1979) The production of hydroxyl radical by tallsomycin and copper(II). *FEBS Lett* **101**: 333-335. [http://dx.doi.org/doi:10.1016/0014-5793\(79\)81037-6](http://dx.doi.org/doi:10.1016/0014-5793(79)81037-6)
7. Burns CP, Luttenegger DG, Dudley DT, Buettner GR, Spector A.A. (1979) Effect of modification of plasma membrane fatty acid composition in fluidity and methotrexate transport in L-1210 murine leukemia cells. *Cancer Research* **39**: 1726-1732. <http://cancerres.aacrjournals.org/cgi/content/abstract/39/5/1726>
8. \*Coffman RE, Buettner GR. (1979) A limit function for long-range ferromagnetic and antiferromagnetic superexchange. *J Phys Chem* **83**: 2387-2391. <http://dx.doi.org/doi:10.1021/j100481a017>
9. Coffman RE, Buettner GR. (1979) The general magnetic dipolar interaction of spin-spin coupled molecular dimers: Application to an EPR spectrum of xanthine oxidase. *J Phys Chem* **83**: 2392-2400. <http://dx.doi.org/doi:10.1021/j100481a018>
10. Oberley LW, Oberley TD, Buettner GR. (1980) Cell differentiation, aging and cancer: The possible roles of superoxide and superoxide dismutase. *Med. Hypotheses* **6**: 249-268. [http://dx.doi.org/10.1016/0306-9877\(80\)90123-1](http://dx.doi.org/10.1016/0306-9877(80)90123-1)
11. Buettner GR, Oberley LW (1980) The apparent production of superoxide and hydroxyl radicals by hematoporphyrin and light as seen by spin trapping. *FEBS Lett* **121**: 161-164. [http://dx.doi.org/doi:10.1016/0014-5793\(80\)81288-9](http://dx.doi.org/doi:10.1016/0014-5793(80)81288-9)



12. Oberley LW, Oberley TD, Buettner GR (1981) Cell division in normal and transformed cells: The possible role of superoxide dismutase and hydrogen peroxide. *Med. Hypotheses* **7**: 21-42. [http://dx.doi.org/doi:10.1016/0306-9877\(81\)90018-9](http://dx.doi.org/doi:10.1016/0306-9877(81)90018-9)
13. Buettner GR, Doherty TP, Patterson LK. (1983) The kinetics of the reaction of superoxide with Fe(III)EDTA, Fe(III)DETAPAC and Fe(III)HEDTA. *FEBS Lett* **183**: 143-146. [http://dx.doi.org/10.1016/0014-5793\(83\)80695-4](http://dx.doi.org/10.1016/0014-5793(83)80695-4)
14. Buettner GR, Doherty TD, Bannister TB. (1984) Hydrogen peroxide and hydroxyl radical formation by methylene blue in the presence of ascorbate. *Rad Environ Biophys* **23**: 235-242. <http://dx.doi.org/doi:10.1007/BF01407595>
15. Buettner GR. (1984) Thiyl free radical production with hematoporphyrin derivative, cysteine and light: A spin-trapping study. *FEBS Lett* **177**: 295-299. [http://dx.doi.org/doi:10.1016/0014-5793\(84\)81303-4](http://dx.doi.org/doi:10.1016/0014-5793(84)81303-4)
16. Motten AG, Buettner GR, Chignell CF. (1985) A spin-trapping study of light induced free radicals of chlorpromazine and promazine. Spectroscopic studies of cutaneous photosensitizers VIII. *Photochem Photobiol* **42**: 9-15.
17. Buettner GR, Need MJ. (1985) Hydrogen peroxide and hydroxyl free radical production by hematoporphyrin derivative, ascorbate and light. *Cancer Lett* **25**: 297-304. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/CancerLett-25-1985-297-grb-AscH-Photofrin.pdf>
18. Buettner GR.(1985) An easy DCl(g) prep for the basic HCl(g)-DCl(g) IR experiment. *J Chem Ed.* **62**: 524. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/JChemEd-1985-62-524-GRB-HCl-DCI.pdf>
19. Buettner GR, Motten A.G, Hall RD, Chignell CF. (1986) Free radical production by chlorpromazine sulfoxide, An ESR spin-trapping and flash photolysis study. *Photochem Photobiol* **44**: 5-10.
20. Buettner GR. (1986) Ascorbate autoxidation in the presence of iron and copper chelates. *Free Rad Res Commun* **1**: 349-353. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/FRR-1986-1-349-grb-AscH-metals.pdf>
21. Buettner GR, Saran M, Bors W. (1986) The kinetics of the reaction of ferritin with superoxide. *Free Rad Res Commun* **2**: 369-372. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1987-2-369-Ferritin.pdf>
22. Hall RD, Buettner GR, Motten AG, Chignell CF. (1987) Near-infrared detection of singlet molecular oxygen photosensitized by promazine and chlorpromazine. *Photochem Photobiol* **46**: 295-301. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/P&P-1987-46-295-Singlet.pdf>
23. Buettner GR, Hall RD. (1987) Superoxide, hydrogen peroxide and singlet oxygen in hematoporphyrin derivative, -cysteine, -NADH and light systems. *Biochim Biophys Acta* **823**: 501-507. [http://dx.doi.org/10.1016/0304-4165\(87\)90060-2](http://dx.doi.org/10.1016/0304-4165(87)90060-2)
24. Buettner GR, Motten AG, Hall RD, Chignell CF. (1987) ESR detection of endogenous ascorbate free radical in mouse skin: Enhancement of radical production during UV irradiation following topical application of chlorpromazine. As a Rapid Communication in *Photochem Photobiol* **46**: 161-164. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/P&P-1987-46-161-Asc-Skin.pdf>



25. Buettner GR. (1987) The reaction of superoxide, formate radical, and hydrated electron with transferrin and its model compound Fe(III)-ethylenediamine-N,N'-bis(2-hydroxylphenyl acetic acid) as studied by pulse radiolysis. *J Biol Chem* **262**: 11995-11998. <http://www.jbc.org/cgi/content/abstract/262/25/11995>
26. Li ASW, Cummings KB, Roethling HP, Buettner GR, Chignell CF. (1988) A spin trapping data base implemented on the IBM PC/AT. *J Mag Resonance* **79**: 140-142. [http://dx.doi.org/10.1016/0022-2364\(88\)90329-0](http://dx.doi.org/10.1016/0022-2364(88)90329-0)
27. Buettner GR. (1988) In the absence of catalytic metals, ascorbate does not autoxidize at pH 7: Ascorbate as a test for catalytic metals. *J Biochem Biophys Meth* **16**: 27-40. [http://dx.doi.org/10.1016/0165-022X\(88\)90100-5](http://dx.doi.org/10.1016/0165-022X(88)90100-5)
28. Buettner GR, Hall RD, Chignell CF, Motten AG. (1989) The stepwise biphotonic photoionization of chlorpromazine as seen by laser flash photolysis. *Photochem Photobiol* **49**: 249-256. **pdf @** <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/P&P-1989-49-249-Biphotonic.pdf>
29. Buettner GR, Chamulitrat W. (1990) The catalytic activity of iron in synovial fluid as monitored by the ascorbate free radical." *Free Rad Biol Med* **8**: 55-56. [http://dx.doi.org/doi:10.1016/0891-5849\(90\)90144-8](http://dx.doi.org/doi:10.1016/0891-5849(90)90144-8)
30. Buettner GR, Britigan BE. (1990) The spin trapping of superoxide with M<sub>4</sub>PO (3,3,5,5-tetramethylpyrroline-N-oxide). *Free Rad Bio Med* **8**: 57-60. [http://dx.doi.org/doi:10.1016/0891-5849\(90\)90145-9](http://dx.doi.org/doi:10.1016/0891-5849(90)90145-9)
31. Buettner GR. (1990) Ascorbate oxidation: UV absorbance of ascorbate and ESR spectroscopy of the ascorbyl radical as assays for iron. *Free Rad Res Comm* **10**: 5-9. **pdf @** [http://www.healthcare.uiowa.edu/corefacilities/esr/FRR-1990-10-5-GRB-AscH\\_EPR.pdf](http://www.healthcare.uiowa.edu/corefacilities/esr/FRR-1990-10-5-GRB-AscH_EPR.pdf)
32. Buettner GR. (1990) On the reaction of superoxide with DMPO/•OOH. *Free Rad Res Comm* **10**: 11-15. **pdf @** [http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1990-10-11-grb-DMPO\\_Superoxide.pdf](http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1990-10-11-grb-DMPO_Superoxide.pdf)
33. Bors W, Buettner GR, Michel C, Saran M. (1990) Does superoxide react with calcium? *Arch Biochem Biophys* **178**: 269-272. [http://dx.doi.org/doi:10.1016/0003-9861\(90\)90258-Z](http://dx.doi.org/doi:10.1016/0003-9861(90)90258-Z)
34. Britigan BE, Coffman TJ, Buettner GR. (1990) Spin trapping evidence for the lack of significant hydroxyl radical production during the respiratory burst of human phagocytes using a spin trap resistant to superoxide mediated destruction. *J Biol Chem* **265**: 2650-2656. <http://www.jbc.org/cgi/content/abstract/265/5/2650>
35. Britigan BE, Pou S, Rosen GM., Lilleg DM, Buettner GR. (1990) Hydroxyl radical is not a product of the reaction of xanthine oxidase and xanthine. *J Biol Chem* **265**: 17533-17538. <http://www.jbc.org/cgi/content/abstract/265/29/17533>
36. Buettner GR, Scott BD, Kerber RE, Mügge A. (1991) Free radicals from plastic syringes. *Free Rad Biol Med* **11**: 69-70. [http://dx.doi.org/doi:10.1016/0891-5849\(91\)90189-A](http://dx.doi.org/doi:10.1016/0891-5849(91)90189-A)
37. Hall RD, Buettner GR, Chignell CF (1991) The biphotonic photoionization of chlorpromazine during conventional flash photolysis: Spin trapping results with 5,5-dimethylpyrroline-N-oxide. *Photochem Photobiol* **54**: 167-173.
38. Britigan BE, Roeder TL, Buettner GR. (1991) Spin traps inhibit formation of hydrogen peroxide via the dismutation of superoxide: Implications for spin trapping the hydroxyl free radical. *Biochim Biophys Acta* **1075**: 213-222. [http://dx.doi.org/10.1016/0304-4165\(91\)90269-M](http://dx.doi.org/10.1016/0304-4165(91)90269-M)

39. Buettner GR, Kiminyo KP (1992) Optimal EPR detection of weak nitroxide spin adduct and ascorbate free radical signals. *J Biochem Biophys Meth* **24**: 147-151.  
[http://dx.doi.org/doi:10.1016/0165-022X\(92\)90054-E](http://dx.doi.org/doi:10.1016/0165-022X(92)90054-E)
40. North JA, Spector AA, Buettner GR. (1992) Detection of lipid radicals by electron paramagnetic resonance spin trapping in intact cells enriched with polyunsaturated fatty acid. *As a Rapid Communication in J Biol Chem* **267**: 5743-5746.  
<http://www.jbc.org/cgi/content/abstract/267/9/5743>
41. Buettner GR, Moseley PL. (1992) Ascorbate both activates and inactivates bleomycin by free radical generation. *Biochemistry* **31**: 9784-9788.  
<http://dx.doi.org/doi:10.1021/bi00155a035>
42. Wagner BA, Buettner GR, Burns CP. (1992) Membrane peroxidative damage enhancement by the ether lipid class of antineoplastic agents. *Cancer Res* **52**: 6045-6051.  
<http://cancerres.aacrjournals.org/cgi/content/abstract/52/21/6045>
43. Dykens JA, Shick JM, Benoit C, Buettner GR, Winston GW. (1992) Oxygen radical production in the sea anemone *Anthopleura Elegantissima* and its endosymbiotic algae. *J Exp Biol* **168**: 219-241.  
<http://jeb.biologists.org/cgi/content/abstract/168/1/219>
44. Buettner GR. (1993) The spin trapping of superoxide and hydroxyl free radicals with DMPO (5-5-dimethylpyrroline-N-oxide): More about iron. *Free Rad Res. Comm* **19**: S79-S87.  
**pdf @** [http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1993-19-S79-grb-Fe&Spin\\_trapping.pdf](http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1993-19-S79-grb-Fe&Spin_trapping.pdf)
45. Buettner GR, Moseley PL. (1993) ESR spin trapping of free radicals produced by bleomycin and ascorbate. *Free Rad Res Comm* **19**: S89-S93.  
<http://www.healthcare.uiowa.edu/corefacilities/esr/FRR-1993-19S-589-GRB-Bleomycin.pdf>
46. Buettner GR, Sharma MK. (1993) The syringe nitroxide free radical - Part II. *Free Rad Res Comm* **19**: S227-S230.  
[http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1993-19-S227-grb-Syringe\\_Nitroxide.pdf](http://www.healthcare.uiowa.edu/corefacilities/esr/papers/FRR-1993-19-S227-grb-Syringe_Nitroxide.pdf)
47. Buettner GR, Jurkiewicz BA. (1993) The ascorbate free radical as a marker of oxidative stress: An EPR study. *Free Rad Biol Med* **14**: 49-55.  
[http://dx.doi.org/doi:10.1016/0891-5849\(93\)90508-R](http://dx.doi.org/doi:10.1016/0891-5849(93)90508-R)
48. Wagner BA, Buettner GR, Burns CP. (1993) Increased generation of lipid-derived and ascorbate free radicals by L1210 cells exposed to the ether lipid edelfosine. *As an Advance in Brief in Cancer Res* **53**: 711-713.  
<http://cancerres.aacrjournals.org/cgi/content/abstract/53/4/711>
49. Sharma MK, Buettner GR. (1993) Interaction of Vitamin C and Vitamin E during free radical stress in plasma: An ESR study. *Free Rad Biol Med* **14**: 649-653.  
[http://dx.doi.org/doi:10.1016/0891-5849\(93\)90146-L](http://dx.doi.org/doi:10.1016/0891-5849(93)90146-L)
50. Buettner GR, Kelley EE, Burns CP. (1993) Membrane lipid free radicals produced from L1210 murine leukemia cells by Photofrin<sup>®</sup> photosensitization: An EPR spin trapping study. *As an Advance in Brief in Cancer Res* **53**: 3670-3673.  
<http://cancerres.aacrjournals.org/cgi/content/abstract/53/16/3670>
51. Jurkiewicz BA, Buettner GR. (1994) Ultraviolet light-induced free radical formation in skin: An electron paramagnetic resonance study. *As a Rapid Communication in Photochem Photobiol* **59**: 1-4.
52. Wagner BA, Buettner GR, Burns CP. (1994) Free radical-mediated lipid peroxidation in cells: Oxidizability is a function of cell lipid *bis*-allylic hydrogen content. *As an*

*Accelerated Publication in Biochemistry* **33**: 4449-4453.

