CURRICULUM VITAE

Part I: General Information

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Place of Birth: Baltimore, Maryland, U.S.A.

Education

1990	B.S., Biology	Loyola University; Baltimore, MD
1990-1991	Postgraduate studies	Georgetown University; Washington, DC
2000	Ph.D., Physiology	Johns Hopkins University; Baltimore, MD

Postdoctoral Training

2001-2001 Research Associate, Pulmonary and Critical Care Medicine
Yale University School of Medicine; New Haven, CT

Academic Appointments

2001-2002 Research Assistant Professor
University of Pittsburgh School of Medicine, Department of Medicine; Pittsburgh, PA
2003-2004 Assistant Professor (tenure track)
University of Pittsburgh School of Medicine, Department of Medicine; Pittsburgh, PA
2004-present Associate Professor
Harvard Medical School; Boston, MA

Non-Academic Appointments

1992-1996 Staff Scientist, Preclinical Pharmacology

	Scios Inc.; Sunnyvale, CA
2003-present	Consultant, Preclinical Development Linde Gas Therapeutics; Lindigö, Sweden
2006-present	Consultant, Alfama Inc., Lisbon, Portugal

Major Committee Assignments

2002-2004	Grant Reviewer, Vienna National Funding Agency
2003-2004	Member, Mid-Atlantic Affiliate American Heart Association Grant Review Panel
2004	Member, NIH Special Emphasis RFA Review Panel for Progression of Cardiovascular Disease in Type I Diabetes
2004-2008	Member, Study Section for the American Heart Association Grants Review
2005	Member, Scientific Advisory Board for iNO Therapeutics
2005-2009	Member, New England Affiliate, American Heart Association Grant Review Panel
2005-2010	Member, NIH Study Section; Physician/Scientist KO8/K02 Grants Review
2007	Grant Reviewer, Sheffield Charitable Trust; United Kingdom
2007	Grant Reviewer, WWTF, Vienna, Austria.
2008-present	BIDMC IACUC Voting Member

Professional Societies

2001-present	Member, American Association for the Advancement of Science
2002-present	Member, American Thoracic Society
2003-2004	Member, Respiratory Cell and Molecular Biology Program Committee
2004-present	Member, International Heme Oxygenase Organization
2004	Organizer, 4th International Congress for Heme Oxygenase-1
2005-present	Member, International Society for Inhaled Medical Gases and Therapies

Editorial Boards

Ad hoc reviewer for:

Blood
Nature Medicine
American Journal of Physiology: Lung, Cellular, and Molecular Biology
American Journal of Respiratory Cell and Molecular Biology
Antioxidant and Redox Signaling
FASEB Journal
Journal of Experimental Medicine
Journal of Clinical Investigation
Journal of Biological Chemistry
Critical Care Medicine
Free Radical Biology and Medicine
Proceedings of The National Academy of Sciences

Awards and Honors

1996	President's Award for outstanding contribution to the company. Scios, Inc.
2000	Travel Award for best student abstract. American Thoracic Society
2003	Senior Vice Chancellor's Research Seminar Award for extraordinary contribution to the Medical School. University of Pittsburgh School of Medicine; Pittsburgh, PA

2005 Therapeutic Effects of Inhaled Carbon Monoxide; GEMI Awards Ceremony, Stockholm, Sweden, September.

Part II: Research, Teaching and Clinical Contributions

A. Narrative Report of Research, Teaching, and Clinical Contributions

Currently my time is exclusively devoted to research that includes the training of postdoctoral fellows and surgical residents. As a faculty member for three years in the Department of Medicine at the University of Pittsburgh, I trained four surgical residents, two pulmonary fellows, and six postdoctoral students. My research has been focused on understanding the role of the enzyme heme oxygenase and the products of its activity, particularly carbon monoxide, in models of oxidative stress. While my experience has been primarily in models of acute lung injury and inflammation, it has recently diverged to include transplant and vascular biology and models of liver injury. My research has evolved into the study of carbon monoxide as a protective molecule, much like nitric oxide (in fact, my laboratory is now involved in exploring the interrelationship between these two gas molecules), with current studies looking at the cellular mechanisms and targets of action. In addition, the translation of this research toward clinical application has directed collaborations with investigators into the initiation of human testing.

I am currently on staff for the Harvard Medical School Human Body Course for first year medical students. The course covers gross anatomy, physiology and cell biology for which I serve as a faculty member and tutor.

