

# CURRICULUM VITAE

Gregg L. Semenza, M.D., Ph.D.

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## DEMOGRAPHIC INFORMATION

### Current Appointments:

- Founding Director, Vascular Program, Institute for Cell Engineering;
- C. Michael Armstrong Professor, Department of Pediatrics (in Genetic Medicine);
- Joint Appointments in Medicine, Oncology, Radiation Oncology, and Biological Chemistry; Johns Hopkins University School of Medicine, Baltimore MD

### Personal Data:

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### Education and Training:

- 1974- Harvard College, Cambridge, MA  
1978 A.B., Biology, magna cum laude  
Thesis: Somatic cell genetic mapping: electrophoretic studies of human and murine glutathione peroxidase expression in hybrid somatic cells
- 1978- University of Pennsylvania, Philadelphia, PA  
1984 M.D., Ph.D. in Genetics  
Thesis: Molecular genetic analysis of the silent carrier of  $\beta$  thalassemia
- 1984- Internship and Residency in Pediatrics  
1986 Duke University Medical Center, Durham, NC

1986- Postdoctoral Fellowship in Medical Genetics  
1990 The Johns Hopkins University School of Medicine, Baltimore, MD

### **Professional Experience:**

Assistant Professor of Pediatrics with Joint Appointment in Medicine, Johns Hopkins University School of Medicine (1990-1994)

Associate Professor of Pediatrics with Joint Appointment in Medicine, Johns Hopkins University School of Medicine (1994-1999)

Professor of Pediatrics with Joint Appointment in Medicine, Johns Hopkins University School of Medicine (1999-present)

Founding Director, Vascular Program, Institute of Cell Engineering, Johns Hopkins University School of Medicine (2003-present)

Joint Appointment in Radiation Oncology, Johns Hopkins University School of Medicine (2003-present)

Joint Appointment in Oncology, Johns Hopkins University School of Medicine (2004-present)

C. Michael Armstrong Endowed Professorship, Johns Hopkins University School of Medicine (2008-present)

Joint Appointment in Biological Chemistry, Johns Hopkins University School of Medicine (2009-present)

Guest Professor, Research Center for High Altitude Medicine, Qinghai University, Xining, China (2017-present)

### **RESEARCH ACTIVITIES**

#### **Publications:**

*[Google Scholar: >130,000 citations; h-index = 164]*

#### **Peer-reviewed original research articles**

1. Semenza GL, Delgrosso K, Poncz M, Malladi P, Schwartz E, Surrey S. The silent carrier allele:  $\beta$  thalassemia without a mutation in the  $\beta$ -globin gene or its immediate flanking regions. *Cell* 39:123-128 (1984).