<http://dx.doi.org/doi:10.1021/bi00181a003>

53. Sharma MK, Buettner GR, Spencer K, Kerber RE. (1994) Ascorbyl free radical as a real-time marker of free radical generation during myocardial reperfusion: An electron paramagnetic resonance study. *Circulation Research* **74**: 650-658.  
<http://circres.ahajournals.org/cgi/content/abstract/74/4/650>  
<http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/CircRes-1994-74-650-Sharma-Asc-radical.pdf>
54. North JA, Spector AA, Buettner GR. (1994) Cell fatty acid composition affects free radical formation during lipid peroxidation. *Am J Physiol*: **267** *Cell Physiol* **36**: C177-C188.  
<http://ajpcell.physiology.org.proxy.lib.uiowa.edu/cgi/content/abstract/267/1/C177>
55. Hall DM, Buettner GR, Mathes RD, Gisolfi CV. (1994) Hyperthermia stimulates nitric oxide formation: Electron paramagnetic resonance detection of •NO - hemoglobin in blood. As a *Rapid Communication* in *J Appl Physiol* **77**:548-553.  
<http://jap.physiology.org/cgi/content/abstract/77/2/548>
56. Alexander-North LS, North JA, Kiminyo KP, Buettner GR, Spector AA. (1994) Polyunsaturated fatty acids increase lipid radical formation induced by oxidant stress in endothelial cells. *J Lipid Res* **35**:1773-1785.  
<http://www.jlr.org/cgi/content/abstract/35/10/1773>
57. Oppenheim SF, Buettner GR, Dordick JS, Rodgers VGJ. (1995) Applying electron paramagnetic resonance spectroscopy to the study of fouling in protein ultrafiltration. *J Membrane Sci* **96**:289-297. [http://dx.doi.org/doi:10.1016/0376-7388\(94\)00140-5](http://dx.doi.org/doi:10.1016/0376-7388(94)00140-5)
58. Schedl HP, Christensen KK, Clark ED, Buettner GR. (1995) Surface charge, fluidity, and calcium uptake by rat intestinal brush border vesicles. *Biochim Biophys Acta* **1234**: 81-89. [http://dx.doi.org/10.1016/0005-2736\(94\)00260-V](http://dx.doi.org/10.1016/0005-2736(94)00260-V)
59. Jurkiewicz BA, Bissett DL, Buettner GR. (1995) The effect of topically applied tocopherols on ultraviolet light-mediated free radical damage in skin. As a *High Impact Paper* in *J Invest Derm* **104**: 484-488. <http://dx.doi.org/doi:10.1111/1523-1747.ep12605921> or <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/JID-1995-104-484-Skin&E.pdf>
60. Kelley EE, Buettner GR, Burns CP. (1995) Relative  $\alpha$ -tocopherol deficiency in cultured tumor cells: Free radical-mediated lipid peroxidation, lipid oxidizability, and cellular polyunsaturated fatty acid content. *Arch Biochem Biophys* **319**: 102-109.  
<http://dx.doi.org/10.1006/abbi.1995.1271>
61. McCormick ML, Buettner GR, Britigan BE. (1995) The spin trap 4-POBN stimulates peroxidase-mediated oxidation of desferrioximine: Implications for pharmacological use of spin trapping agents. *J Biol Chem* **270**: 29265-29269.  
<http://dx.doi.org/doi:10.1074/jbc.270.49.29265>
62. Buettner GR, Jurkiewicz BA. (1996) Catalytic metals, ascorbate, and free radicals: combinations to avoid. **Invited Paper** in *Rad Research* **145**:532-541.  
<http://www.healthcare.uiowa.edu/corefacilities/esr/papers/RadRes-1996-145-532-Buettner-Acs.pdf> or <http://links.jstor.org/sici?sici=0033-7587%28199605%29145%3A5%3C532%3ACMAAFR%3E2.0.CO%3B2-Z>
63. Britigan BE, Ratcliffe HR, Buettner GR, Rosen GM. (1996) Binding of myeloperoxidase to bacteria: Effect of hydroxyl radical formation and susceptibility to oxidant-mediated killing. *Biochim Biophys Acta* **1290**: 231-240. [http://dx.doi.org/10.1016/0304-4165\(96\)00014-1](http://dx.doi.org/10.1016/0304-4165(96)00014-1)

64. Oppenheim SF, Buettner GR, Rodgers VGJ (1996) Relationship of rotational correlation time from EPR spectroscopy and protein-membrane interaction. *J Membrane Sci* **118**: 133-139. [http://dx.doi.org/10.1016/0376-7388\(96\)00070-1](http://dx.doi.org/10.1016/0376-7388(96)00070-1)
65. Catherine MR, Spencer KT, Pagancarlo LA, Smith RS, Buettner GR, Kerber RE. (1996) Direct current shocks to the heart generate free radicals: An electron paramagnetic resonance study. *J Am Coll Cardiology*. **28**: 1598-1609. [http://dx.doi.org/doi:10.1016/S0735-1097\(96\)00333-6](http://dx.doi.org/doi:10.1016/S0735-1097(96)00333-6)
66. Hempel SL, Buettner GR, Wessels DA, Galvan GM, O'Malley Y. (1996) Extracellular iron(II) can protect cells from hydrogen peroxide. *Arch Biochem Biophys* **330**: 401-408. <http://dx.doi.org/doi:10.1006/abbi.1996.0268>
67. Lindower PD, Spencer KT, Catherine MR, Sharma MK, Buettner GR, Kerber RE. (1996) Prolonged coronary artery occlusion-reperfusion sequences reduce myocardial free radical production: An electron paramagnetic resonance study. *Am Heart J* **132**:1147-1155. [http://dx.doi.org/doi:10.1016/S0002-8703\(96\)90457-3](http://dx.doi.org/doi:10.1016/S0002-8703(96)90457-3)
68. Wagner BA, Buettner GR, Burns CP. (1996) Vitamin E slows the rate and delays the onset of free radical-mediated lipid peroxidation in cells. *Arch Biochem Biophys* **334**:261-267. <http://dx.doi.org/doi:10.1006/abbi.1996.0454>
69. Jurkiewicz BA, Buettner GR. (1996) ESR detection of free radicals in UV-irradiated skin: Mouse versus man. *Photochem Photobiol* **64**: 918-922. <http://www.healthcare.uiowa.edu/corefacilities/esr/papers/P&P-1996-64-918-Jurkiewicz-Human.pdf>
70. Oppenheim SF, Rich JO, Buettner GR, Rodgers VGJ. (1996) Protein structure change on adherence to ultrafiltration membranes. An examination by electron paramagnetic resonance spectroscopy. *J Colloid and Interface Science* **183**: 274-279. <http://dx.doi.org/doi:10.1006/jcis.1996.0543>
71. Kelley EE, Buettner GR, Burns CP. (1997) Production of lipid-derived free radicals in L1210 murine leukemia cells is an early event in the photodynamic action of Photofrin. *Photochem Photobiol* **65**:576-580. <http://www.healthcare.uiowa.edu/corefacilities/esr/papers/P&P-1997-65-576-Kelley-PDT.pdf>
72. Wallen ES, Buettner GR, Moseley PL. (1997) Oxidants differentially regulate the heat shock response. *International Journal of Hyperthermia*. **13**:517-24.
73. Kelley EE, Domann FE, Buettner GR, Oberley LW, Burns CP. (1997) Increased efficacy of *in vitro* Photofrin photosensitization of human oral squamous cell carcinoma by the prooxidants iron and ascorbate. *J Photochem Photobiol* **40**:273-277. [http://dx.doi.org/doi:10.1016/S1011-1344\(97\)00068-7](http://dx.doi.org/doi:10.1016/S1011-1344(97)00068-7)
74. Spencer KT, Lindower PD, Buettner GR, Kerber RE. (1998) Transition metal chelators reduce directly measured myocardial free radical production during reperfusion. *J Cardiovascular Pharmacology* **32**:343-348.
75. McCormick ML, Buettner GR, Britigan BE. (1998) Endogenous superoxide dismutase levels regulate iron-dependent hydroxyl radical formation in Escherichia coli exposed to hydrogen peroxide. *J Bacteriology* **180**: 622-625. <http://jb.asm.org/cgi/content/abstract/180/3/622>
76. Wagner BA, Buettner GR, Oberley LW, Burns CP. (1998) Sensitivity of K562 and HL-60 cells to edelfosin, an ether lipid drug, correlates with production of active oxygen species. *Cancer Research* **58**: 2809-2816. <http://cancerres.aacrjournals.org/cgi/content/abstract/58/13/2809>
77. Flanagan SW, Moseley PL, Buettner GR. (1998) Increased flux of free radicals in cells subjected to hyperthermia: detection by electron paramagnetic resonance spin

- p>trapping.
- FEBS Lett.*
- 431**
- :285-285.
- [http://dx.doi.org/doi:10.1016/S0014-5793\(98\)00779-0](http://dx.doi.org/doi:10.1016/S0014-5793(98)00779-0)
78. Garcia LA, DeJong SC, Martin SM, Smith RS, Buettner GR, Kerber RE. (1998) Magnesium reduces free radicals in an in vivo occlusion-reperfusion model. *J. Am Coll Cardiology.* **32**: 536-539. [http://dx.doi.org/doi:10.1016/S0735-1097\(98\)00231-9](http://dx.doi.org/doi:10.1016/S0735-1097(98)00231-9)
  79. McCormick ML, Gaut JP, Lin T-S, Britigan BE, Buettner GR, Heinecke JW. (1998) Electron paramagnetic resonance reveals that horseradish peroxidase, lactoperoxidase and myeloperoxidase oxidize L-tyrosine to tyrosyl radical. *J Biol Chem* **273**: 32030-32037. <http://dx.doi.org/doi:10.1074/jbc.273.48.32030>
  80. Qian SY, Buettner GR. (1999) Iron and dioxygen chemistry is an important route to initiation of biological free radical oxidations: An electron paramagnetic resonance spin trapping study. *Free Radic Biol Med*, **26**: 1447-1456. [http://dx.doi.org/doi:10.1016/S0891-5849\(99\)00002-7](http://dx.doi.org/doi:10.1016/S0891-5849(99)00002-7)
  81. Tapley, D.W., Buettner, G.R., Shick, J.M. (1999) Free radicals and chemiluminescence as products of the spontaneous oxidation of sulfide in seawater, and their biological implications. *Biol. Bull.* **196**:52-56. <http://www.healthcare.uiowa.edu/corefacilities/esr/completepublications/GRB-Papers-pdf/BiolBull-1999-196-52-Tapley.doc.pdf>
  82. Hempel SL, Buettner GR, O'Malley YQ, Wessels DA and Flaherty DA (1999) Fluorescein diacetate is superior for detecting intracellular oxidants: comparison to 2'7'-dichlorodihydrofluorescein diacetate, 5(and 6)-carboxy-2'7'-dichlorodihydrofluorescein diacetate and dihydrorhodamine 123. *Free Radic Biol Med*, **27**: 146-159. [http://dx.doi.org/doi:10.1016/S0891-5849\(99\)00061-1](http://dx.doi.org/doi:10.1016/S0891-5849(99)00061-1)
  83. Pagan-Carlo, LA, Garcia LA, Buettner GR, Kerber RE. (1999) Captopril lowers coronary venous free radical concentration after direct current cardiac shocks. *Chest*, **116**:484-487. <http://www.chestjournal.org/cgi/content/abstract/116/2/484>
  84. Kelley EE, Wagner BA, Buettner GR, Burns CP. (1999) Nitric oxide inhibits iron-induced lipid peroxidation in HL-60 cells. *Arch. Biochem. Biophys.* **370**: 97-104. <http://dx.doi.org/doi:10.1006/abbi.1999.1386>
  85. Yang J-Q, Li S, Domann FE, Buettner GR, Oberley LW. (1999) Superoxide generation in v-Ha-ras transformed human keratinocyte HaCaT cells, *Mol Carcinog* **26**: 180-188. <http://www3.interscience.wiley.com/cgi-bin/abstract/66003729/ABSTRACT>
  86. Schafer FQ, Buettner GR. (1999) Singlet oxygen toxicity is cell line-dependent: A study of lipid peroxidation in nine leukemia cell lines. *Photochem Photobiol* **70**(6): 858-867. [http://dx.doi.org/doi:10.1562/0031-8655\(1999\)070<0858:SOTICL>2.3.CO;2](http://dx.doi.org/doi:10.1562/0031-8655(1999)070<0858:SOTICL>2.3.CO;2)
  87. Hall DM, Oberley TD, Moseley PM, Buettner GR, Oberley LW, Weindruch R, Kregel KC. (2000) Caloric Restriction improves thermotolerance and reduces hyperthermia-induced cellular damage in old rats. *FASEB J.* **14**: 78-86. <http://www.fasebj.org/cgi/content/abstract/14/1/78>
  88. Schafer FQ, Qian SY, Buettner GR. (2000) Iron and free radical oxidations in cell membranes. *Cellular and Molecular Biology.* **46**:657-662. <http://www.healthcare.uiowa.edu/corefacilities/esr/papers/CellMol-2000-46-657-FQS-Fe.pdf>
  89. Liu R, Buettner GR, Oberley LW. (2000) Oxygen free radicals mediate the induction of manganese superoxide dismutase gene expression by TNF- $\alpha$  in human oral carcinoma SCC-25 cells. *Free Radic Biol Med.* **28**:1197-1205. [http://dx.doi.org/10.1016/S0891-5849\(00\)00237-9](http://dx.doi.org/10.1016/S0891-5849(00)00237-9)
  90. Ridnour LA, Sim JE, Hayward MA, Wink DA, Martin SM, Buettner GR, Spitz DR. (2000) A rapid spectrophotometric method for quantification of nitric oxide, nitrite, and nitrate



