
BIOGRAPHICAL SKETCH

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NAME S. Bruce King	POSITION TITLE Professor of Chemistry		
eRA COMMONS USER NAME SBKING			
EDUCATION/TRAINING (<i>Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.</i>)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
West Virginia University, Morgantown, WV	BS	1985	Forestry
West Virginia University, Morgantown, WV	MS	1988	Pharmaceutical Science
Cornell University, Ithaca, NY	PhD	1993	Organic Chemistry
The Scripps Research Institute, La Jolla, CA	Postdoc	1993-1995	Organic Chemistry

A. POSITIONS AND HONORS

Research and Professional Experience

Teaching Assistant, West Virginia University, Department of Pharmacy, 1987-1988
Teaching Assistant, Cornell University, Ithaca, NY, 1988-1990
Graduate Research Assistant, Cornell University, Ithaca, NY (Advisor: Bruce Ganem), 1990-1993
Postdoctoral Fellow, The Scripps Research Institute, (Advisor: K. Barry Sharpless), 1993-1995
Assistant Professor of Chemistry, Wake Forest University, 1995-2001
Member of the Wake Forest University Comprehensive Cancer Center (WFUCCC), 1997-present
Associate, Department of Cancer Biology, Wake Forest University, 2001-present
Faculty, Department of Molecular Medicine, Wake Forest University, 2003-present
Associate Professor of Chemistry, 2001-2006
Professor of Chemistry, 2006-present

Honors and Awards

Swiger Predoctoral Fellowship, West Virginia University, 1985-1987
NIH Predoctoral Fellow, Cornell University, 1990-1993
NIH Postdoctoral Fellow, The Scripps Research Institute, 1994-1995
Henry Dreyfus Teacher-Scholar, 1999
Wake Forest University Award for Excellence in Research, 2000
Established Investigator of the American Heart Association, 2001-2004
Z. Smith Reynolds Foundation Fellow, 2001-2004
American Heart Association Mid-Atlantic/Pennsylvania/Delaware Affiliate Study Section, 2004-2008

NIH Study Panels

2006 Site Visit Panel, NCI Laboratory of Comparative Carcinogenesis
2003 Special Study Section (Conflicts Biophysics and Chemistry)
2000 BNP

B. Selected Publications (Most Recent, Total 58)

Xu, X.; Lockamy, V. L.; Chen, K.; Huang, Z.; Shields, H.; King, S. B.; Ballas, S. K.; Nichols, J. S.; Gladwin, M. T.; Noguchi, C. T.; Schechter, A. N.; Kim-Shapiro, D. B. "Effects of Iron Nitrosylation on Sick Cell Hemoglobin Solubility," *J. Biol. Chem.*, **2002**, 277, 36787-36792.
Zeng, B.; King, S. B. "Palladium Catalyzed Synthesis of Water-Soluble Symmetric 9,10-Disubstituted Anthracenes," *Synthesis*, **2002**, 2335-2337.
King, S. B. "A Role for Nitric Oxide in Hydroxyurea-Mediated Fetal Hemoglobin Induction," *J. Clin. Invest.*, **2003**, 111, 171-172.

