## **BIOGRAPHICAL SKETCH**

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2. Follow this format for each person. DO NOT EXCEED FOUR PAGES.

NAME	POSITION TITLE
Buettner, Garry Richard	Professor, Free Radical and Radiation Biology
eRA COMMONS USER NAME	Director, ESR Core Facility
BUETTNERG	·
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)	

DEGREE INSTITUTION AND LOCATION YEAR(s) FIELD OF STUDY (if applicable) 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

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Positions and Honors	
1969-1973 USAF, Global Weather Central, Offutt AFB, NE	
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-pyrrroline-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. <i>Photochem</i>	
3 Oberley I.W. Buettner GR (1070) The role of superovide dismutase in cancer. Cancer Research <b>30</b> :	
1141-1140. PMID: 217531	
NSE Fellow during graduate education 1974-1976	
Fulbright Scholar, GSF Research Institute, Munich, Germany, 1985-1987	
Master Teacher Award The Cosists for Free Dedical Dislams and Madising (Oursen Cosists 1000	

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

### B. Selected Peer-Reviewed Publications: For all Pubmed entries, see BuettnerGR-PubMed

- Schafer FQ, Buettner GR (2001) Redox state as viewed through the glutathione disulfide/glutathione couple. Free Radic Biol Med. 30:1191-1212; PMID: 11368918 http://dx.doi.org/10.1016/S0891-5849(01)00480-4
- Schafer FQ, Wang HP, Kelley EE, Cueno KL, Martin SM, Buettner GR. (2002) Comparing β-carotene, vitamin E and nitric oxide as membrane antioxidants. Biol Chem 383: 671-681; PMID: 12033456 http://dx.doi.org/doi:10.1515/BC.2002.069

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; PMID: 12868489

http://dx.doi.org/doi:10.1080/1071576031000088283

- Venkataraman S, Schafer FQ, Buettner GR. (2004) Detection of lipid radicals using EPR. Antioxidants and Redox Signaling, 6: 631-638; PMID: 15130290 <u>http://dx.doi.org/10.1089/152308604773934396</u>
- 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; PMID: 15512801 <u>http://dx.doi.org/doi:10.1080/10715760400010470</u>
- 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>• and H<sub>2</sub>O<sub>2</sub> mediate glucose deprivation-induced stress in human cancer cells. *J Biol Chem.* **280**: 4254-4263; PMID: 15561720 http://dx.doi.org/doi:10.1074/ibc.M411662200
- 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; PMID: 15543233 <u>http://dx.doi.org/doi:10.1038/sj.onc.1208145</u>
- 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-1a and vascular endothelial growth factor. *Oncogene*, **24:** 8154-8166; PMID: 16170370 <u>http://dx.doi.org/doi:10.1038/sj.onc.1208986</u>
- 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 <a href="http://dx.doi.org/doi:10.1073/pnas.0506390102">http://dx.doi.org/doi:10.1073/pnas.0506390102</a>
- Hummel SG, Fischer AJ, Maritin 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; PMID: 16443165 http://dx.doi.org/doi:10.1016/j.freeradbiomed.2005.08.047
- 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 Pseudonomas aeruginosa by acidified nitrite derivatives under cystic fibrosis airway conditions. *The Journal of Clinical Investigation.* **116:** 436-446. PMID: 16440061 <u>http://dx.doi.org/10.1172/JCI24684</u>
- Reszka KJ, McCormick ML. Buettner GR, Hart MC, Britigan BE. (2006) Nitric oxide decreases the stability of DMPO spin adducts. *Nitric Oxide*. **14:** 133-141; PMID: 16647868 <u>http://dx.doi.org/10.1016/j.niox.2006.03.004</u>
- 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(8)**:1338-1350; PMID: 17015180. <u>http://dx.doi.org/10.1016/j.freeradbiomed.2006.07.015</u>
- 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 <u>http://dx.doi.org/DOI:10.1562/2006-01-12-RN-774</u>
- 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 <u>http://dx.doi.org/doi:10.1152/ajpcell.00550.2006</u>
- 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 <u>http://dx.doi.org/10.1016/j.ab.2007.03.002</u>
- 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 <u>http://dx.doi.org/10.1021/tx700002f</u>
- Chen Q, Espey MG, Sun AY, Lee JH, Krishna MC, Shacter E, Choyke PL, Pooput C, Kirk KL, Buettner GR, Levin 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
- 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 H<sub>2</sub>O<sub>2</sub> and GPx concentrations. *Free Rad Res.* 41:1201-1211; PMID: 17886026 <u>http://dx.doi.org/10.1080/10715760701625075</u>

- 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. In press. PMID: 18272664 <u>http://dx.doi.org/10.1152/ajprequ.00719.2007</u>
- Kaewpila S, Venkataraman S, Buettner GR, Oberley LW. (2008) Manganese superoxide dismutase modulates Hypoxia Inducible Factor-1α induction *via* superoxide. *Cancer Res.* **68(8):**2781-2788. PMID: 18413745 http://dx.doi.org/10.1158/0008-5472.CAN-07-2635
- Song Y, Wagner BA, Lehmler H-J, Buettner GR. (2008) Semiquinone radicals from oxygenated polychlorinated biphenyls: Electron Paramagnetic Resonance Studies. *Chem Res Tox*. PMID: 18549251 In press.

# 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 level of free radicals, related oxidants and antioxidants (small-molecule and enzymes) in cells and tissues; to 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) /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.

## **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 "13<sup>th</sup> Annual SFRBM Meeting" Support the 2006 Annual meeting of the Society for Free Radical Biology and Medicine.

P01-CA66081 (L.W. Oberley, P.I.) National Cancer Institute 07/23/01 - 06/30/06

"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.)

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.

03/15/01 - 02/28/06

09/15/2005 - 08/31/2006

R13 ES014554-01 (PI: GR Buettner)

NIH/ NIEHS, NIA

"12<sup>th</sup> Annual SFRBM Meeting"

Support the 2005 Annual meeting of the Society for Free Radical Biology and Medicine.