- in cell culture media. *Anal Biochem* **281**:223-229.  
<http://dx.doi.org/doi:10.1006/abio.2000.4583>
91. Schafer FQ, Buettner GR. (2000) Acidic pH amplifies iron-mediated lipid peroxidation in cells. *Free Radic Biol Med.* **28**:1175-1181. [http://dx.doi.org/doi:10.1016/S0891-5849\(00\)00319-1](http://dx.doi.org/doi:10.1016/S0891-5849(00)00319-1)
  92. Venkataraman S, Martin SM, Schafer FQ, Buettner GR. (2000) Detailed methods for quantification of nitric oxide aqueous solutions using either an oxygen monitor or EPR. *Free Radic Biol Med.* **29**:580-585. [http://dx.doi.org/doi:10.1016/S0891-5849\(00\)00404-4](http://dx.doi.org/doi:10.1016/S0891-5849(00)00404-4)
  93. Qian SY, Wang HP, Schafer FQ, Buettner GR. (2000) EPR detection of lipid-derived radicals from PUFA, LDL, and cell oxidations. *Free Radic Biol Med.* **29**:568-579.  
[http://dx.doi.org/doi:10.1016/S0891-5849\(00\)00407-X](http://dx.doi.org/doi:10.1016/S0891-5849(00)00407-X)
  94. Wagner BA, Buettner GR, Oberley LW, Darby CJ, Burns CP (2000) Myeloperoxidase is involved in H<sub>2</sub>O<sub>2</sub>-induced apoptosis of HL-60 human leukemia cells. *J Biol Chem.* **275**:22461-22469. <http://dx.doi.org/doi:10.1074/jbc.M001434200>
  95. McCormick ML, Denning GM, Reszka KJ, Bilski P, Buettner GR, Rasmussen GT, Railsback MA, Britgan BE. (2000) Biological effects of menadione photochemistry: Effects of menadione on biological systems may not involve classical oxidant production. *Biochem J.* **350**:797-804. <http://www.biochemj.org/bj/350/0797/bj3500797.htm>
  96. Wang HP, Qian SY, Schafer FQ, Domann FE, Oberley LW, Buettner GR. (2001) Phospholipid hydroperoxide glutathione peroxidase protects against the singlet oxygen-induced cell damage of photodynamic therapy. *Free Radic Biol. Med.* **30**:825-835. [http://dx.doi.org/doi:10.1016/S0891-5849\(01\)00469-5](http://dx.doi.org/doi:10.1016/S0891-5849(01)00469-5)
  97. Hall DM, Buettner GR, Oberley LW, Xu L, Matthes RD, Gisolfi, CV (2001) Mechanisms of circulatory and intestinal barrier dysfunction during whole body hyperthermia. *Am J Physiol Heart Circ Physiol.* **280**:509H-521H.  
<http://ajpheart.physiology.org.proxy.lib.uiowa.edu/cgi/content/abstract/280/2/H509>
  98. Yang JQ, Li S, Huang Y, Zhang HJ, Domann FE, Buettner GR, Oberley LW. (2001) v-HaRas overexpression induces superoxide production and alters levels of primary antioxidant enzymes. *Antioxidants and Redox Signaling* **3**:697-709.  
<http://dx.doi.org/doi:10.1089/15230860152543032>
  99. Zhang Y, Bissing JW, Xu LJ, Ryan AJ, Martin SM, Miller FJ, Kregel KC, Buettner GR, Kerber RE. (2001) Nitric oxide synthase inhibitors decrease coronary sinus-free radical concentration and ameliorate myocardial stunning in an ischemia-reperfusion model. *J Am Coll Card.* **38**:546-554. [http://dx.doi.org/doi:10.1016/S0735-1097\(01\)01400-0](http://dx.doi.org/doi:10.1016/S0735-1097(01)01400-0)
  100. Schafer FQ, Buettner GR. (2001) Redox state of the cell as viewed through the glutathione disulfide/glutathione couple. *Free Radic Biol Med.* **30**:1191-1212.  
[http://dx.doi.org/10.1016/S0891-5849\(01\)00480-4](http://dx.doi.org/10.1016/S0891-5849(01)00480-4) >450 citations
  101. Yang JQ, Zhao WL, Duan H, Robbins MEC, Buettner GR, Oberley LW, Domann FE. (2001) v-Ha-RaS oncogene upregulates the 92-kDa type IV collagenase (MMP-9) gene by increasing cellular superoxide production and activating NF-kappa B. *Free Radic Biol Med.* **31**: 520-529. [http://dx.doi.org/10.1016/S0891-5849\(01\)00613-X](http://dx.doi.org/10.1016/S0891-5849(01)00613-X)
  102. Friel JK, Martin SM, Langdon M, Herzberg GR, Buettner GR. (2002) Milk from mothers of both premature and full-term infants provides better antioxidant protection than does infant formula. *Pediatric Research* **51**:612-618.  
<http://www.pedresearch.org/cgi/content/abstract/51/5/612>

103. Schafer FQ, Wang HP, Kelley EE, Cueno KL, Martin SM, Buettner GR. (2002) Comparing  $\beta$ -carotene, vitamin E and nitric oxide as membrane antioxidants. *Biol. Chem* **383**: 671-681. <http://dx.doi.org/doi:10.1515/BC.2002.069>
104. Yang JQ, Buettner GR, Domann FE, Li QA, Engelhardt JF, Weydert CD, Oberley LW. (2002) v-Ha ras mitogenic signaling through superoxide and derived reactive oxygen species. *Mol Carcinogen*. **33**:206-218. <http://dx.doi.org/10.1002/mc.10037>
105. Zhang HJ, Zhao W, Venkataraman S, Robbins ME, Buettner GR, Kregel KC, Oberley LW. (2002) Activation of matrix metalloproteinase-2 by overexpression of manganese superoxide dismutase in human breast cancer MCF-7 cells involves reactive oxygen species. *J Biol Chem*. **277**:20919-26. <http://dx.doi.org/doi:10.1074/jbc.M109801200>
106. Baker MT, Gregerson MS, Martin SM, Buettner GR. (2003) Free radical and drug oxidation in an ICU sedative: Propofol with sulfite. *Critical Care Medicine*. **31**:787-792. <http://www.healthcare.uiowa.edu/corefacilities/esr/papers/unmentioned/106CritCareMed-2003-31-787-Baker-sulfite.pdf>  
  
This paper was the subject of the **editorial**, Sulfite-induced propofol oxidation: A cause for radical concern, pp 981-982.
107. Raghuveer T, McGuire EM, Martin SM, Wagner BA, Rebouche CJ, Buettner GR, Widness JA. (2002) Lactoferrin attenuates iron induced oxidation products in preterm infants diet. *Pediatric Res*. **52**:964-972. <http://www.pedresearch.org/pt/re/pedresearch/abstract.00006450-200212000-00024.htm>
108. Samavati L, Monick MM, Sanlioglu S, Buettner GR, Oberley LW, Hunninghake GW. (2002) Mitochondrial K-ATP channel openers activate the ERK kinase by an oxidant-dependent mechanism. *Am J Physiol-Cell Physiol*. **283**:C273-C281. <http://ajpcell.physiology.org/cgi/content/abstract/283/1/C273>
109. Zhang Y, Davies LR, Martin SM, Bawaney IM, Buettner GR, Kerber RE. (2003) Magnesium reduces free radical concentration and preserves left ventricular function after direct current shocks. *Resuscitation*. **56**:199-206. [http://dx.doi.org/10.1016/S0300-9572\(02\)00353-2](http://dx.doi.org/10.1016/S0300-9572(02)00353-2)
110. Wang HP, Schafer FQ, Goswami PC, Oberley LW, Buettner GR. (2003) Phospholipid hydroperoxide glutathione peroxidase induces a delay in G<sub>1</sub> of the cell cycle. *Free Radical Research*. **37**:621-630. <http://dx.doi.org/doi:10.1080/1071576031000088283>
111. Clark CB, Zhang Y, Martin SM, Davies RL, Xu L, Kregel KC, Miller FJ, Buettner GR, Kerber RE. (2003) The nitric oxide synthase inhibitor NG-nitro-L-arginine decreases defibrillation-induced free radical generation. *Resuscitation* **57**:101-108. [http://dx.doi.org/doi:10.1016/S0300-9572\(02\)00413-6](http://dx.doi.org/doi:10.1016/S0300-9572(02)00413-6)
112. Narushima S, Spitz DR, Oberley LW, Toyokuni S, Miyata T, Gunnett CA, Buettner GR, Zhang J, Ismail H, Lynch RG, Berg DJ. (2003) Evidence for oxidative stress in NSAID-induced colitis in IL10<sup>-/-</sup> mice. *Free Radic Biol Med*. **34**:1153-1166. [http://dx.doi.org/doi:10.1016/S0891-5849\(03\)00065-0](http://dx.doi.org/doi:10.1016/S0891-5849(03)00065-0)
113. Zhao L, Wang HP, Zhang HJ, Weydert CJ, Domann FE, Oberley LW, Buettner GR. (2003) L-PhGPx expression can be suppressed by antisense oligodeoxynucleotides, *Arch Biochem Biophys*. **417**: 212-218. [http://dx.doi.org/doi:10.1016/S0003-9861\(03\)00342-4](http://dx.doi.org/doi:10.1016/S0003-9861(03)00342-4)
114. Lam EWN, Kelley EE, Martin SM, Buettner GR (2003) Tobacco xenobiotics release nitric oxide. *Tobacco Induced Diseases*. **1**: 207-211.



<http://www.healthcare.uiowa.edu/corefacilities/esr/TobaccoIndDis-2003-1-207-Lam.pdf>

115. Zhang Y, Davies LR, Martin SM, Coddling WJ, Miller FJ, Buettner GR, Kerber RE. (2003) The nitric oxide donor S-nitroso-N-acetylpenicillamine (SNAP) increases free radical generation and degrades left ventricular function after myocardial ischemia–reperfusion 59(3):345-352. [http://dx.doi.org/10.1016/S0300-9572\(03\)00240-5](http://dx.doi.org/10.1016/S0300-9572(03)00240-5)
116. Venkataraman S, Schafer FQ, Buettner GR. (2004) Detection of lipid radicals using EPR. *Antioxidants and Redox Signaling*, **6**: 631-638. <http://dx.doi.org/10.1089/152308604773934396>
117. Evig CB, Kelley EE, Weydert CJ, Chu Y, Buettner GR, Burns CP. (2004) Endogenous production and exogenous exposure to nitric oxide augment doxorubicin cytotoxicity for breast cancer cells but not cardiac myoblasts. *Nitric Oxide Biol Chem*. **10**:119-129. <http://dx.doi.org/doi:10.1016/j.niox.2004.03.006>
118. Carter AB, Tephly LA, Venkataraman S, Oberley LW, Zhang Y, Buettner GR, Spitz DR, Hunninghake GW. (2004) High levels of catalase and glutathione peroxidase activity dampen H<sub>2</sub>O<sub>2</sub> signaling in human alveolar macrophages. *Am J Respir Cell Mol Biol* **31**:43-53. <http://dx.doi.org/doi:10.1165/rcmb.2003-0377OC>
119. Venkataraman S, Wagner BA, Jiang X, Wang HP, Schafer FQ, Ritchie JM, Burns CP, Oberley LW, Buettner GR. (2004) Overexpression of manganese superoxide dismutase promotes the survival of prostate cancer cells exposed to hyperthermia. *Free Rad Res*. **38**:1119-1132. <http://dx.doi.org/doi:10.1080/10715760400010470>
120. Venkataraman S, Jiang X, Weydert CJ, Zhang Y, Zhang HJ, Goswami PC, Ritchie JM, Oberley LW, Buettner GR. (2005) Manganese superoxide dismutase overexpression inhibits the growth of androgen-independent prostate cancer cells. *Oncogene*, **24**: 77-89. <http://dx.doi.org/doi:10.1038/sj.onc.1208145>
121. Ahmad IM, Aykin-Burns N, Sim JE, Walsh SA, Higashikubo R, Buettner GR, Venkataraman S, Mackey MA, Flanagan SW, Oberley LW, Spitz DR. (2005) Mitochondrial O<sub>2</sub><sup>•-</sup> and H<sub>2</sub>O<sub>2</sub> mediate glucose deprivation-induced stress in human cancer cells. *J Biol Chem*. 280: 4254-4263. <http://dx.doi.org/doi:10.1074/jbc.M411662200>
122. Wang M, Kirk JS, Venkataraman S, Domann FE, Zhang HJ, Schafer FQ, Flanagan SW, Weydert CJ, Spitz DR, Buettner GR, Oberley, LW. (2005) Manganese superoxide dismutase suppresses hypoxic induction of hypoxia inducible factor-1 $\alpha$  and vascular endothelial growth factor. *Oncogene*, **24**: 8154-8166. <http://dx.doi.org/doi:10.1038/sj.onc.1208986>
123. Wagner BA, Evig CB, Reszka KJ, Buettner GR, Burns CP. (2005) Doxorubicin increases intracellular hydrogen peroxide in PC3 prostate cancer cells. *Arch Biochem Biophys*. **440**: 181-190. <http://dx.doi.org/10.1016/j.abb.2005.06.015>
124. Chen Q, Espey MG, Krishna MC, Mitchell JB, Corpe CP, Buettner GR, Shacter E, Levine M. (2005) Ascorbic acid at pharmacologic concentrations selectively kills cancer cells: ascorbic acid as a pro-drug for hydrogen peroxide delivery to tissues. *Proc Natl Acad Sci USA*. **102**: 13604–13609. <http://dx.doi.org/doi:10.1073/pnas.0506390102>
125. Hummel SG, Fischer AJ, Martin SM, Schafer FQ, Buettner GR. (2006) Nitric oxide as a cellular antioxidant: A little goes a long way. *Free Radic Biol Med*. **40**: 501-506. <http://dx.doi.org/doi:10.1016/j.freeradbiomed.2005.08.047>
126. Kramarenko GG, Wilke WW, Dayal D, Buettner GR, Schafer FQ. (2006) Ascorbate enhances the toxicity of the photodynamic action of Verteporfin in HL-60 cells. *Free Radic Biol Med*. **40**: 1615-1627. <http://dx.doi.org/doi:10.1016/j.freeradbiomed.2005.12.027>

127. Yoon, SS, Coakley R, Lau GW, Lyman SV, Gaston B, Karabulut AC, Hennigan RF, Hwang SH, Buettner G, Schurr MJ, Mortensen JE, Burns JL, Speert D, Boucher RC, Hassett DJ. (2006) Anaerobic killing of mucoid *Pseudomonas aeruginosa* by acidified nitrite derivatives under cystic fibrosis airway conditions. *The Journal of Clinical Investigation*. **116**: 436-446. <http://dx.doi.org/10.1172/JCI24684>
128. Reszka KJ, McCormick ML, Buettner GR, Hart MC, Britigan BE. (2006) Nitric oxide decreases the stability of DMPO spin adducts. *Nitric Oxide*. **15(2)**: 133-141. <http://dx.doi.org/10.1016/j.niox.2006.03.004>
129. Luo J, Li L, Zhang Y, Spitz DR, Buettner GR, Oberley LW, Domann FE. (2006) Inactivation of primary antioxidant enzymes in mouse keratinocytes by photodynamically generated singlet oxygen. *Antioxid Redox Signal*. **8(7-8)**: 1307-1314. <http://www.liebertonline.com/doi/abs/10.1089/ars.2006.8.1307>
130. Buettner GR, Ng CF, Wang W, Rodgers VGJ, Schafer FQ. (2006) A new paradigm: Manganese superoxide dismutase influences the production of H<sub>2</sub>O<sub>2</sub> in cells and thereby their biological state. *Free Radic Biol Med*. **41**: 1338-1350. <http://dx.doi.org/10.1016/j.freeradbiomed.2006.07.015>
131. Kramarenko GG, Hummel SG, Martin SM, Buettner GR. (2006) Ascorbate reacts with singlet oxygen to produce hydrogen peroxide. *Photochem Photobiol*. **82**: 1634-1637. <http://dx.doi.org/DOI:10.1562/2006-01-12-RN-774>
132. Uc, A, Reszka KJ, Buettner GR, Stokes JB. (2007) Tin protoporphyrin induces intestinal chloride secretion by inducing light-oxidation processes. *Am J Physiol Cell Physiol* (January 10, 2007). doi:10.1152/ajpcell.00550.2006 in press. <http://ajpcell.physiology.org/papbyrecent.shtml>
133. Vislisel JM, Schafer FQ, Buettner GR. (2007) A simple and sensitive assay for ascorbate using a plate reader . *Analytical Biochemistry*. In press. <http://dx.doi.org/10.1016/j.ab.2007.03.002>