2. Semenza GL, Malladi P, Surrey S, Delgrosso K, Poncz M, Schwartz E. Detection of a novel DNA polymorphism in the  $\beta$ -globin gene cluster. *J. Biol. Chem.* 259:6045-6048 (1984).
3. Bartholomew DW, Batshaw M, Wilson MD, Semenza GL. Excessive protein intake: a common cause of false-positive neonatal screening for tyrosinemia. *Maryland Med. J.* 36:429-432 (1987).
4. Semenza GL, Ladias JAA, Antonarakis SE. An Xba I polymorphism 3' to the human erythropoietin (EPO) gene. *Nucleic Acids Res.* 15:6768 (1987).
5. Semenza GL, Pyeritz RE. Respiratory complications of mucopolysaccharide storage disorders. *Medicine* 67:209-219 (1988).
6. Semenza GL, Dowling CE, Kazazian HH, Jr. Hinf I polymorphism 3' to the human  $\beta$ -globin gene detected by the polymerase chain reaction (PCR). *Nucleic Acids Res.* 17:2376 (1989).
7. Semenza GL, Traystman MD, Gearhart JD, Antonarakis SE. Polycythemia in transgenic mice expressing the human erythropoietin gene. *Proc. Natl. Acad. Sci. USA* 86:2301-2305 (1989).
8. Semenza GL, Dureza RC, Traystman MD, Gearhart JD, Antonarakis SE. Human erythropoietin gene expression in transgenic mice: Multiple transcription initiation sites and cis-acting regulatory elements. *Mol. Cell. Biol.* 10:930-938 (1990).
9. Koury ST, Bondurant MC, Koury MJ, Semenza GL. Localization of cells producing erythropoietin in murine liver by in situ hybridization. *Blood* 77:2497-2503 (1991).
10. Semenza GL, Nejfelt MK, Chi SM, Antonarakis SE. Hypoxia-inducible nuclear factors bind to an enhancer located 3' to the human erythropoietin gene. *Proc. Natl. Acad. Sci. USA* 88:5680-5684 (1991).
11. Semenza GL, Koury ST, Nejfelt MK, Gearhart JD, Antonarakis SE. Cell type-specific and hypoxia-inducible expression of the human erythropoietin gene in transgenic mice. *Proc. Natl. Acad. Sci. USA* 88:8725-8729 (1991).
12. Semenza GL, Wang GL. A nuclear factor induced by hypoxia via de novo protein synthesis binds to the human erythropoietin gene enhancer at a site required for transcriptional activation. *Mol. Cell. Biol.* 12:5447-5454 (1992).
13. Wang GL, Semenza GL. General involvement of hypoxia-inducible factor 1 in transcriptional response to hypoxia. *Proc. Natl. Acad. Sci. USA* 90:4304-4308 (1993).
14. Wang GL, Semenza GL. Characterization of hypoxia-inducible factor 1 and regulation of DNA-binding activity by hypoxia. *J. Biol. Chem.* 268:21513-21518 (1993).

15. Wang GL, Semenza GL. Desferrioxamine induces erythropoietin gene expression and hypoxia-inducible factor 1 DNA binding activity: implications for models of hypoxia signal transduction. *Blood* 82: 3610-3615 (1993).
16. Semenza GL, Roth PH, Fang HM, Wang GL. Transcriptional regulation of genes encoding glycolytic enzymes by hypoxia-inducible factor 1. *J. Biol. Chem.* 269:23757-23763 (1994).
17. Wang GL, Semenza GL. Purification and characterization of hypoxia-inducible factor 1. *J. Biol. Chem.* 270:1230-1237 (1995).
18. Semenza GL, Wang GL, Kundu R. DNA binding and transcriptional properties of wild-type and mutant forms of the homeodomain protein Msx2. *Biochem. Biophys. Res. Commun.* 209:257-262 (1995).
19. Wang GL, Jiang BH, Rue EA, Semenza GL. Hypoxia-inducible factor 1 is a basic-helix-loop-helix-PAS heterodimer regulated by cellular O<sub>2</sub> tension. *Proc. Natl. Acad. Sci. USA* 92: 5510-5514 (1995).
20. Wang GL, Jiang BH, Semenza GL. Effect of altered redox states on expression and DNA-binding activity of hypoxia-inducible factor 1. *Biochem. Biophys. Res. Commun.* 212:550-556 (1995).
21. Sokol L, Luhovy M, Guan Y, Prchal JF, Semenza GL, Prchal JT. Primary familial polycythemia: a frameshift mutation in the erythropoietin receptor gene and increased sensitivity of erythroid progenitors to erythropoietin. *Blood* 86:15-22 (1995).
22. Wang GL, Jiang BH, Semenza GL. Effect of protein kinase and phosphatase inhibitors on expression of hypoxia-inducible factor 1. *Biochem. Biophys. Res. Commun.* 216:669-675 (1995).
23. Semenza GL, Rue EA, Iyer NV, Pang MG, Kearns WG. Assignment of the hypoxia-inducible factor 1 $\alpha$  gene to a region of conserved synteny on mouse chromosome 12 and human chromosome 14q. *Genomics* 34:437-439 (1996).
24. Jiang BH, Rue E, Wang GL, Roe R, Semenza GL. Dimerization, DNA binding, and transactivation properties of hypoxia-inducible factor 1. *J. Biol. Chem.* 271:17771-17778 (1996).
25. Wiener CM, Booth G, Semenza GL. In vivo expression of mRNAs encoding hypoxia-inducible factor 1. *Biochem. Biophys. Res. Commun.* 225:485-488 (1996).
26. Forsythe JA, Jiang BH, Iyer NV, Agani F, Leung SW, Koos RD, Semenza GL. Activation of vascular endothelial growth factor gene transcription by hypoxia-inducible factor 1. *Mol. Cell. Biol.* 16:4604-4613 (1996).
27. Jiang BH, Semenza GL, Bauer C, Marti HH. Hypoxia-inducible factor 1 levels vary exponentially over a physiologically relevant range of O<sub>2</sub> tension. *Am. J. Physiol.* 271:C1172-C1180 (1996).

