

BIOGRAPHICAL SKETCH

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NAME Buettner, Garry Richard	POSITION TITLE Professor, Free Radical and Radiation Biology Director, ESR Core Facility		
eRA COMMONS USER NAME BUETTNERG			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
State College of Iowa, Cedar Falls, IA	B.A.	1967	Chemistry
The University of Iowa, Iowa City, IA	M.S.	1969	Chemistry
The University of Iowa, Iowa City, IA	Ph.D.	1976	Chemistry

A. Positions and Honors

- 1969-1973 USAF, Global Weather Central, Offutt AFB, NE (statistical analysis of weather forecasts)
 1978-1983 Assistant Professor of Chemistry, Wabash College, Crawfordsville, IN;
 1982-1983 Chair, Department of Chemistry, Wabash College, Crawfordsville, IN;
 1981 Visiting Professor, National Biomedical ESR Center, Milwaukee, WI
 1984-1985 Senior Fellow, NRSA, at The NIH/NIEHS, RTP, NC
 1985-1987 Fulbright Fellow and Guest Scientist, Gesellschaft für Strahlen und Umweltforschung, München, Germany
 1988-present Director, ESR Center, The University of Iowa
 1993-1997 Associate Adjunct Professor, The University of Iowa
 1997-1999 Associate Professor, Radiology/Radiation and Free Radical Biology
 1999-present Professor, Radiation Oncology/Free Radical and Radiation Biology Program

Editorial Boards: *Chemico-Biological Interactions*, 1990-1992; *Free Radical Research*, 1999-2003; *Archives Biochemistry & Biophysics*, 1995-present; *Free Radical Biology & Medicine*, 1995-present.

Three Citation Classic Honors by ISI, the publishers of *Current Contents*,

1. 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; PMID: 212052
2. Buettner GR, Oberley LW, Leuthauser SC. (1978) 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; PMID: 216030
3. Oberley LW, Buettner GR. (1979) The role of superoxide dismutase in cancer. *Cancer Research*, **39**: 1141-1149; PMID: 217531

NSF Fellow during graduate education, 1974-1976

Fulbright Scholar, GSF Research Institute, Munich, Germany, 1985-1987

Master Teacher Award, The Society for Free Radical Biology and Medicine/Oxygen Society, 1999

President; Society for Free Radical Biology and Medicine/Free Radical Research Society, 2004-2006.

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

AAAS Fellow 2008 (honored for contributions and leadership in free radical biology, particularly for the application of thermodynamics to elucidate the role of antioxidants in biology)

Silver Medal Biology/Medicine, 2009, International EPR (ESR) Society (The award committee especially noted his fundamental contributions that have advanced the use of EPR spin trapping in biology and medicine.)