## **B. Books/Chapters**

1. Buettner GR, Oberley LW. (1981) Oxygen, oxy radicals and superoxide dismutase in cancer and cancer treatment in *Oxygen and Oxy Radicals in Chemistry and Biology*, ed. by E. Powers and M.A.J. Rodgers, Academic Press, Inc., pp 606-609.
2. Leuthauser SWHC, Oberley LW, Oberley TD, Sorenson JR, Buettner GR. (1981) Antitumor activities of a copper chelate which has superoxide dismutase activity and an iron chelator in *Oxygen and Oxy-Radicals in Chemistry and Biology*, ed. by E. Powers and M.A.J. Rodgers, Academic Press, Inc., pp 679-682.
3. Oberley LW, Leuthauser SWHC, Buettner GR, Sorenson JR, Oberley TD, Bize IB. (1982) The use of superoxide dismutase in the treatment of cancer in *Pathology of Oxygen*, ed. by A. Autor, Academic Press, Inc., pp 207-221.
4. \*Buettner GR. (1982) The spin trapping of superoxide and hydroxyl radicals in *Superoxide Dismutase Vol II.*, ed. by L.W. Oberley, CRC Press, Boca Raton, FL, Chap. 4, pp 63-81.
5. Buettner GR. (1982) Cu-Zn superoxide dismutase in *Inflammatory Diseases and Copper*, ed. by J.R.J. Sorenson, Humana Press, pp 199-207.
6. Buettner GR, Doherty TP. (1983) The apparent role of charge in the reaction of superoxide with Fe(III) chelates in *Oxy Radicals and Their Scavenger Systems. Vol I:*

- Molecular Aspects*, ed. by Gerald Cohen and Robert Greenwald, Elsevier Science Publishing Co., Inc., pp 101-104.
7. Buettner GR. (1985) The spin trapping of hydroxyl free radical in *Handbook of Methods for Oxy Radical Research*, ed. by R. Greenwald, pp 151-155, CRC Press, Boca Raton, FL.
  8. Buettner GR. (1985) Hematoporphyrin derivative and light produces the vitamin E radical in *Primary Photo-Processes in Biology and Medicine*, eds. R.V. Bensasson, G. Jori, E.J. Land and T.G. Truscott, Plenum Publishing Corp., pp 341-344.
  9. \*Buettner GR, Mason RP. (1990) Spin-trapping methods for detecting oxygen-derived radical formation in vitro and in vivo. *Methods in Enzymology*, **186** 127-133.
  10. \*Buettner GR. (1990) Ascorbate oxidation as an assay for metal ion contamination. *Methods in Enzymology* **186** 125-127.
  11. Spector AA, Moore SA, North LA, North JA, Kaduce TL, Buettner GR. (1993) Effects of Omega-3 fatty acids in endothelial cells in *Omega-3 Fatty Acids: Metabolism and Biological Effects*, ed. by C.A. Drevon, I. Baksaas and H.E. Krokan, pp 173-181, Birkhäuser Verlag, Basel, Switzerland.
  12. Burns CP, Wagner BA, Kelley EE, Buettner GR. (1993) Neoplasia and Omega-3 fatty acids in *Omega-3 Fatty Acids: Metabolism and Biological Effects*, ed. by C.A. Drevon, I. Baksaas and H.E. Krokan, pp 305-314, Birkhäuser Verlag, Basel, Boston, Berlin.
  13. Buettner GR, Jurkiewicz BA. (1995) Ascorbate Radical: A valuable marker of oxidative stress in *Free Radical Methodologies*, ed. by A. Favier, J. Cadet, B. Kalayanaraman, M. Fontecave, J.-L. Pierre, Birkhäuser Verlag AG, Boston, pp.145-164.
  14. Jurkiewicz BJ, Buettner GR. (1995) UV light free radical formation in skin in *The Oxygen Paradox*, ed. by K.J.A. Davies and F. Ursini, CLEUP University Press, Padova Italy pp 561-570.
  15. Buettner GR, Jurkiewicz BA. (1996) Chemistry and Biochemistry of Ascorbic Acid in *Handbook of Antioxidants*, ed. by E. Cadenas and L. Packer, Marcel Dekker, Inc, New York, pp 91-115.
  16. Hall DM, Buettner GR. (1996) The *in vivo* spin trapping of nitric oxide by heme: EPR detection *ex vivo*. *Meth. Enzymology* **268** 188-192. [http://dx.doi.org/10.1016/S0076-6879\(96\)68020-3](http://dx.doi.org/10.1016/S0076-6879(96)68020-3)
  17. Bors W, Buettner GR. (1997) The vitamin C radical and its reactions in *Vitamin C in Health and Disease*, ed. by L. Packer and J. Fuchs, Marcel Dekker, Inc., New York, Chapter 4, pp75-94.
  18. Buettner GR. (1999) EPR Spectroscopy: The basics. In *General Aspects of the Chemistry of Radicals* ed Alfassi ZB pp1-18, John Wiley & Sons Ltd.
  19. Shick JM, Dunlap WC, Buettner GR. (2000) UV protection in marine organisms: II. Biosynthesis, accumulation, and functions of mycosporine-like amino acids. *Free Radicals in Chemistry, Biology and Medicine*. Edited by T. Yoshikawa, S. Toyokuni, Y. Yamamoto and Y. Naito. OICA International, London. pp215-228.
  20. Burns CP, Kelley EE, Wagner BA, Garry R. Buettner. (2002) Role of nitric oxide and membrane phospholipid polyunsaturation in oxidative cell death. In: *Subcellular Biochemistry, Vol 36, Phospholipid Metabolism in Apoptosis* (eds P. Quinn and V. Kagan), Kluwer Academic/ Plenum Press, New York, 97-121.

21. Venkataraman S, Martin SM, Buettner GR. (2002) EPR methods for the quantitation of nitric oxide in aqueous solutions. *Meth Enzymology*. **359**:3-18.  
[http://dx.doi.org/10.1016/S0076-6879\(02\)59167-9](http://dx.doi.org/10.1016/S0076-6879(02)59167-9)
22. Hall DM, Buettner GR. (2002) *In vivo* detection of transition metals and nitrosyl-heme complexes using *ex vivo* electron paramagnetic resonance spectroscopy. In: *Methods in Molecular Biology: Vol 196: Ultrastructural and Molecular Biology Protocols*. Ed. Armstrong D. Humana Press inc Totowa, NJ.
23. Schafer FQ, Kelley EE, Buettner GR. (2003) Oxidative stress and antioxidant intervention. In: *Oxidative Stress and Aging, Critical Reviews*. Eds Cutler RG, Rodriguez H. World Scientific Publishing, River Edge, NJ, Chapter 49, pp 849-869.
24. Buettner GR, Mason RP. (2003) Spin trapping methods for detecting superoxide and hydroxyl free radicals in vitro and in vivo. In: *Oxidative Stress and Aging, Critical Reviews*. Eds Cutler RG, Rodriguez H. World Scientific Publishing, River Edge, NJ, Chapter 2, pp 27-38.
25. Schafer FQ, Buettner GR. (2003) Redox state and redox environment in Biology. In *Signal Transduction by Reactive Oxygen and Nitrogen Species: Pathways and Chemical Principles*. Eds Forman HJ, Torres M, Fukuto J. Kluwer Academic Publishers, Dordrecht, Netherlands, Chapter 1, pp. 1-14.
26. Buettner GR, Schafer FQ. (2004) Ascorbate (Vitamin C) as an Antioxidant. in *Vitamin C: its Functions and Biochemistry in Animals and Plants*. Ed May JM, Asard H, Smirnoff N. BIOS Scientific Publishers. pp 173-188.

### C. Abstracts (Partial List)

1. Buettner GR, Doherty TP. (1983) The photosensitized production of hydrogen peroxide and hydroxyl radical by methylene blue in the presence of ascorbic acid. *Photochem Photobiol* **37S**: s106.
2. Motten AM, Buettner GR, Sik RH, Chignell CF. (1984) Chlorpromazine and promazine: A spin-trapping study of cutaneous photosensitizers. *Photochem Photobiol* **39s**:56s.
3. Buettner GR. (1984) Free radical production of Photofrin II in the presence of ascorbate. *Photochem Photobiol* **39s**:56s.
4. Buettner GR (1989) On the reaction of superoxide with DMPO/ $\cdot$ OOH. Presented at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July Guelph, Ontario, Canada.
5. Buettner GR (1989) Ascorbate oxidation as an assay for iron from  $\mu$ l syringes. Presented at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July, Guelph, Ontario, Canada.
6. Buettner GR, Britigan BE. (1989) The spin trapping of superoxide with  $M_4PO$  (3,3,5,5-tetramethylpyrroline-N-oxide)." Presented at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July, Guelph, Ontario, Canada.
7. Hall RD, Buettner GR, Chignell CF. (1989) The biophotonic photoionization of chlorpromazine during conventional flash photolysis: spin trapping results with 5,5-dimethylpyrroline-N-oxide. Presented at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July, Guelph, Ontario, Canada.
8. Li ASW, de Hass AH, Buettner GR, Watson MS, Carlton LD, Chignell CF. (1989) STDBII, a spin trapping database implemented on the PC/AT. Presented at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July, Guelph, Ontario, Canada.

9. Buettner GR. (1990) EPR spin trapping of lipid radicals produced by photosensitization with hematoporphyrin derivative. Presented at the Oxidative Damage & Repair Symposium, Nov., Pasadena, California.
10. Buettner GR, Britigan BE (1990) EPR determination of redox active iron in xanthine oxidase and DNA. Presented at the Oxidative Damage & Repair Symposium, Nov., Pasadena, California.
11. Britigan BE, Roeder TL, Buettner GR. (1990) Spin traps inhibit dismutation of superoxide to hydrogen peroxide: Implications for spin trapping hydroxyl radical. Presented at the Oxidative Damage & Repair Symposium, Nov., Pasadena, California.
12. Buettner GR, Moseley PL. (1991) Ascorbate both activates and inactivates bleomycin by free radical generation. Presented at the 5th International Congress on Oxygen Radicals, Nov., Kyoto, Japan.
13. Sharma MK, Kerber RE, Buettner GR (1991) Interaction of ascorbate and  $\alpha$ -tocopherol in plasma during oxidative stress: A study by electron paramagnetic resonance. Presented at the 5th International Congress on Oxygen Radicals, Nov., Kyoto, Japan.
14. Buettner GR, Sharma MK. (1991) The syringe nitroxide free radical - Part II. Presented at the 5th International Congress on Oxygen Radicals, Nov., Kyoto, Japan.
15. Buettner GR, Kiminyo KP. (1991) Optimal ESR detection of weak spin adduct signals and weak ascorbyl free radical signals. Presented at the 3rd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, Nov., Kyoto, Japan.
16. Buettner GR. (1991) The basic chemistry of spin trapping: Pitfalls and subtleties. Presented at the 3rd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, Nov., Kyoto, Japan.
17. Buettner GR, Moseley PL. (1991) The spin trapping of radicals produced by FeBLM and ascorbate. Presented at the 3rd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, Nov., Kyoto, Japan.
18. Chignell CF, Buettner GR, Li ASW. (1991) STDBII - a computerized spin trapping database. Presented at the 3rd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, Nov., Kyoto, Japan.
19. Sharma MK, Buettner GR, Kerber RE. (1992) Ascorbyl free radical as a real-time marker of oxidative myocardial stress: An electron paramagnetic resonance study. *J Am Coll Cardiol* **19**:1A.
20. Jurkiewicz BA, Buettner GR. (1993) EPR detection of free iron in skin by formation of a paramagnetic Fe(III) desferal complex. *Photochem Photobiol* **57**:38S. Presented at the 21st Annual Meeting of the American Society for Photobiology.
21. Buettner GR, Kelley EE, Burns CP. (1993) Membrane lipid free radicals produced from intact L1210 murine leukemia cells by hematoporphyrin derivative and light: An EPR spin trapping study. *Photochem Photobiol* **57**:88S. Presented at the 21st Annual Meeting of the American Society for Photobiology.
22. Buettner GR. (1993) Photosensitized production of free radicals: Electron paramagnetic resonance detection - direct and spin trapping approaches. *Photochem Photobiol* **57**:106S. Presented at the 21st Annual Meeting of the American Society for Photobiology.
23. Jurkiewicz BA, Buettner GR. (1993) UV light-induced free radical formation in skin: An EPR study. Presented at the annual meeting of the Oxygen Society, Charleston, SC, Nov.
24. Wagner BA, Buettner GR, Burns CP. (1993) Free radical-mediated lipid peroxidation in cells: Oxidizability is a function of cell lipid *bis*-allylic hydrogen content. A poster presentation at the annual meeting of the Oxygen Society, Charleston, SC, Nov.
25. Buettner GR, Hall DM, Mathes RD, Gisolfi CV. (1993) Hyperthermia stimulates nitric oxide formation: Electron paramagnetic resonance detection of NO-Hemoglobin in blood. A poster presentation at the annual meeting of the Oxygen Society, Charleston, SC, Nov.

26. Buettner GR, Kelley EE, Burns CP. (1993) Membrane lipid free radicals produced from L1210 murine leukemia cells by photofrin photosensitization: An EPR spin trapping study. A poster presentation at the annual meeting of the Oxygen Society, Charleston, SC, Nov.
27. Buettner GR. (1993) Ascorbate radical as a marker of oxidative stress: *In vitro* and *ex vivo* applications.: Presented at the 4th International Symposium on Spin Trapping and Organic EPR Spectroscopy, Oklahoma City, OK, Oct.
28. Buettner GR, Wagner BA, Burns CP. (1993) Free radical-mediated lipid peroxidation in cells: spin trapping as a tool. Presented at the 4th International Symposium on Spin Trapping and Organic EPR Spectroscopy, Oklahoma City, OK, Oct.
29. Jurkiewicz BA, Buettner GR. (1993) UV light-induced free radical formation in intact skin. Presented at the 4th International Symposium on Spin Trapping and Organic EPR Spectroscopy, Oklahoma City, OK, Oct.
30. Buettner GR. (1994) Light-induced free radical formation in cells and intact skin as detected by EPR. *Photochem Photobiol* **59**:16S. Presented at the 22nd annual meeting of the American Society for Photobiology, Scottsdale, AZ, June.
31. Jurkiewicz BA, Buettner GR. (1994) The role of iron in UV light-induced free radical formation in intact skin." *Photochem Photobiol* **59**:61S. Presented at the 22nd annual meeting of the American Society for Photobiology, Scottsdale, AZ, June.
32. Buettner GR, Wagner BA, Burns CP. (1994) Free radical -mediated lipid peroxidation in cells: oxidizability is a function of cell lipid bis-allylic hydrogen content. Presented at the Therapeutic Potential of Biological Antioxidants Symposium, Tiburon, CA, Sept.
33. Jurkiewicz BA, Buettner GR. (1994) The effect of topically applied alpha-tocopherol on ultraviolet-light mediated free radical formation in skin. Presented at the Therapeutic Potential of Biological Antioxidants Symposium, Tiburon, CA, Sept.
34. Shick JM, Buettner GR, Dunlap WC. (1994) Preliminary study using electron paramagnetic resonance to assess protection from UV-induced oxidative stress by mycosporin-like amino acids in ovaries of sea urchins. Presented at the Therapeutic Potential of Biological Antioxidants Symposium, Tiburon, CA, Sept.
35. Buettner GR. (1995) Ascorbate, catalytic metals and free radicals. Invited paper at the 43rd Annual Meeting of the Radiation Research Society San Jose, CA, April.
36. Buettner GR, Kelley EE, Burns .P. (1995) Membrane lipid free radicals produced from L1210 murine leukemia cells by Photofrin photosensitization. Presented at the 43rd Annual Meeting of the Radiation Research Society San Jose, CA, April.
37. Jurkiewicz BA, Bissett DL., Buettner GR. (1995). The effect of topically applied tocopherol on ultraviolet light-mediated free radical damage in skin. Presented at 43rd Annual Meeting of the Radiation Research Society San Jose, CA, April.
38. Jurkiewicz BA, Buettner GR 1995). Mouse and man: UV radiation-induced free radical formation in human skin. Presented at the Oxygen Society (Free Radical Research Society) meeting Nov. Pasadena, CA.
39. Domann FE, Kelley EE, Buettner GR, Burns CP, Oberley LW. (1995) Increased efficacy of photofrin photosensitization of oral squamous cell carcinoma by the pro-oxidants iron and ascorbate. Presented at the Oxygen Society (Free Radical Research Society) meeting Nov. Pasadena, CA.
40. Kelley EE, Buettner GR, Burns CP.(1995). Production of lipid-derived free radicals in the initial peroxidative events of photofrin photosensitization of leukemic cells. Presented at the Oxygen Society (Free Radical Research Society) meeting Nov. Pasadena, CA.
41. Britigan BE, Ratcliffe HR, Buettner GR, Rosen GM.(1995) Binding of myeloperoxidase to bacteria: Effect on hydroxyl radical formation and susceptibility to oxidant-mediated killing. Presented at the Oxygen Society (Free Radical Research Society) meeting Nov. Pasadena, CA.