28. Semenza GL, Jiang BH, Leung SW, Passantino R, Concordet JP, Maire P, Giallongo A. Hypoxia response elements in the aldolase A, enolase 1, and lactate dehydrogenase A gene promoters contain essential binding sites for hypoxia-inducible factor 1. *J. Biol. Chem.* 271:32529-32537 (1996).
29. Doheny KF, Rasmussen SA, Rutberg J, Semenza GL, Stamberg J, Schwartz M, Batista DAS, Stetten G, Thomas GH. Segregation of a familial balanced (12;10) insertion resulting in dup(10)(q21.2q22.1) and del(10)(q21.2q22.1) in first cousins. *Am. J. Med. Genet.* 69:188-193 (1997).
30. Winograd J, Reilly MP, Roe R, Lutz J, Laughner E, Xu X, Hu L, Asakura T, vander Kolk C, Strandberg JD, Semenza GL. Perinatal lethality and multiple craniofacial malformations in MSX2 transgenic mice. *Hum. Mol. Genet.* 6:369-379 (1997).
31. Lee PJ, Jiang BH, Chin BY, Iyer NV, Alam J, Semenza GL, Choi AMK. Hypoxia-inducible factor 1 mediates transcriptional activation of the heme oxygenase-1 gene in response to hypoxia. *J. Biol. Chem.* 272:5375-5381 (1997).
32. Jiang BH, Zheng JZ, Leung SW, Roe R, Semenza GL. Transactivation and inhibitory domains of hypoxia-inducible factor 1 $\alpha$ : modulation of transcriptional activity by oxygen tension. *J. Biol. Chem.* 272:19253-19260 (1997).
33. Agani F, Kirsch D, Friedman SL, Kastan MB, Semenza GL. p53 does not repress hypoxia-induced transcription of the vascular endothelial growth factor gene. *Cancer Res.* 57:4474-4477 (1997).
34. Jiang BH, Agani F, Passaniti A, Semenza GL. V-SRC induces expression of hypoxia-inducible factor 1 (HIF-1) and transcription of genes encoding vascular endothelial growth factor and enolase 1: involvement of HIF-1 in tumor progression. *Cancer Res.* 57:5328-5335 (1997).  
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35. Iyer NV, Kotch LE, Agani F, Leung SW, Laughner E, Wenger RH, Gassmann M, Gearhart JD, Lawler AM, Yu AY, Semenza GL. Cellular and developmental control of O<sub>2</sub> homeostasis by hypoxia-inducible factor 1 $\alpha$ . *Genes Dev.* 12:149-162 (1998).  
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36. Palmer LA, Semenza GL, Stoler MH, Johns RA. Hypoxia induces type II NOS gene expression in pulmonary artery endothelial cells via HIF-1. *Am. J. Physiol.* 274:L212-L219 (1998).
37. Martin C, Yu AY, Jiang BH, Davis L, Kimberly D, Hohimer AR, Semenza GL. Cardiac hypertrophy in chronically anemic fetal sheep: increased vascularization is associated with increased myocardial expression of vascular endothelial growth factor and hypoxia-inducible factor 1. *Am. J. Obstet. Gynecol.* 178:527-534 (1998).

