

## Hao Zhu, Ph.D.

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### Education:

- 1995 – 1999 Postdoctoral, Hematology Division, Brigham and Women's Hospital, Harvard Medical School  
Research project: *Cloning, structural and functional analysis of NCB5OR*.  
Mentor: Prof. H. Franklin Bunn
- 1989 – 1994 Ph.D., Department of Zoology, The University of Texas at Austin  
Thesis title: *Yeast flavohemoglobin - structural and functional studies*.  
Mentor: Prof. Austen F. Riggs
- 1983 – 1987 B.S., Department of Biological Engineering, Fudan University, Shanghai, China  
Thesis title: *Construction of expression vector for human interleukin II gene in yeast*.  
Mentor: Prof. YuYang Li

### Professional Position:

- Oct'06 – present Adjunct Assistant Professor, Department of Biochemistry and Molecular Biology,  
University of Kansas Medical Center, Kansas City
- July'06 – present Adjunct Assistant Professor, Department of Physical Therapy and Rehabilitation Science,  
University of Kansas Medical Center, Kansas City
- Dec'05 – present Assistant Professor, Department of Clinical Laboratory Sciences,  
University of Kansas Medical Center, Kansas City
- Jan'05 – Nov'05 Associate Biochemist, Hematology Division, Brigham and Women's Hospital, Boston
- 1999 – Nov'05 Instructor, Department of Medicine, Harvard Medical School, Boston
- 1995 – 2004 Research Fellow, Hematology Division, Brigham and Women's Hospital, Boston
- 1994 – 1995 Research Associate, Department of Zoology, The University of Texas at Austin
- 1989 – 1994 Research Assistant, Department of Zoology, The University of Texas at Austin
- 1987 – 1989 Research Assistant, Laboratory of Medical Genetics, Shanghai Children's Hospital, China

### Membership in Professional Society:

- 2007 – present Member, American Diabetes Association
- 2006 – present Member, The American Society of Biochemistry and Molecular Biology
- 1996 - present Member, The American Association for the Advancement of Science

### Award and Honors:

- October 2004 Best Poster Award, Redox Signaling in Biology and Disease, a symposium sponsored by  
American Society of Biochemistry and Molecular Biology
- February 2004 Co-inventor, US Patent Application # 10/772,076 (Publication # US 2005/0031605 A1)  
Compositions and Methods of Treating Diabetes
- 2001 – 2004 Mentored Research Scientist Development Award, National Institutes of Health
- 1997 – 2000 Individual National Research Service Award, National Institutes of Health
- October 1997 Scholarship for Short Term Visitor and Lecturer, National Science Foundation, China
- April 1992 Young Scientist Award, International Congress on Invertebrate Dioxigen Carriers  
Lunteren, The Netherlands

### Funding Information:

- 2006-2007 KUMC Research Institute Shared Equipment Award  
Principal Investigator (total budget: US \$ 19.4K)
- 2005-2010 RO1 DK067355, NIDDK, NIH  
Co-Principal Investigator (total sub-contracting budget: US \$ 375K expected)

- 2001-2004 Grant title: *Role of Ncb5or in Insulin Production.*  
 KO1 DK59901, NIDDK, NIH  
 Principal Investigator (total budget: US \$ 277K)
- 1997-2000 Grant title: *Oxygen sensor: structural and functional studies.*  
 F32 DK09678, NIDDK, NIH  
 Principal Investigator (total budget: US \$ 104K)  
 Fellowship title: *Structural and functional analysis of oxygen sensor.*

### Teaching Experience:

- October 12, 2007 Department of Physical Therapy and Rehabilitation Science, KUMC  
 Guest Lecturer on “*Oxygen and Free Radicals in Human Health and Diseases*” for  
 Pathobiology of Human Function I (PTRS862)
- Aug – Dec 2007 Department of Clinical Laboratory Sciences, University of Kansas Medical Center  
 Instructor for Molecular Biotechnology (CLS 710 & CLS 711), a Master program  
 5 student contact hours
- October 13, 2006 Department of Physical Therapy and Rehabilitation Science, KUMC  
 Guest Lecturer on “*Oxygen and Free Radicals in Human Health and Diseases*” for  
 Pathobiology of Human Function I (PTRS862)
- Sept – Dec 2006 Department of Clinical Laboratory Sciences, University of Kansas Medical Center  
 Mentor of Eric Kweku Otoo (University of Wolverhampton, UK), Honours Project (BM3309)  
 Thesis title: *Tissue expression profiles of stearyl-CoA desaturase gene in Ncb5or null mice*
- Aug – Dec 2006 Department of Clinical Laboratory Sciences, University of Kansas Medical Center  
 Instructor for Molecular Biotechnology (CLS 710 & CLS 711), a Master program  
 5 student contact hours
- 1998 – July 2005 Hematology Division, Brigham and Women's Hospital, Boston  
 Teacher of six technicians, all of whom are now enrolled in graduate programs  
 Newton Lee, University of Pennsylvania, Pre-Med  
 Kimberly Malecka, University of Pennsylvania, Ph.D.  
 Andrew Styperek, Emory University Medical School, M.D.  
 Jane Park, MIT, M.S.  
 Shuning Huang, MIT, Ph.D.
- 1997 – 2002 Hae-Won Patti Yoon, Columbia University, MPH / MBA  
 Hematology Division, Brigham and Women's Hospital, Boston  
 Teacher of two medical students for their M.D. research theses  
 Timothy A. Jackson, HST program, Harvard Medical School, Boston  
 Thesis title: *Kinetic studies of a candidate oxygen sensor – Human flavohemoprotein b5+b5R*  
 Stephanie J. Gros, Medical School of the University of Bonn, Germany  
 Thesis title: *Biochemical studies on cysteine mutants of the human flavohemoprotein NCB5OR*
- 1990 – 1991 Department of Zoology, The University of Texas at Austin  
 Graduate Teaching Assistant in Genetics for junior and senior undergraduate students  
 Duties: To host daily problem-solving session and to help grading for a class of 100+.