42. McCormick ML, Buettner GR, Britigan BE.(1995) The spin trap 4-POBN stimulates peroxidase-mediated oxidation of deferoximine: Implications for pharmacological use of spin trapping agents. Presented at the Oxygen Society (Free Radical Research Society) meeting Nov. Pasadena, CA.
43. Hall DM, Buettner GR, Oberley LW, Gisolfi CV.(1995) Hyperthermia enhances nitric oxide release and reactive oxygen species in splanchnic tissues. Presented at the Oxygen Society (Free Radical Research Society) meeting Nov. Pasadena, CA..
44. Qian Y, Buettner GR.(1996) Iron in free radical oxidations: EPR spin trapping studies on the initiation of chemical and biochemical oxidations. Presented at the 44th annual meeting of the Radiation Research Society, Chicago, IL.
45. Kelley EE, Burns CP, Oberley LW, Domann FE, Buettner GR (1996) Increased efficacy of in vitro photodynamic therapy of oral cancer cells by the prooxidants, iron and ascorbate. Presented at the 44th annual meeting of the Radiation Research Society, April, Chicago, IL.
46. Qian Y, Buettner GR. (1996) Iron in free radical oxidations: EPR spin trapping studies on the initiation of chemical and biochemical oxidations. Presented at the 44th annual meeting of the Radiation Research Society, April, Chicago, IL.
47. Kelley EE, Buettner GR, Burns CP. (1996) Production of lipid-derived free radicals in L1210 murine leukemia cells is an early oxidative event in the photodynamic action of Photofrin. Presented at the 24th annual meeting of the American Society for Photobiology, June, Atlanta, GA.
48. Buettner GR. (1996) EPR detection of photogenerated free radicals from cells and tissues. Platform talk presented at the 24th annual meeting of the American Society for Photobiology, June, Atlanta, GA.
49. Buettner GR. (1996) Metals and free radicals: The chemistry of vitamin c. Opening lecture for the Sunrise Free Radical School presented at Oxygen '96, the Annual meeting of the Oxygen Society (Free Radical Research Society), November 20-25, Miami Beach, FL.
49. Jurkiewicz BA, Buettner GR (1996) UV Radiation-induced free radical formation in skin. Presented at the 24th annual meeting of the American Society for Photobiology, June, Atlanta, GA.
50. Buettner GR. (1996) What is EPR? Simple Theory. Opening lecture for the EPR Workshop held in conjunction with Oxygen '96, the Annual meeting of the Oxygen Society (Free Radical Research Society), November 20-25, Miami Beach, FL.
51. Qian Y, Buettner GR. (1996) Iron-oxygen complexes may be more important than the Fenton reaction in initiating biological free radical oxidations: an EPR spin trapping study, presented at Oxygen '97, the Annual meeting of the Oxygen Society (Free Radical Research Society), November 20-25, Miami Beach, FL.
52. Wagner BA, Buettner GR, Burns CP. (1996) Effect of vitamin E on free radical-mediated lipid peroxidation in live L1210 cells, presented at Oxygen '96, the Annual meeting of the Oxygen Society (Free Radical Research Society), November 20-25, Miami Beach, FL.
53. Kelley EE, Burns CP, Buettner GR. (1996). *In vivo* photodynamic therapy with Photofrin produces nitric oxide from L1210 solid tumors, presented at Oxygen '96, the Annual meeting of the Oxygen Society (Free Radical Research Society), November 20-25, Miami Beach, FL.
54. Schafer F, Kelley EE, Buettner GR. (1997) Influence of vitamin E on Photofrin photosensitization in L1210 murine leukemia cells. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.
55. Wong H, Schafer F, Kelley EE, Buettner GR. (1997) Beta-carotene rescues cells from photodynamic therapy with Photofrin. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.
56. Jurkiewicz-Lange BA, Buettner GR. (1997) Iron chelators protect against UV radiation induced free radical formation in skin: An EPR study. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.



57. McCormick ML, Denning GM, Reszka KJ, Bilski P, Buettner GR, Rasmussen GT, Railsback MA, Britigan BE. (1997) Some photochemistry of menadione and its biological consequences. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.
58. Kelley EE, Burns CP, Buettner GR. (1997) In vivo photodynamic therapy with Photofrin produces nitric oxide in L1210 solid tumors. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.
59. Qian Y, Buettner GR. (1997) Iron-ascorbate enhances the phototoxicity of in vitro PDT in L1210 cells: A mechanistic study by EPR. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.
60. Garcia LA, Smith RS, DeJong SC, Martin SM, Buettner GR, Kerber RE. (1997) Magnesium reduces free radicals in and *in vivo* occlusion-reperfusion model. Presented at The AFMR Midwest meeting, September 25-26, Chicago, IL *J Invest Med* **45(7)**:322A.
61. Hempel SL, Buettner GR, O'Malley YQ, Wessels DA, Flaherty DM. (1997) A new fluorescent probe for detecting intracellular oxidants. Magnesium reduces free radicals in and *in vivo* occlusion-reperfusion model. Presented at The AFMR Midwest meeting, September 25-26, Chicago, IL *J Invest Med* **45(7)**:300A.
62. Kelley EE, Sim JE, Buettner GR, Spitz DR. (1997) Oxygen-Resistant Chinese Hamster Fibroblast Cells are Cross-Resistant to Photosensitization with Photofrin® Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
63. Jiang X, Yan T, Buettner GR, Oberley LW. (1997) Transfection of canine MDCK cells with human MnSOD Induces overexpression of MnSOD: is dog really man's best friend? Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
64. Ridnour LA, Sim JE, Wink DA, Martin SM, Buettner GR, Spitz DR. (1997) A Rapid Spectrophotometric Method for Quantification of •NO, NO<sub>2</sub><sup>-</sup>, and NO<sub>3</sub><sup>-</sup> in Cell Culture Media. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
65. Qian Y, Buettner GR. (1997) EPR Detection of peroxy, alkoxy, and carbon-centered radical formation during membrane lipid peroxidation in cells. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
66. Qian Y, Buettner GR. (1997) Iron-ascorbate enhances the phototoxicity of *in vitro* PDT in cells (L1210, K562, & HL60): A mechanistic EPR study. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
67. McCormick ML, Buettner GR, Hart CM, Lewis TS, Britigan BE. (1997) The NO donor DEANO markedly decreases the stability of the DMPO/•OH spin adduct. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
68. McCormick ML, Buettner GR, Britigan BE. (1997) Endogenous SOD levels regulate iron-dependent •OH formation in *Escherichia coli* exposed to H<sub>2</sub>O<sub>2</sub>. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
69. McCormick ML, Gout J, Buettner GR, Britigan BE, Heinecke JW. (1997) Peroxidase/H<sub>2</sub>O<sub>2</sub> forms tyrosyl radical as detected by EPR. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
70. Wang H, Schafer F, Kelley EE, Wagner BA, Buettner GR. (1997) Problems in the delivery of β-carotene to cultured cells: THF enhances Photofrin toxicity. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.
71. Schafer F, Buettner GR. (1997) Influence of vitamin E on Photofrin photosensitization of HL60, K562 and L1210 cells. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 21-24 in San Francisco, CA.

72. Kelley EE, Huynh HK, Sim JE, Buettner GR and Spitz DR. (1998) Cellular oxygen resistance confers cross-resistance to Photofrin® photosensitization. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 20-24 in Washington D.C.
73. Qian Y, Buettner GR. (1998) EPR Detection of peroxy, alkoxy, and carbon-centered radicals formed during PDT-mediated cell membrane lipid peroxidation. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 20-24 in Washington D.C.
74. Schafer F, Buettner GR.(1998) Photofrin photosensitization in HL60 and K562 cells is (PUFA) and pH dependent. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 20-24 in Washington D.C.
75. Buettner GR, Hall DM, Flanagan SW, Oberley LW. (1999) Detecting free radical formation during hyperthermia using EPR. Presented at the International Conference on Prostate Cancer Research, June 24-27, Iowa City, IA.
76. Hall DM, Buettner GR, Oberley LW, Oberley TD, Xu L, Drake VJ, Swartz S, Kregel K. (1999) Aging lowers stress-induced nuclear antioxidant enzyme translocation and increases metal activation. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA..
77. Jiang X, Buettner GR, Oberley LW. (1999) Overexpression of MnSOD protects PC3 cells from cytotoxicity induced by hyperthermia. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
78. Kelley EE, Wagner BA, Buettner GR, Burns CP. (1999) Nitric oxide inhibits Photofrin-induced lipid peroxidation in murine leukemia. Presented at the American Society for Photobiology 27<sup>th</sup> annual meeting, July 10-15, Washington D.C.
79. Kelley EE, Wagner BA, Buettner GR, Burns CP. (1999) Nitric oxide inhibits Photofrin-induced lipid peroxidation in HL-60 cells. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
80. McCormick ML, Rasmussen GT, Reszka KJ, Buettner GR, Britigan BE. (1999) Nitrite exhibits contrasting effects on H<sub>2</sub>O<sub>2</sub>/peroxidase-mediated and hypohalous acid-mediated cytotoxicity. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
81. McCormick ML, Rasmussen GT, Reszka KJ, Buettner GR, Britigan BE. (1999) L-tyrosine enhances eosinophil peroxidase-mediated damage to A549 human lung epithelial cells. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
82. McCormick ML, Reszka KJ, Hazen SL, Buettner GR, Britigan BE. (1999) EPR evidence for peroxidase-dependent formation of a nitrite-derived oxidant. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
83. Qian SY and Buettner GR. (1999) The EPR detection of lipid-derived radicals during membrane lipid peroxidation of cells. Presented at the International Conference on Prostate Cancer Research, June 24-27, Iowa City, IA.
84. Qian SY, Wang H, Schafer F, Buettner GR. (1999) EPR detection of lipid-derived radicals during peroxidation of PUFA, LDL and cells. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
85. Schafer F and Buettner GR. (1999) Photodynamic therapy with Photofrin is cell line-dependent: a study of lipid peroxidation in leukemia cell lines. Presented at the International Conference on Prostate Cancer Research, June 24-27, Iowa City, IA.
86. Schafer F, Aminzay A, Cueno KL, Buettner GR. (1999) Photofrin photosensitization is cell line dependent: a study of nine leukemia cell lines. Presented at the American Society for Photobiology 27<sup>th</sup> annual meeting, July 10-15, Washington D.C.
87. Schafer F, Wagner BA, Wang H, Oberley LW, Buettner GR. (1999) Does peroxide toxicity correlate with antioxidant enzyme activity or oxidizability of cells? Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.

88. Venkataraman S, Martin SM, Schafer F, Buettner GR. (1999) A new method for quantification of nitric oxide in solution using a standard oxygen monitor. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
89. Wang H, Buettner GR, Oberley LW. (1999) Overexpression of human PhGPx in human breast cancer cells (MCF-7): effects on Photofrin photosensitization. Presented at the American Society for Photobiology 27<sup>th</sup> annual meeting, July 10-15, Washington D.C.
90. Wang H, Qian SY, Schafer F, Oberley LW, Buettner GR. (1999) Phospholipid hydroperoxide glutathione peroxidase (PhGPx) uniquely protects cell membranes from photo-oxidation. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
91. Wang H, Schafer F, Kelley EE, Wagner BA and Buettner GR. (1998) The effect of  $\beta$ -carotene on lipid peroxidation induced by Photofrin® photosensitization. Presented at the Oxygen Society/Free Radical Research Society Annual Meeting, Nov 20-24 in Washington D.C.
92. Yang J-Q, Li S, Domann FE, Buettner GR, Oberley LW. (1999) RAS regulates expression of 92-kDa Type IV collagenase gene by altering oxidant levels. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
93. Yang J-Q, Li S, Domann FE, Buettner GR, Oberley LW. (1999) Superoxide generation in v-Ha-RAS transduced human keratinocytes. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
94. Yang J-Q, Li S, Huang Y, Zhang H, Domann FE, Buettner GR, Oberley LW. (1999) RAS oncogene mediates mitogenic signaling in part through superoxide production. Presented at the Oxygen Society 6<sup>th</sup> annual meeting, November 18-22, New Orleans, LA.
95. Haak JL, Zhang HJ, Buettner GR, Spitz DR, Kregel KC. (2006) Holey electron transport chain: aging increases mitochondrial superoxide production in rat liver. *FASEB J.* **20 (5):** A1457-A1458 Part 2 MAR 7.
96. Buettner GR, Ng CF, Wang M, Rodgers VGJ, Schafer FQ. (2006) *MnSOD, Beyond an Antioxidant: A Redox Enzyme via Hydrogen Peroxide*. 13<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine held at the Adam's Mark Denver, Co, Nov 15 – 19.
97. Ng CF, Schafer FQ, Buettner GR, Rodgers VGJ, (2006) *Effective GPx Activity: a new view on comparing removal of H<sub>2</sub>O<sub>2</sub> in cells*. 13<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine held at the Adam's Mark Denver, Co, Nov 15 – 19.
98. Fischer AJ, Martin SM, Schafer FQ, Rodgers VGJ, Buettner GR. (2006) *Nitric oxide is consumed by half-order kinetics during cellular lipid peroxidation*. 13<sup>th</sup> Annual Meeting of the Society for Free Radical Biology and Medicine held at the Adam's Mark Denver, Co, Nov 15 – 19.
99. Suh Y, Buettner GR, Robertson LW, Ludewig G. (2006) Formation of free radicals by uv-irradiation of deca-bromodiphenyl ether (deca-BDE). Presented at the Superfund Basic Research Program Annual Meeting, San Diego, California, December 11-12, 2006. Abstract 40
100. *not complete.*