38. Liu Y, Christou H, Morita T, Laughner E, Semenza GL, Kourembanas S. Carbon monoxide and nitric oxide suppress the hypoxic induction of vascular endothelial growth factor gene via the 5' enhancer. *J. Biol. Chem.* 273:15257-15262 (1998).
39. Yu AY, Frid MG, Shimoda LA, Wiener CM, Stenmark K, Semenza GL. Temporal, spatial, and oxygen-regulated expression of hypoxia-inducible factor 1 in the lung. *Am. J. Physiol.* 275:L818-L826 (1998).
40. Iyer NV, Leung SW, Semenza GL. The human hypoxia-inducible factor 1 $\alpha$  gene: HIF1A structure and evolutionary conservation. *Genomics* 52:159-165 (1998).
41. Agani F, Semenza GL. Mersalyl is a novel inducer of vascular endothelial growth factor gene expression and hypoxia-inducible factor 1 activity. *Mol. Pharmacol.* 54:749-754 (1998).
42. Zhong H, Agani F, Baccala AA, Laughner E, Rioseco-Camacho N, Isaacs WB, Simons JW, Semenza GL. Increased expression of hypoxia-inducible factor 1 $\alpha$  in rat and human prostate cancer. *Cancer Res.* 58:5280-5284 (1998).  
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43. Ozaki H, Yu AY, Della N, Ozaki K, Luna JD, Yamada H, Hackett SF, Okamoto N, Zack DJ, Semenza GL, Campochiaro PA. Hypoxia-inducible factor 1 $\alpha$  is increased in ischemic retina: temporal and spatial correlation with VEGF expression. *Invest. Ophthalm. Vis. Sci.* 40:182-189 (1999).
44. Yu AY, Shimoda LA, Iyer NV, Huso DL, Sun X, McWilliams R, Beaty T, Sham JSK, Wiener CM, Sylvester JT, Semenza GL. Impaired physiological responses to chronic hypoxia in mice partially deficient for hypoxia-inducible factor 1 $\alpha$ . *J. Clin. Invest.* 103:691-696 (1999).
45. Kotch LE, Iyer NV, Laughner E, Semenza GL. Defective vascularization of HIF-1 $\alpha$ -null embryos is not associated with VEGF deficiency but with mesenchymal cell death. *Dev. Biol.* 209:254-267 (1999).
46. Feldser D, Agani F, Iyer NV, Pak B, Ferreira G, Semenza GL. Reciprocal positive regulation of hypoxia-inducible factor 1 $\alpha$  and insulin-like growth factor 2. *Cancer Res.* 59:3915-3918 (1999).
47. Zhong H, De Marzo AM, Laughner E, Lim M, Hilton DA, Zagzag D, Buechler P, Isaacs WB, Semenza GL, Simons JW. Overexpression of hypoxia-inducible factor 1 $\alpha$  in common human cancers and their metastases. *Cancer Res.* 59:5830-5835 (1999).  
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48. Zaman K, O'Donovan K, Lin KI, Miller MP, Marquis JC, Baraban JM, Semenza GL, Ratan RR. Protection from oxidative stress-induced apoptosis in cortical neurons by iron chelators is associated with increased expression of glycolytic enzymes, p21/waf1/cip1, and erythropoietin, and enhanced DNA binding of hypoxia-inducible factor 1 and ATF-1/CREB. *J. Neurosci.* 19:9821-9830 (1999).