- King, S. B. "The Nitric Oxide Producing Reactions of Hydroxyurea, *Current Medicinal Chemistry*, **2003**, *10*, 1241-1253.
- Cohen, A. D.; Zeng, B.; King, S. B.; Toscano, J. P. "Direct Observation of an Acyl Nitroso Species in Solution by Time-Resolved IR Spectroscopy," *J. Am. Chem. Soc.* **2003**, 1444-1445.
- Xu, X.; Cho, M.; Spencer, N. Y.; Patel, N.; Huang, Z.; Shields, H.; Kings, S. B.; Gladwin, M. T.; Hogg, N.; Kim-Shapiro, D. B. "Measurements of Nitric Oxide on the Heme Iron and -93 Thiol of Human Hemoglobin During Cycles of Oxygenation and Deoxygenation," *Proc. Natl. Acad. Sci.* **2003**, *100*, 11303-11308.
- Huang, Z.; Hearne, L.; Irby, C. E.; King, S. B.; Ballas, S. K.; Kim-Shapiro, D. B. "Kinetics of Increased Deformability of Deoxygenated Sickle Cells Upon Oxygenation," *Biophysical Journal*, **2003**, *85*, 2374-2383.
- Huang, J.; Zou, Z.; Kim-Shapiro, D. B.; Ballas, S. K.; King, S. B., "Hydroxyurea Analogs as Kinetic and Mechanistic Probes of the Nitric Oxide Producing Reactions of Hydroxyurea and Oxyhemoglobin," *J. Med. Chem.*, **2003**, *46*, 3748-3753.
- Lockamy, V. L.; Huang, J.; Shields, H.; Ballas, S. K.; King, S. B.; Kim-Shapiro, "Urease Enhances the Formation of Iron Nitrosyl Hemoglobin in the Presence of Hydroxyurea," *Biochimica et Biophysica Acta* **2003**, *1622*, 109-116.
- Zeng, B.; Huang, J.; Wright, M. W.; King, S. B. "Nitroxyl (HNO) Release from New Functionalized N-Hydroxyurea Derived Acyl Nitroso-9, 10-Dimethylanthracene Cycloadducts," *Bioorganic and Medicinal Chemistry Letters*, **2004**, *14*, 5565-5568.
- Lockamy, V. L.; Shields, H.; Kim-Shapiro, D. B.; King, S. B. "Iron Nitrosyl Hemoglobin Formation from the Reaction of Hydroxylamine and Hemoglobin under Physiological Conditions," *Biochimica et Biophysica Acta*, **2004**, *1674*, 260-267.
- King, S. B. "Nitric Oxide Production from Hydroxyurea," *Free Rad. Biol. Med.*, **2004**, *37*, 737-744.
- King, S. B. "Mechanisms and Novel Directions in the Biological Applications of Nitric Oxide Donors," *Free Rad. Biol. Med.*, **2004**, *37*, 735-736.
- Huang, J.; Kim-Shapiro, D. B.; King, S. B. "Catalase-Mediated Nitric Oxide Formation From Hydroxyurea," *J. Med. Chem.*, **2004**, *47*, 3495-3501.
- King, S. B. "N-Hydroxyurea and Acyl Nitroso Compounds as Nitroxyl (HNO) and Nitric Oxide (NO) Donors," *Curr. Top. Med. Chem.* **2005**, *5*, 665-673.
- Azizi, F.; Kielbasa, J. E.; Adeyiga, A. M.; Maree, R. D.; Yakubu, M.; Frazier, M.; Shields, H.; King, S. B.; Kim-Shapiro, D. B. "Rates of Nitric Oxide Dissociation from Hemoglobin," *Free Rad. Biol. Med.*, **2005**, *39*, 145-151.
- Pennington, R. L.; Sha, X.; King, S. B. "N-Hydroxy Sulfonylimidamides as New Nitroxyl (HNO) Donors," *Bioorganic and Medicinal Chemistry Letters*, **2005**, *15*, 2331-2334.
- Parrish, D. A.; Allen, C. L.; Day, C. S.; Zhou, Z.; King, S. B. "A Convenient Method for the Synthesis of N-Hydroxyureas," *Tetrahedron Lett.* **2005**, *46*, 8841-8843.
- Poole, L. B.; Zeng, B.; Knaggs, S. A.; Yakubu, M.; King, S. B. "Synthesis of Chemical Probes to Map Sulfenic Acid Modifications in Proteins," *Bioconj. Chem.* **2005**, *16*, 1624-1628.
- Donzelli, S.; Espey, M. G.; Thomas, D. D.; Mancardi, D.; Tocchetti, C. G.; Ridnour, L. A.; Paolocci, N.; King, S. B.; Miranda, K. M.; Lazzarino, G.; Fukuto, J.; Wink, D. A. "Discriminating HNO Formation from Other Reactive Nitrogen Oxide Species," *Free Rad. Biol. Med.*, **2006**, *40*, 1056-1066.
- Huang, J.; Yakubu, M.; Kim-Shapiro, D. B.; King, S. B. "Rat Liver-Mediated Metabolism of Hydroxyurea to Nitric Oxide," *Free Rad. Biol. Med.*, **2006**, *40*, 1675-1681.
- Sha, X.; Isbell, S.; Patel, R. P. P.; Day, C. S.; King, S. B. "Hydrolysis of Acyl Nitroso Compounds Yields Nitroxyl (HNO)," *J. Am. Chem. Soc.* **2006**, *128*, 9687-9692.
- Alexander, R. L.; Bates, D. J. P.; Wright, M. W.; King, S. B.; Morrow, C. S. "Modulation of Nitrated Lipid Signaling by Multidrug Resistance Protein 1 (MRP1): Glutathione Conjugation and MRP1-Mediated Efflux Inhibits Nitrooleic Acid-Induced PPAR α -Dependent Transcription Activation," *Biochemistry*, **2006**, *45*, 7889-7896.
- Gorczynski, M. J., Huang, J. King, S. B. Regio- and Stereospecific Syntheses and Nitric Oxide Donor Properties of (E)-9 and (E)-10-Nitrooctadec-9-enoic Acids, *Org. Lett.*, **2006**, *8*, 2305-2308.
- Huang, J.; Yakubu, M.; Kim-Shapiro, D. B.; King, S. B. "Rat Liver-Mediated Metabolism of Hydroxyurea to Nitric Oxide," *Free Rad. Biol. Med.*, **2006**, *40*, 1675-1681.
- Basu, S.; Hill, J. D.; Shields, H.; Huang, J.; King, S. B.; Kim-Shapiro, D. B. "Hemoglobin effects in the Saville Assay," *Nitric Oxide: Biology and Chemistry*, **2006**, *15*, 1-4.
- Chen, W.; Day, C. S.; King, S. B. "Grignard Reagent-Mediated Conversion of an Acyl Nitroso-Anthracene Cycloadduct to a Nitron," *J. Org. Chem.* **2006**, *71*, 9221-9224.