#### **D. Reviews (Papers marked with an asterisk have over 100 citations)**

1. \*Oberley LW, Buettner GR. (1979) The role of superoxide dismutase in cancer: A review. *Cancer Research* **39**: 1141-1149. **\*\*Citation Classic\*\*** (> 600 citations)  
<http://cancerres.aacrjournals.org/cgi/content/abstract/39/4/1141>

2. Chignell CF, Motten AG, Buettner GR. (1985) Photoinduced free radicals from chlorpromazine and related phenothiazines. Relationship to phenothiazine induced photosensitization. *Environ Health Perspect* **64**: 103-110.  
<http://links.jstor.org/sici?sici=0091-6765%28198512%2964%3C103%3APFRFCA%3E2.0.CO%3B2-V>
3. Buettner GR. (1987) Activation of oxygen by metal complexes and its relevance to autoxidative processes in living systems." *Bioelectrochem Bioenergetics* **18**: 29-36.  
[http://dx.doi.org/10.1016/0302-4598\(87\)85005-5](http://dx.doi.org/10.1016/0302-4598(87)85005-5)
4. \*Buettner GR (1987) Spin trapping: ESR parameters of spin adducts. *Free Radic Biol Med* **3**: 259-303. (> 800 citations)
5. \*Miller DM, Buettner GR and Aust SD. (1990) Transition metals as catalysts of 'autoxidation' reactions. *Free Radic Biol Med* **8**: 95-108. (> 350 citations)  
[http://dx.doi.org/10.1016/0891-5849\(90\)90148-C](http://dx.doi.org/10.1016/0891-5849(90)90148-C)
6. \*Buettner GR. (1993) The pecking order of free radicals and antioxidants: Lipid peroxidation,  $\alpha$ -tocopherol, and ascorbate. As an **Invited Review**, *Arch Biochem Biophys* **300**:535-543. (> 725 citations) <http://dx.doi.org/10.1006/abbi.1993.1074>
7. Hall DM, Buettner GR, Gisolfi CV. (1997) *In vivo* detection of nitric oxide and NO<sub>x</sub> species using *ex vivo* electron paramagnetic resonance spectroscopy. *Microchemical J* **56**: 165-170. <http://dx.doi.org/doi:10.1006/mchj.1997.1445>
8. \*Schafer FQ, Buettner GR. (2001) Redox state of the cell as viewed through the glutathione disulfide/glutathione couple. *Free Radic Biol Med.* **30**:1191-1212.  
[http://dx.doi.org/10.1016/S0891-5849\(01\)00480-4](http://dx.doi.org/10.1016/S0891-5849(01)00480-4) >450 citations
9. Buettner GR, Schafer FQ. (2000) Free radicals, oxidants, and antioxidants. *Teratology* **62**:234. <http://www.healthcare.uiowa.edu/corefacilities/esr/papers/Teratology-2000-62-234-GRB.PDF>
10. Burns CP, Kelley EE, Wagner BA, Buettner GR. (2002) Role of nitric oxide and membrane phospholipid polyunsaturation in oxidative cell death. *Sub-Cellular Biochemistry.* **36**:97-121.
11. Lange BA, Buettner GR. (2001) Electron paramagnetic resonance detection of free radicals in UV-irradiated human and mouse skin. *Current Problems in Dermatology.* **29**:18-25.

#### **E. Electronic Publications:**

1. Li ASW, Cummings KB, Roethling HP, Buettner GR, Chignell CF, (1988) *Spin Trap Database*. <http://epr.niehs.nih.gov/stdb.html>
2. Buettner, GR (1998). Antioxidant enzymes and functions. *Sunrise Free Radical School*, Society for Free Radical Biology and Medicine.  
<http://www.medicine.uiowa.edu/esr/completopublications/electronicpubs/sunrisefreradschool98buettner.pdf>
3. Buettner GR. (1999) Antioxidants: How they work in plastics and people. *Sunrise Free Radical School*, Society for Free Radical Biology and Medicine.  
<http://www.medicine.uiowa.edu/esr/completopublications/electronicpubs/sunrisefreradschool99buettner.pdf>
4. Buettner GR. (2001) Free Radical Basics: Concepts and considerations. *Sunrise Free Radical School*, Society for Free Radical Biology and Medicine.  
<http://www.medicine.uiowa.edu/esr/completopublications/electronicpubs/SFRS-2001-BuettnerG.pdf>

5. Buettner GR, Schafer FQ. (2002) Free radical nomenclature: A beginning. *Virtual Free Radical School*, Society for Free Radical Biology and Medicine.  
<http://www.medicine.uiowa.edu/esr/completepublications/electronicpubs/FRRB-FreeRad-names.pdf>
6. Buettner GR, Schafer FQ. (2002) SI Units. *Virtual Free Radical School*, Society for Free Radical Biology and Medicine. <http://www.medicine.uiowa.edu/esr/FRRB-SIunits.pdf>
6. Schafer FQ, Buettner GR. (2002) Redox state and redox environment. *Virtual Free Radical School*, Society for Free Radical Biology and Medicine.  
<http://www.medicine.uiowa.edu/esr/completepublications/electronicpubs/Schafer-Redox-State-1.ppt>
7. Buettner GR, Schafer FQ. (2002) Ascorbate (Vitamin C), its antioxidant chemistry. *Virtual Free Radical School*, Society for Free Radical Biology and Medicine.  
<http://www.medicine.uiowa.edu/esr/completepublications/electronicpubs/Buettner-Ascorbate-Chemistry-1.ppt>
8. Schafer FQ, Buettner GR. (2003) Targets of photosensitization: Lipids, proteins and nucleic acids. In electronic press as part of *The Digital Photobiology Compendium*  
[http://www.photobiology.info/instruct/preview/prev\\_mod22.htm](http://www.photobiology.info/instruct/preview/prev_mod22.htm)

## **F. Other Publications**

1. Buettner GR. (1983) Strawberry Daiquiri First Place Winner, Montgomery County Strawberry Festival Recipes (ed. A. Strong) Crawfordsville, Indiana.  
<http://www.medicine.uiowa.edu/esr/completepublications/Buettner-Strawberry%20Daiquiri.htm>
2. Buettner, G.R. (1992) Iron, chelating agents, and oxygen radicals. **Citation Classic Commentary** in *Current Contents Life Sciences*, p8.  
<http://www.medicine.uiowa.edu/esr/PressReleases/CitClasironchelating.pdf>
3. Buettner GR. (2006) Commentary on: "Faster Plasma Vitamin E Disappearance In Smokers Is Normalized By Vitamin C Supplementation", *Free Radic Biol Med.* **40** (4): 555-556.  
<http://dx.doi.org/10.1016/j.freeradbiomed.2005.12.007>
4. Buettner GR, Schafer FQ. (2006) Albert Szent-Györgyi: Vitamin C identification. *The Biochemist.* **28(5)**: 31-33. <http://www.biochemist.org/bio/>

## **G. Research**

### **1. Research Interests, overview**

- Free radical chemistry as related to health problems.
- Free radicals and antioxidant enzymes in cancer and cancer therapy.
- Photodynamic therapy of cancer.
- Iron in disease
- $^1\text{O}_2$  chemistry as related to the initiation of free radical chain reactions.
- Vitamins C and E, mechanisms of their antioxidant reactions
- Nitric oxide initiated oxidations and NO as an antioxidant
- Quantitative Redox Biology

## **2. Current Projects**

1. *The fundamental chemistry and biochemistry of vitamins C and E.*
2. *The use of ascorbate in the treatment of cancer.*
3. *The use of the ascorbate radical as a marker for free radical oxidative stress.* This research has provided the foundation for many ongoing free radical-related research projects here at Iowa and around the world.
4. *Photodynamic Cancer Therapy.* This research has been an important theme in the lab for many years. We have demonstrated mechanisms by which PDT produces free radicals in cells and tissues.
5. *The role of metals in free radical oxidations:* This has been a long time area of research. We were the first to demonstrate that adventitious iron can change the results observed in free radical experiments and that chelating agents could be used to modulate the catalytic activity of metals. This work has been honored as a Citation Classic. We have published extensively on this theme and continue work in this area.
6. *Nitric Oxide as an antioxidant.*
7. *The chemistry of EPR spin trapping.* This represents the ongoing developmental aspects of the ESR Facility.
8. *UV light and free radical production in skin.* This cancer-related project has been assisted by Procter & Gamble Company, and a seed grant from the Center for Global and Regional Environmental Research here at The University of Iowa. Thus far, the results of this project are the first to demonstrate directly UV light production of radicals in skin and that antioxidants blunt this radical formation with a concomitant reduction of skin tumor formation.

## **3. Published Reviews of Scholarship**

Buettner GR. (1997) In: C. Rice-Evans, B. Halliwell and G.G. Lunt, Editors, *Free Radicals and Oxidative Stress: Environment, Drugs and Food Additives* (Biochemical Society Symposium No. 61), Portland Press (1995) ISBN 1 85578 069 0, p. x + 276.  
 • Book Review, *Trends in Food Science & Technology*, Volume 8, Issue 2, February 1997, Pages 64-65.

## **4. Financial Resources**

The list of grants below represent only those in which I had a significant role, such that financial support directly benefited our efforts. There are many other funded grants that I have assisted and provided scientific input, data analysis *etc*, but are not included below.

Consultation of UIRIS shows that the ESR Facility has assisted in bringing **\$163,000,000** in grant and contract funds to The University of Iowa since 1988 (accessed 01/19/2007). This is a lower limit, as many others are not listed in my UIRIS profile.

### **Grants Active**

<b>TITLE</b>	<b>Organization/P.I.</b>	<b>Date</b>	<b>Amount</b>
<i>Oxidative Events in Cancer Therapy</i>	NIH (P01-CA66081) P.I.: LW Oberley	07/01/2001 - 06/30/2007	\$5,200,000/ Total Direct
<i>Project 3: Membrane Free</i>	Proj. 3 Leader:		\$910,000/

<i>Radicals in Photodynamic Cancer Therapy</i>	GR. Buettner (25%)		Total Direct
<i>Core a: Electron Paramagnetic Resonance Core</i>	Core a Leader: GR. Buettner (35%)		\$918,000/ Total Direct
<i>Nutrition Experiences in Cancer Prevention</i>	NIH/ Snetselaar, Linda GR Buettner 5%	07/01/06- 06/30/11	\$300,000 direct/yr
<i>Semi-Volatile PCBs: Sources, Exposures, Toxicities</i>	NIEHS/ Robertson, Larry GR Buettner, Project 1 5%	04/01/2006 - 03/31/2011	\$2,154,995 direct/yr
<i>Oxidative Stress and Aging: Integrative Mechanisms</i>	R01-AG-12350 P.I., Kevin Kregel, National Institute on Aging Co-Invest.: Garry R. Buettner 5%	09/01/98- 08/31/07	\$313,854
<i>13th Annual SFRBM Meeting</i>	NIH/ PI: GR Buettner	11/15/2006 11/19/2006	39,902.00?? to be determined

#### Past

<b>TITLE</b>	<b>Organization</b>	<b>Date</b>	<b>Amount</b>
<i>Nitric Oxide as a Cellular Antioxidant</i>	NIH R01 CA84462 PI: GR Buettner 25%	03/15/2001 - 02/28/2006	\$501,000 Total direct
<i>Free Radicals in Hyperthermia</i>	NIH-RO1-CA81090 PI: GR Buettner 25%	04/01/1999- 03/31/2003	\$674,000 Total direct
<i>Neonatal anemia: Pathophysiology and treatment</i>	NIH-2-PO1-HL46925 P.I.: Ronald G Strauss Co-Invest.: Garry R. Buettner 5%	04/01/99- 03/31/04	\$5,380,000 direct
<i>Strategies to limit defibrillation and reperfusion injury</i>	NIH P.I.: Richard Kerber Co-Invest.: Garry R. Buettner, 5%	7/99-6/03	\$1,008,651/ 4 years
<i>A Proposed role for manganese-superoxide dismutase in tumor angiogenesis</i>	University of Iowa/ Carver Trust Medical Research Initiative PI: GR Buettner with LW Oberley	03/01/99- 02/29/00	\$30,000
<i>HPLC for Free Radical Research</i>	NIH-NCRR Shared Instrumentation Grant 1 S10 RR13821 GR Buettner, P.I.	05/01/99- 04/30/00	\$100,000
<i>Defibrillation: Mechanisms of injury</i>	NIH R01 P.I: Dr. Richard Kerber Consultant: Garry R. Buettner via ESR Facility	10/95-9/99	\$410,000/ 4 years
<i>Subproject: Free radicals and antioxidant enzymes in hyperthermia</i>	NIH-R21-CA/ES68738 P.I.: David Lubaroff Co-Invest: Garry R. Buettner (5%)	9/97-8/99	\$34,000 direct
<i>Fatty Acids, Lipoproteins and Lipid Peroxidation</i>	NIH Program Project P.I.: Dr. Arthur A. Spector	10/92- 12/97	\$600,000/ year



<i>Project I: Polyunsaturated acids and cell function</i>	Co-Invest. Project I: Dr. Garry R. Buettner (15%)		
<i>Response of human Prostatic Cancer Cells to Polyunsaturated Fatty Acid Supplementation</i>	The University of Iowa Cancer Center	6/94-5/95	\$10,000
<i>Free Radical Aspects of Skin Photobiology</i>	Procter & Gamble Co., Cincinnati, OH	8/94-7/95	\$56,800
<i>Free Radical Aspects of Skin Photobiology</i>	Procter & Gamble Co., Cincinnati, OH	7/92-6/93	\$69,400
<i>Free Radical Aspects of Skin Photobiology</i>	Procter & Gamble Co., Cincinnati, OH	7/91-6/92	\$69,400
<i>Free Radicals and Antioxidants in Ultraviolet Radiation-Induced Skin Cancer</i>	Center for Global and Regional Environmental Research at The University of Iowa	9/93-8/94	\$15,000
<i>Free Radical Symposium</i>	Upjohn	6/4/93	\$8,000
<i>Free Radicals and ESR</i>	Parke-Davis Company	7/92-Indef	\$10,500
<i>Free Radical Studies</i>	Procter & Gamble	1/94-Indef	\$13,800
<i>Membrane Free Radicals in Photodynamic Cancer Therapy</i>	American Cancer Society	10/90-9/91	\$10,000

## H. Invited Lectures

1. Buettner GR (1989) *On the reaction of superoxide with DMPO/•OOH*. Invited lecturer at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July, Guelph, Ontario, Canada.
2. Li ASW, de Hass AH, Buettner GR, Watson MS, Carlton LD, Chignell CF. (1989) *STDBII, a spin trapping database implemented on the PC/AT*. Invited lecturer at the 2nd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, July, Guelph, Ontario, Canada.
3. Buettner GR (1991) *The basic chemistry of spin trapping*. Invited lecturer, Nov. at the 3rd International Symposium on Spin Trapping and Aminoxy Radical Chemistry, Kyoto, Japan.
4. Buettner GR. (1991) *The pecking order of free radical reactions*. Invited lecturer Dec., at Parke-Davis, Ann Arbor, MI.
5. Buettner GR. (1992) *Catalytic metals and free radical reactions*. Invited plenary lecturer, April at the International Conference on ESR of Organic and Bio-Organic Radicals, sponsored by the Royal Society of Chemistry and the Society for Free Radical Research, York, United Kingdom.