49. Bergeron M, Yu AY, Solway KE, Semenza GL, Sharp FR. Induction of hypoxia-inducible factor 1 (HIF-1) and its target genes following focal ischemia in rat brain. *Eur. J. Neurosci.* 11:4159-4170 (1999).
50. Ravi R, Mookerjee B, Bhujwala ZM, Sutter CH, Artemov D, Zeng Q, Dillehay LE, Madan A, Semenza GL, Bedi A. Regulation of tumor angiogenesis by p53-induced degradation of hypoxia-inducible factor 1 $\alpha$ . *Genes Dev.* 14:34-44 (2000).  
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51. Becker PM, Alcasabas A, Yu AY, Semenza GL, Bunton TE. Oxygen-dependent upregulation of vascular endothelial growth factor and vascular barrier dysfunction during ventilated pulmonary ischemia in isolated ferret lungs. *Am. J. Resp. Cell. Mol. Biol.* 22:272-279 (2000).
52. Zhong H, Chiles K, Feldser D, Laughner E, Hanrahan C, Georgescu MM, Simons JW, Semenza GL. Modulation of HIF-1 $\alpha$  expression by the epidermal growth factor/phosphatidylinositol 3-kinase/PTEN/AKT/FRAP pathway in human prostate cancer cells: implications for tumor angiogenesis and therapeutics. *Cancer Res.* 60:1541-1545 (2000).  
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53. Sutter CH, Laughner E, Semenza GL. HIF-1 $\alpha$  protein expression is controlled by oxygen-regulated ubiquitination that is disrupted by deletions and missense mutations. *Proc. Natl. Acad. Sci. USA* 97:4748-4753 (2000).
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55. Bergeron M, Gidday JM, Yu AY, Semenza GL, Ferriero DM, Sharp FR. Role of hypoxia-inducible factor-1 in hypoxia-induced ischemic tolerance in neonatal rat brain. *Ann. Neurol.* 48:285-296 (2000).
56. Rivard A, Berthou-Soulie L, Principe N, Kearney M, Curry C, Branellec D, Semenza GL, Isner JM. Age-dependent defect in VEGF expression is associated with reduced HIF-1 activity. *J. Biol. Chem.* 275:29643-29647 (2000).
57. Bos R, Zhong H, Hanrahan CF, Mommers ECM, Semenza GL, Pinedo HM, Abeloff MD, Simons JW, van Diest PJ, van der Wall E. Levels of hypoxia-inducible factor-1 $\alpha$  during breast carcinogenesis. *J. Natl. Cancer Inst.* 93:309-314 (2001).
58. Gardner LB, Li Q, Park MS, Flanagan WM, Semenza GL, Dang CV. Hypoxia inhibits G<sub>1</sub>/S transition through regulation of p27 expression. *J. Biol. Chem.* 276:7919-7926 (2001).
59. Aebbersold DM, Burri P, Beer KT, Laissue J, Djonov V, Greiner RH, Semenza GL. Expression of hypoxia-inducible factor 1 $\alpha$ : a novel predictive and prognostic parameter in the radiotherapy of oropharyngeal cancer. *Cancer Res* 61:2911-2916 (2001).

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60. Laughner E, Taghavi P, Chiles K, Mahon PC, Semenza GL. HER2 (neu) signaling increases the rate of hypoxia-inducible factor 1 $\alpha$  (HIF-1 $\alpha$ ) synthesis: novel mechanism for HIF-1-mediated vascular endothelial growth factor expression. *Mol. Cell. Biol.* 21:3995-4004 (2001).  
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62. Dong Z, Venkatachalam MA, Wang J, Patel Y, Saikumar P, Semenza GL, Force T, Nishiyama J. Upregulation of apoptosis inhibitory protein IAP-2 by hypoxia: HIF-1 independent mechanisms. *J. Biol. Chem.* 276:18702-18709 (2001).
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64. Mahon PC, Hirota K, Semenza GL. FIH-1: a novel protein that interacts with HIF-1 $\alpha$  and VHL to mediate repression of HIF-1 transcriptional activity. *Genes Dev.* 15:2675-2686 (2001).
65. Tuder RM, Chacon M, Alger LA, Wang J, Taraseviciene-Stewart L, Kasahara Y, Cool CD, Bishop AE, Geraci MW, Semenza GL, Yacoub M, Polak JM, Voelkel NF. Expression of angiogenesis-related molecules in plexiform lesions in severe pulmonary hypertension: evidence for a process of disordered angiogenesis. *J. Pathol.* 195:367-374 (2001).
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69. Kojima H, Gu H, Nomura S, Caldwell CC, Kobata T, Carmeliet P, Semenza GL, Sitkovsky MV. Abnormal B lymphocyte development and autoimmunity in hypoxia-inducible factor 1 $\alpha$  deficient chimeric mice. *Proc. Natl. Acad. Sci. USA* 99:170-2174 (2002).
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77. Bos R, van der Groep P, Greijer AE, Shvarts A, Meijer S, Pinedo HM, Semenza GL, van Diest PJ, van der Wall E. Levels of hypoxia-inducible factor 1 $\alpha$  independently predict prognosis in patients with lymph node negative breast carcinoma. *Cancer* 97:1573-1581 (2003).  
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78. Fukuda R, Kelly B, Semenza GL. Vascular endothelial growth factor gene expression in colon cancer cells exposed to prostaglandin E<sub>2</sub> is mediated by hypoxia-inducible factor 1. *Cancer Res.* 63:2330-2334 (2003).  
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79. Cai Z, Manalo DJ, Wei G, Rodriguez ER, Fox-Talbot K, Lu H, Zweier JL, Semenza GL. Hearts from rodents exposed to intermittent hypoxia or erythropoietin are protected against ischemia-reperfusion injury. *Circulation* 108:79-85 (2003).
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angiogenesis by an insulin-like growth factor-1 receptor autocrine loop in human pancreatic cancer. *Am. J. Pathol.* 163:1001-1011 (2003).