Speaker Bureau, Society for Toxicology 2009-2011

B. Selected Peer-Reviewed Publications: For Web of Science or PubMed or entries, search Buettner GR

- Chen Q, Espey MG, Krishna MC, Mitchell JB, Corpe CP, Buettner GR, Shacter E, Mark 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; PMID: 16157892 <http://dx.doi.org/doi:10.1073/pnas.0506390102> **Open Access** PMCID: PMC1224653
- 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; PMID: 16632121 <http://dx.doi.org/doi:10.1016/j.freeradbiomed.2005.12.027>
- Yoon SS, Coakley R, Lau GW, Lymar 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. PMID: 16440061 <http://dx.doi.org/10.1172/JCI24684> PMCID: PMC1350997 **Open Access**
- Buettner GR, Ng CF, Wang W, Rodgers VGJ, Schafer FQ. (2006) A new paradigm: Manganese superoxide dismutase influences the production of H₂O₂ in cells and thereby their biological state. *Free Radic Biol Med*. **41(8)**:1338-1350; PMID: 17015180. <http://dx.doi.org/10.1016/j.freeradbiomed.2006.07.015> PMCID: PMC2443724
- Kramarenko GG, Hummel SG, Martin SM, Buettner GR. (2006) Ascorbate reacts with singlet oxygen to produce hydrogen peroxide. *Photochem Photobiol*. **82**: 1634-1637. PMID: 16898858 <http://dx.doi.org/DOI:10.1562/2006-01-12-RN-774> PMCID: PMC2147043
- 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* 292:1906-1914; PMID: 17215323 <http://dx.doi.org/doi:10.1152/ajpcell.00550.2006> **Open Access**
- Vislisel JM, Schafer FQ, Buettner GR. (2007) A simple and sensitive assay for ascorbate using a plate reader. *Analytical Biochemistry*. **365**: 31-39; PMID: 17433246 <http://dx.doi.org/10.1016/j.ab.2007.03.002> PMCID: PMC2129083
- Wagner BA, Teesch LM, Buettner GR, Britigan BE, Burns CP, Reszka KJ. (2007) Inactivation of anthracyclines by serum heme proteins. *Chem Res Tox*. **20**: 920-926; PMID: 17497896 <http://dx.doi.org/10.1021/tx700002f>
- Chen Q, Espey MG, Sun AY, Lee JH, 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*. *Proc Natl Acad Sci USA*. **104**: 8749-8754; PMID: 17502596 <http://dx.doi.org/10.1073/pnas.0702854104> **Open Access** PMCID: PMC1885574
- Ng CF, Schafer FQ, Buettner GR, Rodgers VGJ. (2007) The rate of cellular hydrogen peroxide removal shows dependency on GSH: Mathematical insight into *in vivo* H₂O₂ and GPx concentrations. *Free Rad Res*. **41**:1201-1211; PMID: 17886026 <http://dx.doi.org/10.1080/10715760701625075> **Open Access** PMCID: PMC2268624
- Bloomer SA, Brown KE, Buettner GR, Kregel KC. (2008) Dysregulation of hepatic iron with aging: implications for heat stress-induced oxidative liver injury. *Am J Physiol Regul Integr Comp Physiol*. **294(4)**:R1165-R1174 PMID: 18272664 <http://dx.doi.org/10.1152/ajpregu.00719.2007> **Open Access** PMCID: Journal-in progress
- Kaewpila S, Venkataraman S, Buettner GR, Oberley LW. (2008) Manganese superoxide dismutase modulates Hypoxia Inducible Factor-1 α induction *via* superoxide. *Cancer Res*. **68(8)**:2781-2788. PMID: 18413745 <http://dx.doi.org/10.1158/0008-5472.CAN-07-2635> PMCID: PMC2633869
- Pasanphan W, Buettner GR, Chirachanchai S. (2008) Chitosan conjugated with deoxycholic acid and gallic acid: A novel biopolymer-based additive antioxidant for polyethylene. *J Applied Polymer Sci*. **109**:38-46. <http://dx.doi.org/10.1002/app.27953>
- Raghuvver TS, Buettner GR. (2008) Iron supplements and oxidative stress in very low birth weight infants. *J Pediatr*. **152**:890-891. PMID: 18492540 <http://dx.doi.org/doi:10.1016/j.jpeds.2007.12.041>
- Song Y, Wagner BA, Lehmler H-J, Buettner GR. (2008) Semiquinone radicals from oxygenated polychlorinated biphenyls: Electron Paramagnetic Resonance Studies. *Chem Res Tox*. **21**: 1359–1367. PMID: 18549251 <http://dx.doi.org/10.1021/tx8000175> **Open Access**; PMCID: PMC Journal - In Process
- Venkatesha VA, Venkataraman S, Sarsour EH, Kalen AL, Buettner GR, Robertson LW, Lehmler H-J, Goswami PC (2008) Catalase ameliorates polychlorinated biphenyl-induced cytotoxicity. in non-malignant human breast epithelial cells. *Free Radic Biol Med*. **45**:1094-1102.. PMID: 18691649 <http://dx.doi.org/10.1016/j.freeradbiomed.2008.07.007> PMCID: PMC2614346 [Available on 2009/10/15]
- Song Y, Buettner GR, Parkin S, Wagner BA, Robertson LW, Lehmler H-J. (2008) Chlorination Increases the Persistence of Semiquinone Free Radicals Derived from Polychlorinated Biphenyl Hydroquinones and Quinones. *J Org Chem*. **73(21)**: 8296–8304 PMID: 18839991 <http://dx.doi.org/10.1021/jo801397g> PMCID: PMC2629131
- Li Q, Spencer NY, Oakley FD, Buettner GR, Engelhardt J. (2009) Endosomal Nox2 Facilitates Redox-Dependent Induction of NF κ B by TNF α . *Antioxid Redox Signal*. **11(6)**:1249-1263 PMID: 19113817 <http://dx.doi.org/10.1089/ars.2008.2407> PMCID: PMC Journal - In Process

- Haak JL, Buettner GR, Spitz DR, Kregel KC. (2009) Aging Augments Mitochondrial Susceptibility to Heat Stress. *Am J Physiol Regul Integr Comp Physiol*. **296(3)**:R812-820. PMID: 19144753
<http://dx.doi.org/10.1152/ajpregu.90708.2008> PMID: PMC2665848 [Available on 2010/03/01]
- Suh Y-W, Buettner GR, Venkataraman S, Treimer SE, Robertson LW, Ludewig G. (2009) UVA/B-induced formation of free radicals from 2 decabromodiphenyl ether (deca-BDE). *Environmental Science & Technology*. **47(3)**:2581-2586. PMID: PMC <http://pubs.acs.org/doi/abs/10.1021/es8022978> PMID: PMC2685467 [Available on 2010/04/01]
- Song Y, Wagner BA, Witmer JR, Lehmler H-J, Buettner GR. (2009) Non-enzymatic displacement of chlorine and formation of free radicals upon the reaction of glutathione with PCB quinones. *Proc Natl Acad Sci USA*. **106**:9725-9730. PMID: 19497881 <http://www.pnas.org/cgi/doi/10.1073/pnas.0810352106> **Open Access** PMID: PMC2689812