6. Buettner GR. (1992) *The pecking order of free radicals and antioxidants: Lipid peroxidation,  $\alpha$ -tocopherol, and ascorbate*. April, GSF Research Institute, Munich, Germany.
7. Buettner GR. (1992) *The pecking order of free radicals and antioxidants: Lipid peroxidation,  $\alpha$ -tocopherol, and ascorbate*. August, University of Kansas Medical Center, Kansas City, KS.
8. Buettner GR. (1992) *The pecking order of free radicals and antioxidants: Lipid peroxidation,  $\alpha$ -tocopherol, and ascorbate*. August, University of Kansas Medical Center, Kansas City, KS.
9. Buettner GR. (1992) *The pecking order of free radicals and antioxidants*. Sept., Department of Biochemistry, The University of Iowa, Iowa City, Iowa.
10. Buettner GR. (1993) *The pecking order of free radicals and antioxidants: Vitamins C, E, and the iron Triad*. June, Procter & Gamble Co., Cincinnati, OH.
11. Buettner GR. (1993) *Photosensitized production of free radicals: Electron paramagnetic resonance detection - direct and spin trapping approaches*. Invited symposium presentation, June, American Society for Photobiology meeting, Chicago, IL.
12. Buettner GR. (1993) *Free radical chemistry for the health sciences*. Ten invited lectures for the course, Free Radicals in Toxicology and Medicine, TOX780:022, University of Kentucky, Lexington, KY, June.
13. Buettner GR. (1993) *The pecking order of free radicals and antioxidants: The Vitamin C, Vitamin E, and Iron Triad*. Nov., The University of Illinois, Urbana.
14. Buettner GR. (1993) *Ascorbate radical as a marker of oxidative stress: In vitro and ex vivo applications*. Invited lecture at the 4th International Symposium on Spin Trapping and Organic EPR Spectroscopy, Oct. at the Oklahoma Medical Research FDN, Oklahoma City, OK.
15. Organized the Oxygen Society EPR Information Session, (1993) *EPR (ESR) Centers: What they can do for you*, and presented An EPR Laboratory as a Core Facility at The University of Iowa as part of this session at the annual meeting of the Oxygen Society, Charleston, SC, Nov.
16. Buettner GR. (1994) *How I write a scientific paper: Selling your data with power writing*. Presented 27 Jan. as the Radiation Research Laboratory Seminar.
17. Buettner GR. (1994) *Get Heart Smart: An introduction to free radicals, lipid peroxidation, and antioxidants*. The Cardiovascular Center, The University of Iowa, April 1.
18. Buettner GR. (1994) *How I write a scientific paper: Selling your data with power writing*. Presented 14 April as the Computer Science Department Seminar.
19. Buettner GR. (1994) *The pecking order of free radicals and antioxidants*. Chevron Oil Company, San Francisco, CA, May 17.
20. Buettner GR. (1994) *The pecking order of free radicals and antioxidants: Applications to photodynamic therapy*. May 18, Stanford University CA.

21. Buettner GR. (1994) The pecking order of free radicals and antioxidants: Applications to photodynamic therapy. May 24, NIH, Bethesda, MD.
22. Buettner GR. (1994) *Light-induced free radical formation in cells and intact skin as detected by EPR*. Invited symposium speaker at The American Society for Photobiology meeting, June 25-29.
23. Buettner GR, Wagner BA, Burns CP. (1994) *Free radical mediated lipid peroxidation in cells: Oxidizability as a function of cell lipid bis-allylic hydrogen content*. 29 Sept. - 1 Oct., As an invited presentation at the symposium on Therapeutic Potential of Biological Antioxidants sponsored by the Linus Pauling Institute.
24. Buettner GR. (1995) *Selling your data with power writing*. For the Women in Research Day, The University of Iowa, Feb. 23.
25. Buettner GR. (1995) *Ascorbate, catalytic metals, and free radicals*. Invited speaker for the Fenton Centennial Symposium held at the Radiation Research Society Meeting, April, San Jose, CA.
26. Buettner GR. (1995) *Free radical chemistry for the health sciences. Ten invited lectures for the course, Free Radicals in Toxicology and Medicine*, TOX-780:022, University of Kentucky, Lexington, KY, June.
27. Buettner GR. (1995) *Free radical-mediated lipid peroxidation in cells: Oxidizability as a function of cell lipid bis-allylic hydrogen content*. June 13, Marian Merrill Dow, Cincinnati, OH.
28. Buettner GR. (1995) *How I write a scientific paper: Selling your data with power writing*. 14 June, Presented at the University of Kentucky, Lexington KY,.
29. Buettner GR. (1995) *How I write a scientific paper: selling your data with power writing*. Sept. 15, Infectious Disease Research Conference, The University of Iowa. .
30. Buettner GR. (1995) *The chemistry of vitamins C & E: Free radicals and your health*. Sep. 21, Luther College, Decorah, IA.
31. Buettner GR. (1995) *The pecking order of free radicals and antioxidants: Detecting ascorbate, tocopherol, and lipid radicals by EPR*. Oct. 1, As the opening lecture for the University California at Davis Free Radical Seminar Series, Davis, CA.
32. Buettner GR. (1995) *Free Radical Basics: The pecking order and more*. As the lead off lecture for the Sunrise Free Radical School at the Nov. 1995 Oxygen Society/Free Radical Research Society Meeting, Pasadena, CA.
33. Buettner GR. (1995) *Basic Free Radical Chemistry: The pecking order and proteins*. Dec. 15-16. The featured speaker at the University of Kansas IDeA Symposium on the REDOX modification of proteins, Lawrence, KS.
34. Buettner GR. (1995) *Proteins as targets for peroxynitrite*. Dec. 15-16, The University of Kansas IDeA Symposium on the REDOX modification of proteins, Lawrence, KS.
35. Buettner GR. (1996) *Lipid peroxidation in cells: Vitamin E, oxidizability, free radicals, rancidity, antioxidants and you*. Infectious disease research conference, The University of Iowa Jan. 12.

36. Buettner GR. (1996) *How I write a scientific paper: Selling your data with power writing.* May 3 presentation to the Multidisciplinary Aging Research Seminar, The University of Iowa.
37. Buettner GR. (1996) *The pecking order of free radicals and antioxidants: Detecting ascorbate, tocopherol and lipid radicals by electron paramagnetic resonance.* June 27, Southern Illinois University, Springfield, IL.
38. Buettner GR. (1996) *Free radicals and your health: Vitamins C and E.* Cornell College, Sept.
39. Buettner GR. (1996) *Metals and Free Radicals: The chemistry of vitamin C.* Leadoff lecture for the Sunrise Free Radical School at Oxygen '96 the annual meeting of the Oxygen Society, Miami, FL Nov 22-25.
40. Buettner GR.(1996) *What is ESR? Simple Theory.* Leadoff speaker of the ESR Spectroscopy workshop held Nov 21, Miami, FL, held in conjunction with Oxygen '96.
41. Buettner GR (1997) *The pecking order of free radicals and antioxidants: Detecting ascorbate, tocopherol and lipid radicals by EPR,* The Ohio State University April.
42. Buettner GR, Oberley LW, Flanagan SW, Li JJ, Hall DM. (1997) *Are free radicals involved in hyperthermia?* Oral Presentation at the Radiation Research Society Meeting, May.
43. Buettner GR. (1997) *EPR detection of radicals from cells and tissues.* Oral Presentation at the Radiation Research Society Meeting, May.
44. Buettner GR. (1997) *Introduction to Free Radicals - chemistry and biochemistry.* Presented at the Workshop on the Detection of Free Radicals. May 22-24, Bangkok, Thailand.
45. Buettner GR. (1997) *Mechanisms of Free Radical Generation.* Presented at the Workshop on the Detection of Free Radicals. May 22-24, Bangkok, Thailand.
46. Buettner GR. (1997) *Electron paramagnetic resonance - simple theory: direct EPR and EPR spin trapping.* Presented at the Workshop on the Detection of Free Radicals. May 22-24, Bangkok, Thailand.
47. Buettner GR. (1997) *EPR detection of free radicals in UV-light + skin, photodynamic therapy, and myocardial ischemia reperfusion.* Presented at the Workshop on the Detection of Free Radicals. May 22-24, Bangkok, Thailand.
48. Buettner GR. (1997) *Free radical chemistry for the health sciences and toxicology.* Presented at the Free Radicals in Toxicology Workshop. June 3, Taipei, Taiwan.
49. Buettner GR (1997) *Perspectives in scientific manuscript preparation.* Special Presentation at the American Society for Photobiology 25th annual meeting, July 5-10.
50. Buettner GR (1997) *Spin trapping of reactive oxygen species in cells and tissues.* Symposium Presentation at the American Society for Photobiology 25th annual meeting, July 5-10.

51. Buettner GR, Kelley EE. (1997) *EPR detection of nitric oxide (NO) in the phototherapy of tumors*. Symposium Presentation at the American Society for Photobiology 25th annual meeting, July 5-10.
52. Buettner GR (1997) Photobiology School Lecture: *Free radicals: ins, outs, ups, downs, and EPR*. Presented at the American Society for Photobiology 25th annual meeting, July 5-10.
53. Buettner GR (1997) *The pecking order of free radicals and antioxidants: The vitamin E, vitamin C and iron triad* given in the symposium on Free Radicals in Biological Systems at the Midwest American Chemical Society Meeting, October 29-November 1, Tan-Tar-A Resort, Lake of the Ozarks, Osage Beach, MO.
54. Buettner GR (1997) Invited to speak on *Radicals and Radical Production: Tools of the Trade* given in the Sunrise Free Radical School at the annual meeting of the Oxygen Society/Free Radical Research Society, November 21-24, San Francisco, CA.
55. Buettner GR (1997) Invited Special Presentation on *How I write a Scientific Paper* at the annual meeting of the Oxygen Society/Free Radical Research Society, November 21-24, San Francisco, CA.
56. Buettner GR. (1997) *Generation, Properties and Localization of reactive oxygen and related species*. Unilever Symposium on Reactive Oxygen Species and Antioxidants in Human Health and Disease, Dec 17-19, Colworth House, Bedfordshire, UK.
57. Buettner GR. (1998) *Invited Speaker EPR Basics: Simple Theory* at the Oxygen Club of California meeting, Feb 6-8 in Santa Barbara, CA.
58. Buettner GR (1998) Invited to speak on "*In vitro and in vivo detection of free radical intermediates*". Annual meeting of the Society of Toxicology March 1-6, Seattle WA.
59. Buettner GR. (1998) *Spin trapping of free radicals from heated cells and tissues*. In the symposium on the Role of Oxidative Stress in Biological Responses to Hyperthermia at the North American Hyperthermia Society/Radiation Research Society Meeting, April 25-30, Louisville, KY.
60. Buettner GR. (1998) *How I write a Scientific Paper* at the North American Hyperthermia Society/Radiation Research Society Meeting, April 25-30, Louisville, KY.
61. Buettner GR (1998) *Techniques to measure free radicals during oxidative stress*. At the Annual meeting of the American College of Sports Medicine, Jun 3-6, Orlando, FL.
62. Buettner GR. (1998) *Detection of free radicals during cellular lipid peroxidation*. A FASEB symposium on The Molecular and Biological Mechanisms of Antioxidant Action, August 2-7, Copper Mountain, CO.
63. Buettner GR (1998) *Free Radicals and antioxidants: The vitamins C, E and iron triad*. Oct. 19, The University of Missouri, Rolla.
64. Buettner GR (1998) *Free Radicals and antioxidants: The vitamins C, E and iron triad*. Oct. 22, NIH/NIEHS, Research Triangle Park, North Carolina.
65. Buettner GR (1998) *Free Radicals and antioxidants: The vitamins C, E and iron triad*. Oct. 26, Air Force Research Laboratory and Wright State University, Ohio.

66. Buettner GR (1998) *Antioxidant enzymes and functions*. In the Sunrise Free Radical School of the Annual Meeting of the Oxygen Society, Nov 19-Nov 23, Washington D.C.
67. Buettner GR (1999) *Origins of free radicals, cell targets and toxicity*. Keynote Speaker, Teratology Society Annual Meeting, June 28-July 4, Keystone, CO.
68. Buettner GR. (1999) *Photosensitizers can produce different intermediates: are you a product of your environment?* July 15, American Society for Photobiology 27<sup>th</sup> annual meeting, July 10-15, Washington D.C.
69. Buettner GR. (1999) *Title: Antioxidants; how they work in plastics and people*. Nov. 21 at The Sunrise Free Radical School of the 6<sup>th</sup> annual meeting of The Oxygen Society, Nov. 18-22, New Orleans, LA..
70. Buettner GR. (2000) Staples Distinguished Lecturer. *Title: Antioxidants and their Networks of Protection*, The University of Maine Sep 19, 2000
71. Buettner GR. (2000) Staples Distinguished Lecturer: *How I Write a Scientific Paper: Selling your Data with Power Writing*, The University of Maine Sep 19, 2000.
72. Buettner GR. (2000) *Title: Free Radicals and Antioxidants in Health and Disease*, Staples Distinguished Lecturer. Sep 20, 2000, The University of Maine.
73. Buettner GR. (2000) *Title: Does MnSOD Influence H<sub>2</sub>O<sub>2</sub> Production in Mitochondria?* Nov, Annual meeting of the Oxygen Society, New Orleans, LA.
74. Buettner GR. (2001) *Title: The Battle of Pro- and Antioxidants: Vitamins C, E and NO vs. The Challengers: Iron, Oxygen and Oxygen Radicals*. Feb 2, 2001. University of Windsor, Windsor, Ontario.
75. Buettner GR. (2001) *Title: The Battle of Pro- and Antioxidants: Vitamins C, E and NO vs. The Challengers: Iron, Oxygen and Oxygen Radicals*. May 9, 2001. University of Arizona, Tuscon, AZ.
76. Buettner GR. (2001) *Title: Free Radical Basics: Concepts and Considerations?* Nov. 15-20, Annual meeting of the Oxygen Society, Research Triangle Park, NC.
77. Buettner GR. (2002) *Title: The Battle of Pro- and Antioxidants: Vitamins C, E and NO vs. The Challengers: Iron, Oxygen and Oxygen Radicals*. Jan 25, 2002. Institute for Environmental Medicine, University of Pennsylvania, Philadelphia, PA.
78. Buettner GR. (2002) *Title: Vitamin E, Nitric Oxide, PhGPx, and GSH as the Antioxidant Force in Cell Membranes: Protection Against Oxygen Radicals, Hydroperoxides, and Singlet Oxygen*. Feb. 25, 2002. Carleton University, Ottawa.
79. Buettner GR (2002) *Title: Iron, Free Radicals, and Donor Antioxidants: A potentially destructive triad*. March 14, 2002, Medical College of Wisconsin.
80. Buettner GR. (2002) *Title: Spin Trapping of Radicals from Cells: the effect of Pro- and Antioxidants*. 7th International Symposium on Spin Trapping to be held at the Carolina Inn, July 7-11, 2002, Chapel Hill, North Carolina.
81. Buettner GR (2002) *Title: The Battle of Pro- and Antioxidants: Vitamins C, E and NO vs. The Challengers: Iron, Oxygen and Oxygen Radicals*. Sep 30, 2002, University of California, Davis, CA.