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### **Invited Book Chapters, Review Articles, Editorials, and Letters**

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### **Books**

1. Semenza GL. *Transcription Factors and Human Disease*. Oxford University Press, New York, 368 pp (1998).
2. Lahiri S, Semenza GL, Prabhakar NR. (Ed.) *Oxygen Sensing: Responses and Adaptation to Hypoxia*. Marcel Dekker, Inc., New York, 775 pp (2003).
3. Sen CK, Semenza GL. (Ed.) *Methods in Enzymology, Volume 381: Oxygen Sensing*. Academic Press, New York, 381 pp (2004).

### **Inventions/Patents:**

#### *Nucleic Acids Encoding Hypoxia-Inducible Factor 1*

- U.S. Patent 5,882,914, issued March 16, 1999.  
U.S. Patent 6,020,462, issued February 1, 2000.  
Australian Patent 704384, issued April 22, 1999.

#### *Mutant Hypoxia-Inducible Factor 1*

- U.S. Patent 6,124,131, issued September 26, 2000



*Hypoxia-Inducible Factor 1 and Method of Use*

U.S. Patent 6,222,018, issued April 24, 2001  
European Patent 0833840, issued February 28, 2007  
European Patent 1806357, issued July 11, 2007  
Canadian Patent 2,222,279

*Stable Hypoxia-Inducible Factor 1 $\alpha$  and Method of Use*

U.S. Patent 6,562,799, issued May 13, 2003  
U.S. Divisional Patent Application 10/423,419, filed April 25, 2003  
Australian Patent 758627, issued July 10, 2003  
Singapore Patent 79348  
New Zealand Patent 510002, issued March 9, 2004  
Mexican Patent 226,897  
European Patent 1107768, issued November 2, 2006  
Canadian Patent 2,222,279, issued February 1, 2011

*Iron Chelators and Use Thereof for Reducing Transplant Failure During Rejection Episodes*

M. R. Nicolls, X. Jiang, G. C. Gurtner, G. L. Semenza, and J. Rajadas  
U.S. Patent 9,763,899, issued September 19, 2017

**Extramural Sponsorship:**

Current

Research Professor Award

RP-16-239-06-COUN, American Cancer Society, 01/01/17-12/31/21  
PI: G. L. Semenza, 18% effort  
Year 1 direct costs: \$80,000; total award amount: \$400,000  
The goal is to study the role of HIF-1 in breast cancer progression.

Emerson Collective Cancer Research Award

Emerson Collective Cancer Research Fund, 02/01/17-01/31/19  
PI: G.L. Semenza, 5% effort  
Year 1 direct costs: \$86,816; total award amount: \$199,945  
The goal is to improve outcome in breast cancer by targeting hypoxia-inducible factor 1.

Sybil B. Harrington Stein Innovation Award

Research to Prevent Blindness, 01/01/18-12/31/20  
PI: G. L. Semenza, 10% effort  
Year 1 direct costs: \$150,000; total award amount: \$300,000  
The goal is to develop novel therapies for ocular diseases.