B. Funding Information

Current:

2001-2005 NIH-RO1-HL55330; Co-Investigator
"The Role of Heme Oxygenase in Hyperoxic Lung Injury"

2002-2005 AGA Linde Healthcare (gift); Principal Investigator
"Advancing of Carbon Monoxide Toward Clinical Application"

2003-2007 NIH-RO1-HL071797; Principal Investigator
"Anti-Inflammatory Effects of Carbon Monoxide in the Lung"

2004-2007 Linde Gas Therapeutics; Principal Investigator
"Exploratory Evaluation of Carbon Monoxide as a Therapeutic"

2004-2008 NIH-RO1-HL076167
"Carbon Monoxide to Prevent Circulatory Collapse"

2005-2008 NIH-RO1; Co-Investigator (S. Plevy; PI)
"Heme Oxygenase and Carbon Monoxide in Inflammatory Bowel Disease"

2005-2010 NIH-RO1; Co-Investigator (F. Bach, PI)
"Heme Oxygenase-1 in Transplantation"

2006-2008 iNO Therapeutics: Principal Investigator
"Carbon monoxide to prevent ischemia/reperfusion injury in the rat"

2006-2008 iNO Therapeutics: Principal Investigator
"Carbon monoxide to treat delayed graft function following kidney transplant in swine"

2007-2009 iNO Therapeutics: Principal Investigator
"Molecular Mechanisms of Protection Afforded by CO to prevent DGF in swine"

2007-2011 NIH-T32 Transplant Center Training Grant, Preceptor.

Pending:

2009-2014	NIH-RO1; Principal Investigator "Heme oxygenase and vascular injury and repair"
2009-2014	NIH-RO1; Principal Investigator "Carbon monoxide as a therapy for septic shock"
2009-2014	NIH-RO1; Principal Investigator "Carbon monoxide to prevent acute lung injury"
2009-2014	NIH –RO1"EUREKA" Award; Principal Investigator "Endogenous Gas Molecules as Transcription Factors"
2009-2014	NIH-R01; Principal Investigator Heme Oxygenase and Carbon Monoxide and DNA Repair
2009-2010	CIMIT Award Finalist

Past:

2001-2003	American Heart Association; Principal Investigator "Heme Oxygenase-1 and Carbon Monoxide in Hyperoxic Lung Injury: Role of the Mitogen-Activated Protein Kinase"
2002-2004	Atorvastatin Reseach Award; Pfizer Inc; Principal Investigator "Anti-Inflammatory Effects of Carbon Monoxide"
2002-2004	NIH; Preceptor Surgical Trauma Training Grant University of Pittsburgh Medical Center

C. Current Research Activities

1) Human Kinome Project – (Principal Investigator). We are evaluating the expression and functional profiling of every human kinase in response to endotoxin in macrophages. In collaboration with the Broad Institute at MIT.
2) Genomic/Proteomic Analyses in the Inflammatory Response (Principal Investigator) of shock *in vitro* and *in vivo* testing the effects of heme oxygenase and carbon monoxide by genomic and proteomic approaches.
3) Vascular Injury Response (Principal Investigator) to test the effects of carbon monoxide on endothelial progenitor cell function.

D. Report of Teaching

Training	Name	Current Position
1998-2000	Jeffrey Chapman, M.D.	Assistant Professor of Medicine Cleveland Clinic; Cleveland, OH
1998-2001	Danielle Dyck Morse, M.D.	Assistant Professor of Medicine University of Pittsburgh; Pittsburgh, PA
2000-2004	Judit Sarady, M.D., Ph.D.	Postdoctoral Fellow University of Pittsburgh; Pittsburgh, PA
2000-2004	Cynthia Song, M.D., Ph.D.	Research Assistant Professor University of Pittsburgh; Pittsburgh, PA
2001-2003	Brian Zuckerbraun, M.D.	Surgical Resident University of Pittsburgh; Pittsburgh, PA
2002-2004	Kathy Raman, M.D.	Surgical Resident University of Pittsburgh; Pittsburgh, PA
2003	Sarah McCartle	Postdoctoral Fellow, University of Toronto;

		Toronto, Ontario, Canada
2005-2006	Michael Rappel	Thesis Committee; MIT, Boston, MA
2004-present	Beek Yoke Chin	Instructor, BIDMC, Boston, MA
2004-present	Jeffrey R. Scott	Postdoctoral Fellow, BIDMC, Boston, MA
2004-present	Barbara Wegiel	Graduate Student, University of Lund, Sweden
2005-present	Arvand Haschemi	Masters Student, University of Vienna, Austria
2005-2008	Kyoichiro Maeshima, M.D., PhD.	Postdoctoral Fellow, BIDMC, Boston, MA
2005-2008	Martin Bilban, PhD	Postdoctoral Fellow, BIDMC, Boston, MA
2008-present	Kaori Kuramatsu	Postdoctoral Fellow, BIDMC, Boston, MA

Invited Presentations

2000 Symposium on the gaseous molecules carbon monoxide and nitric acid; American Thoracic Society International Conference. Toronto, Ontario, Canada; May.

Session Chair on oxidative stress and lung injury; American Thoracic Society International Conference. Toronto, Ontario, Canada; May.