### Editorial and Review Experience:

- 1999 - present Ad hoc reviewer for *Blood, Gene, Journal of Biological Chemistry*

### Organizing Experience:

- November 2004 Co-organizer for RiggsFest and a mini-symposium (<http://bioinst.cm.utexas.edu/riggfest/>)  
 to honor and celebrate Austen Riggs' fifty years in hemoglobin research
- 2000 – Jan'05 Organizer for Bunn group weekly journal club, Brigham and Women's Hospital

### Publications:

- K.Larade, Z.G.Jiang, A.Dejam, **H.Zhu**, H.F.Bunn. "The reductase Ncb5or is responsive to the redox status in  
 -cells and is not involved in the ER stress response" *Biochem. J.*, 404:467-476, 2007

W.E.Royer, **H.Zhu**, T.A.Gorr, J.F.Flores, and J.E.Knapp. "Allosteric Hemoglobin Assembly: Diversity and Aimirality" (Mini-Review). *J. Biol. Chem. (U.S.A.)*, 280: 27477 – 27480, 2005

G.Anderson, L.Wegner, C.S.Rose, J.Xie, **H.Zhu**, K.Larade, A.Johansen, J.Ek, J.Lauenborg, T.Drivsholm, K.Borch-Johnsen, P.Damm, T.Hansen, H.F.Bunn, and O.Pedersen. "Variation in Ncb5or: Studies of Relationships to Type 2 Diabetes, MODY, and Gestational Diabetes Mellitus", *Diabetes*, 53:2992-7, 2004

J.Xie, **H.Zhu**, K.Larade, A.Ladoux, A.Seguritan, M.Chu, S.Ito, R.T.Bronson, E.H.Leiter, C.Y.Zhang, E.D.Rosen, and H.F.Bunn. "Absence of a reductase, NCB5OR, causes insulin-deficient diabetes", *Proc. Nat'l. Acad. Sci. (U.S.A.)*, 101: 10750-10755, 2004

**H.Zhu**, K.Larade, T.A.Jackson, J.Xie, A.Ladoux, H.Acker, U.Berchner-Pfannschmidt, J.Fandrey, A.R.Cross, G.S.Lukat-Rodgers, K.R.Rodgers, and H.F.Bunn. " NCB5OR is a novel soluble NAD(P)H reductase localized in the endoplasmic reticulum", *J. Biol. Chem. (U.S.A.)*, 279:30316-30325, 2004

**H.Zhu**, T.A.Jackson, and H.F.Bunn. "Detecting and Responding to Hypoxia" (Review). *Nephrol.Dial. Transplant*, 1:3-7, 2002

**H.Zhu** and H.F.Bunn. "How Do Cells Sense Oxygen ?" (Perspective). *Science*, 292:449-451, 2001

P.R.Gardner, L.A.Martin, A.M.Gardner, Y.Dou, T.Li, J.S.Olson, **H.Zhu** and A.F.Riggs. "Nitric Oxide Dioxygenase Activity and Function of Flavohemoglobins: Sensitivity to Nitric Oxide and Carbon Monoxide Inhibition", *J. Biol. Chem. (U.S.A.)*, 275:31581-31587, 2000

**H.Zhu**, H.Qiu, H.P.Yoon, S.Huang, and H.F.Bunn. "Identification of a Cytochrome *b*-type NAD(P)H Oxidoreductase Ubiquitously Expressed in Human Cells", *Proc. Nat'l. Acad. Sci. (U.S.A.)*, 96:14742-14747, 1999

**H.Zhu** and H.F.Bunn. " Oxygen Sensing and Signaling: Impact on the Regulation of Physiologically Important Genes" (Review). *Respiration Physiology*, 115: 239-247, 1999