Role of HIF-1 in Prostate Cancer Progression

Armstrong Family Foundation, 07/01/18-6/30/23

PI: G. L. Semenza, 5% effort

Current year direct costs: \$100,000; total award: \$500,000

The goal is to investigate whether HIF-1 promotes prostate cancer treatment failure.

Role of HIF-1 in Triple Negative Breast Cancer

Cindy Rosencrans Foundation, 02/02/16-02/01/19

PI: G. L. Semenza, 5% effort

Current (year 3) direct costs: \$25,000; total award: \$75,000

The goal is to investigate the role of HIF-1 in promoting cancer stem cells and metastasis.

Nanomedicine Multicomponent Inhibition of Hypoxia-Inducible Factors to Treat Cancer

Maryland Technology Development Corporation, 12/05/17-09/05/18

PI: G. L. Semenza, 2% effort; Co-investigator: J. G. Green

Direct costs (total award): \$115,000

The goal is to demonstrate utility and plan commercialization of a controlled release preparation of a HIF inhibitor to treat cancer.

Aquaporin 1 and Pulmonary Hypertension

R01-HL126514, NIH/NHLBI, 09/01/14 – 08/31/19

PI: L. A. Shimoda; Co-investigator: G. L. Semenza, 10% effort

Current (year 3) direct costs (to G.L.S.): \$24,412

The goal is to determine the role of aquaporin 1 in hypoxia-induced pulmonary hypertension.

Two-Pronged Therapeutic Approach for Glioblastoma: High Dose Radiation Therapy Then Repair of Radiation-Induced Brain Injury

R01-NS102675, NIH, 08/01/18-06/30/23

PI: P. Walczak; Co-investigator: G.L. Semenza, 4.5% effort

Current (year 1) direct costs: \$218,750

The goal is to use multimodality intravital imaging to rapidly and accurately assess both radiation damage and treatment responses.

### Past

Human Erythropoietin Gene Expression in Transgenic Mice

F32-HL07983, NIH/NHLBI, 8/1/88-7/31/89

National Research Service Award, Individual Postdoctoral Fellowship

P.I.: G.L. Semenza

Total direct costs \$27,000

Developmental-Stage and Tissue-Specific Expression of the Erythropoietin Gene

Lucille P. Markey Scholar Award in Biomedical Science

89-22, Lucille P. Markey Charitable Trust, 7/1/89-6/30/95

P.I.: G.L. Semenza

Total direct costs \$574,000

Analysis of Immediate-Early Gene Response to Hypoxia in Myocardial Cells

Beginning Grant-in-Aid Award, American Heart Association Maryland Affiliate, 7/1/93-6/30/95  
P.I.: G.L. Semenza  
Total direct costs \$44,000

Expression of Human Erythropoietin Gene  
R01-DK39869-04-08, NIH/NIDDK, 9/1/1990-8/31/1995  
P.I.: G.L. Semenza  
Total direct costs \$550,839

Molecular Characterization of Hypoxia-Inducible Factor 1  
Grant-in-Aid Award 94007210, American Heart Association National Center, 7/1/94-6/30/97  
P.I.: G.L. Semenza  
Total direct costs \$132,000

Established Investigator Award  
Award 94002940, American Heart Association National Center, 7/1/94-6/30/99  
Award recipient: G.L. Semenza  
Total direct costs \$265,000

Establishment of Stably Transfected Cell Lines for Use in High-Throughput Screening for  
Compounds that Stabilize Vascular Endothelial Growth Factor mRNA  
Study 840.06.00-GS, Procter and Gamble Pharmaceuticals, 11/1/96-10/31/97  
P.I.: G.L. Semenza  
Total direct costs \$78,016

Expression of Human Erythropoietin Gene  
R01-DK39869-09-12, NIH/NIDDK, 9/1/1995-8/31/1999  
P.I.: G.L. Semenza  
Total direct costs \$497,175

Center for Craniofacial Development and Disorders  
P50-DE11131, NIH/NIDR, 10/1/94-9/30/99  
P.I. (Project V): G.L. Semenza  
Total direct costs (Project V): \$477,177