C. Research Support

ONGOING Support

1R01-GM-073929 (Garry Buettner. P.I.) 03/05/2008 –01/31/2012

NIH/NIGMS

“Quantitative Redox Biology”

The objective is to quantify on an absolute basis the antioxidant enzymes in a subset of cancer cells; establish a database of this information that can be used as input to model the chemical processes in cells and tissues that determine the intracellular redox environment; and make this information freely available to the public.

1 R25 CA111341 Snetselaar, Linda G (PI), 07/01/2006 - 06/30/2011

NIH/NCI “Nutrition Experiences in Cancer Prevention”

The goal is to support education.

P42 ES013661 Robertson, Larry (PI) Buettner, GR (Co-Investigator, Project 1) 04/01/2006 - 03/31/2011

NIH/NIEHS Superfund

“Semi-Volatile PCBs: Sources, Exposures, Toxicities” I am involved as a co-investigator in Project 1.

The overall theme is to investigate mechanisms of toxicity of PCBs.

P30 CA086862 Weiner, GJ (PI) Buettner, GR (Free Radical Core, Co-leader) 08/10/2005 - 06/30/2010

NIH/NCI

Cancer Center Support Grant (CCSG) no salary support.

Support of the Holden Comprehensive Cancer Center: I contribute effort to the Free Radical Core.

1 R01 AG030417-01A2 (Moser, David, J., PhD) 09/01/2008 06/30/2013

NIH

Title: Vascular Function, Cognition, and Brain MRI in Atherosclerotic Vascular Disease

The major goal of this project is to examine the mechanisms and importance of vascular function in maintaining cognitive functions. Our laboratory supports the measurements of antioxidant vitamins, C & E, I patient blood samples.

Oberley Seed Grant (Buettner PI) 03/01/2009 -/02/28/2010

Holden Comprehensive Cancer Center, The University of Iowa

Title: Enhancing Radiation Therapy of Cancer with Pharmacological Ascorbate

The goal is to determine if high levels of vitamin C (i.v. delivery) will enhance the effectiveness of radiation therapy.

1 R21 CA137230-01 (Cullen, Joseph PI) 07/01/2009-06/30/2011
NIH (Buettner GR, Co-investigator)
Title: Mechanisms of Ascorbate-Induced Cytotoxicity in Pancreatic Cancer
The major goals of this project are to determine mechanisms for ascorbate toxicity in cancer

COMPLETED in last three years

R01-AG-12350 (Kevin Kregel, P.I.) 09/01/98 – 08/31/07
National Institute on Aging
“Oxidative Stress and Aging: Integrative Mechanisms”
The objective of this project is to investigate the effects of aging on oxidative stress by assessing the generation of reactive oxygen species and concomitant antioxidant regulation.)

1 R13 CA126364-01 (PI: GR Buettner) 09/15/2006 - 08/31/2007
NIH/NCI, NIA, NIEHS
“13th Annual SFRBM Meeting”
Support the 2006 Annual meeting of the Society for Free Radical Biology and Medicine.

P01-CA66081 (L.W. Oberley, P.I.) 07/23/01 – 06/30/06
National Cancer Institute
“Oxidative Events in Cancer Therapy”
Project 3: The long-term objective of Project 3 is to investigate the role of free radicals and antioxidants in the mechanism of Photodynamic Therapy. Particular emphasis is on the role of vitamins C and E in cancer therapy. (Buettner GR, Project 3 Leader)

Core A, EPR Core: Provide program investigators with assistance in EPR spectroscopy, nitric oxide measurements, and HPLC analysis of small molecule antioxidants and oxidative footprints such as 8-oxo-dG. (Buettner GR, Core A Leader)

R01-CA84462 (Garry R. Buettner, P.I.) 03/15/01 – 02/28/06
National Cancer Institute
“Nitric Oxide as a Cellular Antioxidant”
The objective of this project is to study the mechanisms by which nitric oxide can serve as a chain-breaking antioxidant. We have as a goal to compare the mechanisms and effectiveness of nitric oxide and vitamin E.

R13 ES014554-01 (PI: GR Buettner) 09/15/2005 - 08/31/2006
NIH/ NIEHS, NIA
“12th Annual SFRBM Meeting”
Support the 2005 Annual meeting of the Society for Free Radical Biology and Medicine.