H.F.Bunn, J.Gu, L.E.Huang, J.W.Park, and **H.Zhu**. "Erythropoietin: A Model System for Studying Oxygen-dependent Gene Regulation" (Review). *J. Exp. Biol.*, 201(Pt 8): 1197-1201, 1998

**H.Zhu**, D.Ownby, C.K.Riggs, N.J.Nolasco, J.K.Stoops, and A.F.Riggs. "Assembly of the Gigantic Hemoglobin of the Earthworm *Lumbricus terrestris*. Roles of subunit equilibria, non-globin linker chains and valence of the heme iron", *J. Biol. Chem. (U.S.A.)*, 271:30007-30021, 1996

**H.Zhu**, M.Hargrove, Q.Xie, Y.Nozaki, K.Linse, S.S.Smith, J.Olson, and A.F.Riggs. "Stoichiometry of Subunits and Heme Content of Hemoglobin from the Earthworm *Lumbricus terrestris*", *J. Biol. Chem. (U.S.A.)*, 271:29999-30006, 1996

D.J.Smith, **H.Zhu**, P.R.Kolatkar, L.T.Tam, T.O.Baldwin, B.A.Roe, R.H.Broyles, and A.F.Riggs. "The Hemoglobin of the Bullfrog, *Rana catesbeiana*. The cDNA-derived amino acid sequences of the chains of adult hemoglobins B and C: their roles in deoxygenation-induced aggregation", *J. Biol. Chem. (U.S.A.)*, 268:26961-26971, 1993

D.W.Ownby, **H.Zhu**, K.Schneider, R.C.Beavis, B.T.Chait, and A.F.Riggs. "The Extracellular Hemoglobin of the Earthworm *Lumbricus terrestris*. Determination of subunit stoichiometry", *J. Biol. Chem. (U.S.A.)*, 268:13539-13547, 1993

**H.Zhu** and A.F.Riggs. "Yeast Flavohemoglobin is an Ancient Protein Related to Globins and a Reductase

Family", *Proc. Nat'l. Acad. Sci. (U.S.A.)*, 89:5015-5019, 1992

S.Z.Huang, Z.R.Ren, X.D.Zhou, **H.Zhu**, and Y.T.Zeng. "Molecular Characterization of  $\beta$ -Thalassemia Mutations in Chinese", *Ann. NY Acad. Sci. (U.S.A.)*, 612:490-492, 1990

S.Z.Huang, X.D.Zhou, **H.Zhu**, Z.R.Ren, and Y.T.Zeng. "Detection of  $\beta$ -Thalassemia Mutations in Chinese Using Amplified DNA from Dried Blood Specimens", *Human Genetics (Berlin)*, 84:129-131, 1990

### **Book Chapters:**

T.A.Jackson, G.S.Lukat-Rodgers, A.R.Cross, H.F.Bunn, K.Rodgers, and **H.Zhu**. "Characterization of human NAD(P)H oxidase, flavohemoprotein b5/b5R" in *Proceedings of the 1st International Conference on NAD(P)H oxidases 2002* (edit. K.K.Griendling, K.H.Krause, H.H.H.W.Schmidt), *Book on Demand GmbH (Norderstedt, Germany)*, 2004

H.F.Bunn and **H.Zhu**. "Structure and Function of Hemoglobins" in *Human Hemoglobin* (edit. YT Zeng), *Science Publisher (Peking, China)*, 2002

### **Plenary Presentations:**

February 2007 Liver Club and Kidney Institute, University of Kansas Medical Center  
September 2006 Faculty Assembly of School of Allied Health, University of Kansas Medical Center  
March 2006 Department of Biochemistry and Molecular Biology, University of Kansas Medical Center  
July 2005 School of Basic Medical Sciences, Beijing University Health Science Center, China  
June 2005 Annual Meeting of American Diabetes Society, San Diego  
April 2002 First International Conference on NAD(P)H Oxidases, Giessen, Germany  
April 2002 Biochemical Engineering Institute, Saarland University, Germany  
April 2002 Institute of Physiology, University of Essen, Germany  
April 2000 Annual Meeting of American Physiology Society, San Diego  
June 1999 Hematology Division, Brigham & Women's Hospital, Harvard Medical School  
October 1998 Institute of Genetics, College of Biological Engineering, Fudan University, China  
October 1997 Shanghai Institute of Medical Genetics, Shanghai Children's Hospital, China

### **Poster Presentations:**

July 26<sup>th</sup>, 2007 Gordon Research Conference on Molecular and Cellular Biology of Lipids  
Title: "Lack of *Ncb5or* enzyme leads to loss of adiposity and diabetes in mice"  
Nov. 9<sup>th</sup>, 2006 2006 KU Medical Center Faculty Research Day  
Title: "Loss of adipose tissues in *Ncb5or* null mice"  
March 30<sup>th</sup>, 2006 2006 Kansas City Area Life Sciences Research Day  
Title: "Lack of a soluble NAD(P)H reductase, *NCB5OR*, causes diabetes in mice with decreased insulin production and altered glutathione redox status"