Symposium on carbon monoxide and acute lung injury; 1st International Heme Oxygenase/CO Conference. New York, NY; September.

2002 Symposium on carbon monoxide; American Thoracic Society International Conference. Atlanta, GA; May.

Carbon monoxide suppresses smooth muscle cell proliferation and intimal hyperplasia. Research Day lecture for visiting Nobel Laureate Ferid Murad, M.D., Ph.D. Department of Surgery, University of Pittsburgh School of Medicine; Pittsburgh, PA; September.

2003 Gaseous molecules in disease. Visiting Lecturer, iNO Therapeutics; Clinton, NJ; March.

Animal models of human disease. Department of Medicine, Division of Pulmonary and Critical Care Medicine, University of Pittsburgh; Pittsburgh, PA; July.

Anti-inflammatory and anti-apoptotic effects of carbon monoxide. International Heme Oxygenase/CO Conference. Uppsala, Sweden; October.

2004 Carbon monoxide in biology and medicine. Invited lecturer, Senior Vice Chancellor's Seminar. University of Pittsburgh School of Medicine; Pittsburgh, PA; January.

Session Chair for genomics and lung disease. American Thoracic Society International Conference. Orlando, FL; April.

Unleashing the protective properties of heme-carbon monoxide. Research Day. Beth Israel Deaconess Medical Center. Boston, MA; October.

Anti-inflammatory effects of Carbon monoxide in the liver. Department of Surgery Beth Israel Deaconess Medical Center. Boston, MA; December.

2005 Carbon Monoxide: Toxic Molecule or Novel Protective Molecule for Inflammatory Proliferative Disorders. Transplant Center. Beth Israel Deaconess Medical Center, Boston, MA; March.

2005 Carbon Monoxide: To Boldly Go Where NO Has Gone Before; iNO Therapeutics; Chicago, IL; October.

2005 Carbon Monoxide to Prevent Circulatory Collapse. Resuscitation Society Symposium; NIH; Bethesda, MD; October.

2006 Anti-Inflammatory and Cytoprotective Effects of Carbon Monoxide. Clowes Visiting Professor Faculty Lecture Presentation, Department of Surgery. Beth Israel Deaconess Medical Center, Boston, MA; November.

2007 Carbon Monoxide as a Therapeutic Molecule. Ikaria Inc., Seattle, WA

Heme Oxygenase-1: Evolution of a Protective Homeostatic Gene in Medicine. Plenary Lecture. Combio 2007, Sydney Australia.

Carbon Monoxide as a Therapeutic Molecule in the Lung. Symposium Lecture. Combio 2007, Sydney Australia.

Anti-Inflammatory Effects of Carbon Monoxide in the Lung. Red Cell Club. Harvard Medical School. Boston, MA.

2008 Carbon monoxide as a Therapeutic Molecule. Dose Response Conference, Amherst, MA

Clinical Use of Carbon Monoxide. ESLO Conference, San Diego, CA

Therapeutic Effects of Carbon Monoxide. AARC Congress, Anaheim, CA

2009 CO Releasing Molecules as Novel Therapeutics. North Shore Technology Council, Beverly, MA.

Part III: Bibliography

1. **Otterbein L,** Lowe VC, Kyle DJ, Noronha-Blob L. Addictive effects of a bradykinin antagonist, NPC 17761, and a leumedin, NPC 15669, on survival in animal models of sepsis. Agents & Actions 1993;C125-127.
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8. Fessler HE, **Otterbein L,** Chung HS, Choi AMK. Alpha-2 adrenoceptor blockade protects rats against lipopolysaccharide. Am J of Respir & Crit Care Med 1996;154:1689-1693.

9. Lee PJ, Alam J, Sylvester SL, Inamdar N, **Otterbein L,** Choi AMK. Regulation of heme oxygenase-1 expression *in vivo* and *in vitro* in hyperoxic lung injury. Am J of Respir Cell & Mol Biol 1996:14:556-568.

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Patents

Serial No.	Title	Status
10/053,535	Carbon Monoxide as a Biomarker and Therapeutic	Pending
10/177,930	Carbon Monoxide Improves Outcomes in Tissue and Organ Transplants and Suppresses Apoptosis	Approved
10/367,277	Methods of Treating Vascular Disease	Approved
10/371,666	Methods of Treating Ileus	Pending
10/439,632	Methods of Treating Hepatitis	Pending
10/455,564	Methods of Treating Angiogenesis, Tumor Growth, and Metastasis	Pending
10/600,182	Pharmaceutical Use of Nitric Oxide, Heme Oxygenase-1 and Products of Heme Degradation	Pending
10/676,280	Methods of Treating Hemorrhagic Shock	Pending
10/423,817	Methods of Treating Necrotizing Enterocolitis	Pending