82. Buettner GR (2002) *Title: The Battle of Pro- and Antioxidants: Vitamins C, E and NO vs. The Challengers: Iron, Oxygen and Oxygen Radicals.* October 18, 2002, University of Colorado, Denver, CO.
83. Buettner GR. (2002) *Title: What is an antioxidant? How do they work?* Nov. 20-24, Annual meeting of the Oxygen Society, San Antonio, TX.
84. Buettner GR. (2003) *Title: The Battle of Pro- and Antioxidants: Vitamins C, E and NO vs. The Challengers: Iron, Oxygen and Oxygen Radicals.* May 15, 2003. Radiation Oncology, University of Pennsylvania, Philadelphia, PA.
85. Buettner GR. (2003) *Title: Chalcogen ('kal-kā-jēn) chemistry and biochemistry: The many faces of O, S, and Se in proteins and enzymes.* Nov. 20-24, 10<sup>th</sup> Annual Meeting of The Society for Free Radical Biology and Medicine, Seattle, WA.
86. Buettner GR. (2003) *Title: How I Write a Scientific Paper: Selling your data with power writing.* Nov. 20-24, 10<sup>th</sup> Annual Meeting of The Society for Free Radical Biology and Medicine, Seattle, WA.
87. Buettner GR. (2004) *Title: The ascorbate radical and oxidative flux.* March 09, 2004. Radiation Oncology, NIH, Bethesda, MD.
88. Buettner GR. (2004) *Title: The Pecking Order of Free Radicals and Antioxidants.* XII<sup>th</sup> Biennial Meeting of the Society for Free Radical Research, May 5-9, 2004, Buenos Aires, Argentina.
89. Buettner GR. (2004) *Title: The Thiol System: Life and Death in the Numbers.* XII<sup>th</sup> Biennial Meeting of the Society for Free Radical Research, May 5-9, 2004, Buenos Aires, Argentina.
90. Buettner GR. (2004) *Title: NO is cellular chain-breaking antioxidant via its reaction with LOO•: LO• are minor propagating species .* XII<sup>th</sup> Biennial Meeting of the Society for Free Radical Research, May 5-9, 2004, Buenos Aires, Argentina.
91. Buettner GR. (2004) *Title: The ascorbate radical and oxidative flux.* Sep 15, 2004. Biochemistry and Redox Biology Center, University of Nebraska, Lincoln, NE.
92. Buettner GR (2005) *Title: Ascorbate Radical as a Real-time Marker of Oxidative Stress: Challenges and Opportunities with Transition Metals.* Society Free Radical Biology and Medicine. November 16-21, 2005, Austin, TX.
93. Buettner GR (2005) *Title: Cellular Redox Environment and Biological Status: Redox Buffers in Space & Time.* Plant Oxygen Group of the Society for Free Radical Research (SFRR), in association with the Society for Experimental Biology (SEB), Oxygen metabolism, ROS and redox signalling in plants, 18 - 20 December 2005, at the University of the West of England, Bristol, U.K.
94. Buettner (2005) *MnSOD, Beyond an Antioxidant: A Redox Enzyme via H<sub>2</sub>O<sub>2</sub>?* Presented at the Free Radical & Radiation Biology Graduate Program Seminar, The University of Iowa, 09/01/2005.
95. Buettner GR (2006) *Title: The Chemistry of Redox Biology.* 14<sup>th</sup> Gordon Research Conference on Oxygen Radicals in Biology. February 5 - 10, 2006, Ventura, CA.



96. Buettner GR, Schafer FQ. (2006) *Cellular Redox Environment and Biological Status: Redox Buffers in Space & Time*. XIII Biennial meeting of the Society for Free Radical Research international, August 15-19 Davos, Switzerland.
97. Buettner GR. (2006) *What is an antioxidant? How do antioxidants work?* XIII Biennial meeting of the Society for Free Radical Research international, August 15-19 Davos, Switzerland.
98. Buettner (2006) *Cellular Redox Buffers in Space & Time: The Ying & Yang of One-Electron and Two-Electron Signalling* Presented at the Free Radical & Radiation Biology Graduate Program Seminar, The University of Iowa, 08/24/2006.
99. Buettner, GR (2006) *Free Radical Biochemistry: The Basics and New Views*. International Free Radical Summer School 2006, Sep 30- Oct 6. Spetses Island, Greece.
100. Schafer, FQ, Buettner, GR (2006) *The radicals of ionizing radiation: chemical and biological consequences (TR001)*. Radiation Research Society. 53rd Annual Meeting, Pennsylvania Convention Center, Philadelphia, PA, November 5 – 8.
101. Buettner GR. (2006) *Superoxide and hydrogen peroxide production in mitochondria. (MS1101)*. Radiation Research Society. 53rd Annual Meeting, Pennsylvania Convention Center, Philadelphia, PA, November 5 – 8.
102. Buettner GR, Ng CF, Wang M, Rodgers VGJ, Schafer FQ. (2006) *Superoxide and hydrogen peroxide production in mitochondria: new mechanisms and consequences (S047)*. Radiation Research Society. 53rd Annual Meeting, Pennsylvania Convention Center, Philadelphia, PA, November 5 – 8.
103. Buettner GR, Ng CF, Wang M, Rodgers VGJ, Schafer FQ. (2007) *MnSOD, beyond an antioxidant: A redox enzyme that serves as a switch between one-electron and two-electron signalling (PL1)*. Presented at Emerging Trends in Free Radical and Antioxidant research the Third biennial meeting of the Society for Free Radical Research –Asia and the Sixth Annual meeting of the Society for Free Radical Research – India. At Lonavala, India, Jan 8 – 11.

## I. Pending Decisions

### 1. Grants

TITLE	Organization/P.I.	Date	Amount
<i>Understanding Intracellular Superoxide Production Due to Exogenous H<sub>2</sub>O<sub>2</sub></i>	American Heart Assoc	01/01/2007	\$ 143,000
	K. Kader and GR Buettner	- 12/31/2007	
<i>Prevention of Radiation-Induced Fibrosis with Pentoxifylline and Antioxidants</i>	NIH R21	05/25/2006	\$405,625
	PI: Dr. G. Jacobson	- 04/01/2007	
<i>Oxidative Events in Cancer Therapy</i>	NIH PO1	12/01/2006	\$1,924,634
	PI: LW Oberley, Core A Leader: GR Buettner	- 11/30/2007	

<i>Ascorbate: Adjuvant for Photodynamic Therapy of Cancer</i>	NIH R21 CA117309 PI: GR Buettner 20%	07/01/2007 -06/30/2009	\$ 368,750
<i>Role of ERK in Sepsis-Induced Acute Lung Injury</i>	NIH RO1 PI: M. Monick GR Buettner 5%	07/01/2007 -06/30/2012	\$1,835,084
<i>Nutraceuticals for mitochondrial function and metabolic boost</i>	U of I CAP LOC: Garry R. Buettner and Linda G. Snetselaar	09/01/2007- 08/31/2008	50,000
<i>Nutraceuticals for mitochondrial function and metabolic boost: A new approach to healing and health</i>	NIH: Directors Pioneer Award PI: GR Buettner	09/01/2007- 08/31/2012	3,400.000
<i>Mathematical Modeling of Redox Processes in the Mitochondria</i>	NSF VGJ Rodgers and GR Buettner	07/01/2007 -06/30/2010	\$357,800

## 2. Manuscripts Submitted or in Preparation

- ChenQ, Espey MG, Sun AY, Lee J-H, Krishna MC, Shacter E, Choyke PL, Pooput C, Kirk KL, Buettner GR, Levine M. (2007) Ascorbic acid in pharmacologic concentrations: a pro-drug for selective delivery of ascorbate radical and hydrogen peroxide to extracellular fluid *in vivo*. Submitted.
- Schafer FQ, Cueno KL, Venkataraman S, Buettner GR. (2007) Nitric oxide as a chain-breaking antioxidant in cellular lipid peroxidation: Mechanisms. *Submitted, in revision*.
- McCormick ML, Buettner GR, Lewis TS, Heinecke JW, Britigan BE. (2006) Eosinophil peroxidase forms o,o'-dityrosine at plasma concentrations of chloride and bromide by a reaciontpathway that involves free tyrosyl radical. *Submitted*.
- Du J, Flipovich M, Martin SM, Buettner GR. (2006) Ascorbate mediates the non-enzymatic production of nitric oxide. *Nitric Oxide*. Submitted, in revision.
- Ng CF, Schafer FQ, Buettner GR, Rodgers VGJ. (2006) Hydrogen peroxide removal shows dependency on effective GPx activity: Mathematical insight into observed *in-vivo* behavior. *Free Radic Biol Med*. *Submitted*. In revision
- Fischer AJ, Martin SM, Schafer FQ, Rodgers VGJ, Buettner GR. (2006) In cellular lipid peroxidation nitric oxide disappears by half-order kinetics indicating a diffusion-limited reaction. Submitted. In revision
- Wagner BA, Teesch LM, Buettner GR, Britigan BW, Burns CP, Reszka KJ. (2007) Inactivation of anthracyclines by serum heme proteins. *Submitted*.
- Martin SM, Wilke WW, Schafer FQ, Buettner GR. (2007) The redox chemistry of GdTex with AsCH- and GSH. *In Preparation*.
- Schafer FQ, Martin SM, and Buettner GR. (2007) A new method for detecting hydroperoxides; an EPR study. *In preparation*

Kelley EE et al. (2007) Induction of endogenous nitric oxide production sensitizes human breast cancer cells to Photofrin® photosensitization. In prep.

Schafer FQ, Buettner GR. (2007) Cellular redox buffers in both space and time. In prep.

Buettner GR. (2007) The stability of dehydroascorbic and its consequences. In prep.

Kramarenko GG, Schafer FQ, Buettner GR (2007) The reaction of catalase with ascorbate: rethinking the biological mechanism of catalase. In prep.

## IV. Service

### **Professional Affiliations**

1974-Present American Chemical Society  
1975-Present American Society for Photobiology  
1978-Present Sigma Xi, The Scientific Research Society  
1984-Present Society for Free Radical Research International  
1985-Present Society for Free Radcial Biology and Medicine/Free Radical Research Society  
President Elect, 2002-2004  
1987-Present European Society for Photobiology  
1987 Bioelectrochemical Society  
1988-Present EPR Society  
1995-Present Radiation Research Society

### **Other Professional Activities**

Council member Society for Free Radical Biology and Medicine/Free Radical Research Society  
1996-2000, elected by the membership - approximately 1200/3000 members  
worldwide; President Elect 2002-2004

Editorial Board (1990-1992) *Chemico-Biological Interactions*

Editorial Board (1995-1999) *Free Radicals in Biology and Medicine*

Editorial Board (1995-2001) *Archives Biochemistry and Biophysics*

Editorial Board (1999-2002) *Free Radical Research*

Yearly I have provided reviews on over 50 manuscripts for editors of Journals ranging from *J Am Chem Soc*, *J Biol Chem*, *Arch. Biochem. Biophys.*, *Chem.-Biol. Int.*, *Free Radic. Biol. Med.*, *Photochem. Photobiol.*, *Cancer Res.*, *J. Chem. Soc. Perkin Trans.*, *BBA*, *Free Rad. Res. Commns.*, *J. Agr.*, *Food Chem.*, *Lipids*, *Rad. Res.*, *AGE*, *Mol. Pharm.*, *J. Photochem Photobiol.*, *Free Rad. Res.*, *Chem Res Toxicol*, etc.

Organized "Free Radicals, Oxidants and Tissue Injury: The University of Iowa Symposium," held June 4, 1993, which was attended by over 130 researchers from around the Midwest.

Organized "Nitric Oxide: A new Frontier in Free Radical Research" A University of Iowa Symposium held October 7 1995, which was attended by approximately 90 researchers from around the Midwest.

Organized the Sunrise Free Radical School held in conjunction with the Oxygen Society/Free Radical Research Society Meeting Nov 16-20, 1995.

Organized the Sunrise Free Radical School held in conjunction with the Oxygen Society/Free Radical Research Society Meeting Nov. 22-25, 1996 Miami, FL.

Organized a Workshop on "New methods for detection of free radicals" to be held in conjunction with the May 1997 meeting of the Radiation Research Society, Providence, RI.

Organized the Sunrise Free Radical School held in conjunction with the Oxygen Society/Free Radical Research Society Meeting held Nov. 21-24, 1997, San Francisco, CA.

Organizing, currently, the Sunrise Free Radical School to be held in conjunction with the Oxygen Society/Free Radical Research Society meeting to be held Nov. 18-23, 1998, Washington D.C.

Reviewer of research proposals for the NSF, Veterans Adm., U.S. Army, Air Force, Office of Naval Research, NIH, United States-Israel Binational Research Fdn., Seed grant applications for other Universities

As President of the Society for Free Radical Biology and Medicine, organized the 2005 annual meeting of the Society held at Austin, TX Nov 2005.

On the Advisory Committee of the Society for Free Radical Research International 2006 bi-annual meeting that was held in Davos, Switzerland, August 2006.

Elected Co-Vice Chair of the 2008 Gordon Conference on Oxygen Free Radicals to be held in Ventura, CA Feb 2008.

Elected Co- Chair of the 2010 Gordon Conference on Oxygen Free Radicals to be held in Ventura, CA Feb 2010.

As President of the Society for Free Radical Biology and Medicine, organized the 2006 annual meeting of the Society held at the Adam's Mark Hotel, Denver, CO Nov 2006.

On the Advisory Committee of the Society for Free Radical Research International 2008 bi-annual meeting to be held in Beijing, China.

### **Committees**

ESR Facility Committee, The University of Iowa, 1989-present

WWW page for FRRB; 1993-2002, Chair -, The University of Iowa

Research Committee, College of Medicine 1997-2000, The University of Iowa

Executive committee of the Center for Global and Regional Environmental Research,

The University of Iowa, July 1, 1997 - 2002.

Research Advisory Council, Representative of the College of Medicine Core Research Facilities, 07/98-present. The University of Iowa

University of Iowa Faculty Senate, 2004- 2006

Research Training Committee of the CCOM, 2006- present.

### **Clinical Activities**

Not Applicable.

## **V. Physical Facilities**

- A. Office                      68A EMRB                      14 m<sup>2</sup>; 60 EMRB  $\approx$  18 m<sup>2</sup>
- B. Laboratory                64 & 68 EMRB                      40 m<sup>2</sup>

## **VI. Personnel and Students Currently Supervised**

Brett Wagner, M.S.    ESR Facility  
Mark Belmont, Undergraduate, hourly                      ESR Facility  
Jesse Vislisl, Undergraduate, hourly                      ESR Facility  
Yang Song, PhD. Postdoctoral (50%) with                      College of Public Health