Chakrapani, H.; Gorczynski, M. J.; King, S. B. "Allylic Nitro Compounds as Nitrite Donors," *J. Am. Chem. Soc.* **2006**, *128*, 16332-16337.

Gorczynski, M. J.; Huang, J.; Lee, H.; King, S. B. "Evaluation of Nitroalkenes as NO Donors," *Bioorganic and Medicinal Chemistry Letters*, **2007**, *17*, 2013-2017.

C. Research Support

Active

4 RO1 HL62198-01 (King, PI) 12/03-12/07
NIH/NHLBI
Nitric Oxide Producing Reactions of Hydroxyurea

The major goal of this project is to understand the nitric oxide producing reactions of hydroxyurea and how these reactions provide the beneficial effects of hydroxyurea therapy in sickle cell disease.

R01HL58091-06 converted to R37 (MERIT) in 2007
(Kim-Shapiro, PI, King, Collaborator) 9/1/02-8/31/12
NIH/NHLBI
Effects of Nitric Oxide in Sickle Cell Blood

The main goal of this project is to determine the extent of beneficial and deleterious effects of nitric oxide in sickle cell blood.

R21 CA112145 (Poole, PI, King, Co-PI) 12/04-12/06
National Institutes of Health
Profiling of Redox Sensitive Signaling Proteins

The major goal of this project is to prepare new labeling compounds to identify redox modified proteins to generate profiles that relate redox modification to biological function.

Completed

Wake Forest University 7/06-7/07
Cross Campus Collaborative Research Support Fund,
Dr. Charles Morrow, Department of Biochemistry-collaborator
Structural Requirements of Nitrated Fatty Acids-Natural Cellular Signaling Agents and Nitric Oxide (NO) Donors

The major goal of this project is to prepare specific regio-isomers of nitrated fatty acids and evaluate their ability to influence nuclear transcription.

DAMD17-01-1-0664 (King, PI) 1/02-1/03
Department of Defense
Fructose-Derived N-Hydroxyureas as Novel Therapeutic Agents for Breast Cancer

The major goal of this project was the design, synthesis and evaluation of fructose derived N-hydroxyureas as selective anti-tumor agents

(King, PI) 1/00-12/04
Dreyfus Foundation
Bio-organic Chemistry of N-Hydroxyureas and Related Compounds

The major goal of the Henry Dreyfus Teacher-Scholar Award was to support and stimulate undergraduate research.

0140020N (King, PI)

1/01-12/04

American Heart Association

Synthesis and Evaluation of L-Arginine Derivatives as Mechanistic Probes of Nitric Oxide Synthase

The major goal of this project was to prepare unique compounds as tools to examine the mechanism of nitric oxide formation from L-arginine as catalyzed by nitric oxide synthase.

Pending

R33 CA126659-01 (Poole, PI, King, Co-PI)

12/07-12/10

National Institutes of Health

Profiling of Redox Sensitive Signaling Proteins

The major goal of this project is to prepare new labeling compounds to identify redox modified proteins to generate profiles that relate redox modification to biological function. This proposal is a renewal of the active R21 listed above.

R21 (Kim-Shapiro and King, Co-PI)

12./07-`12/09

National Institutes of Health

Nitric Oxide Donor Compounds for the Treatment of Hemolytic Conditions

The major goal of this project is to develop new nitric oxide and nitroxyl donors that selectively react with cell-free hemoglobin for the treatment of hemolytic disorders.

Overlap

No overlap exists between these projects and the current application.