Expression of HIF-1 in Cancer Cell Lines  
S99-141, SAIC Frederick/NCI-FCRDC, 6/23/99-12/22/99  
P.I.: G.L. Semenza  
Total direct costs: \$5,000

Identification of Cis-acting Amino Acid Sequences Required for O<sub>2</sub>-Dependent Regulation of  
HIF-1 $\alpha$  Protein Stability  
Genzyme Corporation, 4/1/98-2/29/00  
P.I.: G.L. Semenza  
Total direct costs: \$122,655

The Role of Hypoxia-Inducible Factor 1 in Cardiovascular Development and Physiology  
S98750M, American Heart Association Maryland Affiliate, 7/1/98-6/30/00

P.I.: G.L. Semenza

Total direct costs \$66,000

Role of Hypoxia-Inducible Factor 1 in Brain Tumor Progression

Children's Brain Tumor Foundation, 11/10/1999-11/9/2001

P.I.: G. L. Semenza

Total direct costs \$90,000

Effect of HIF-1 Expression on Myocardial Viability Following Hypoxia/Reoxygenation or Ischemia/Reperfusion

American Heart Association, Mid-Atlantic Affiliate, 7/1/00-7/6/30/02

P.I.: G. L. Semenza

Total direct costs \$100,000

(This award was declined due to overlap with NIH P01 HL65608.)

Pathogenesis of Retinal Vascularization in Proliferative Diabetic Retinopathy

R01-EY12609, NIH/NEI, 1/1/1999-12/31/2001

P.I.: Peter Campochiaro; Co-Investigator: G. L. Semenza

Regulation of HIF-1 Activity

Boehringer-Ingelheim Austria, 4/03/00-4/02/02

P.I.: G.L. Semenza, 1% effort

Total direct costs: \$201,766

Multidisciplinary Functional Imaging of Cancer

P20-CA86346, NIH/NCI, 6/1/00-5/31/03

P.I.: Zaver Bhujwalla; Co-Invest.: G. L. Semenza

Neuroprotective Gene Induction by Antioxidant Iron Chelators

R01-NS39170, NIH, 7/15/99-6/30/2003

P.I.: Rajiv Ratan; Co-Investigator Subcontract: G. L. Semenza

Expression of Human Erythropoietin Gene

R01-DK39869-13-16, NIH/NIDDK, 9/1/1999-8/31/2003

P.I.: G.L. Semenza

Total direct costs \$695,765

Regulation of HIF-1 Activity

Boehringer-Ingelheim Austria, 4/03/02-4/02/04

P.I.: G.L. Semenza, 4% effort

Total direct costs: \$200,000

The goal is to identify molecular mechanisms by which HIF-1 activity is regulated.

Comprehensive Oral Health Research Center of Discovery

P60-DE13078, NIH/NIDCR, 8/1/99-7/31/04

Center P.I.: E.W. Jabs; Co-Inv: G.L. Semenza

Current year direct costs (Project II) \$168,420

The goal is to investigate the role of MSX2 in the pathogenesis of ethanol-induced craniofacial malformations.

Comprehensive Oral Health Research Center of Discovery

P60-DE13078, NIH/NIDCR, 8/1/99-7/31/04

Center P.I.: E.W. Jabs; Assistant Director: G.L. Semenza

Current year direct costs (Center) \$1,624,387

The goal is to establish a multidisciplinary and multi-institutional comprehensive program of excellence in craniofacial research, education and patient care.

Hypoxia-Inducible Factor 1 and Oxygen Homeostasis

R01-HL55338-09, NIH/NHLBI, 2/1/2000-2/28/2005

P.I.: G.L. Semenza

Current year direct costs \$167,274

The objective is to investigate the role of HIF-1 in the maintenance of cellular and systemic O<sub>2</sub> homeostasis.

Oxidants and Nitric Oxide in Post-ischemic Heart Injury

P01-HL65608-05, NIH/NHLBI, 9/15/00-7/31/05

P.I.: L. Becker; Project 4 P.I.: G. L. Semenza

Current year direct costs (Project IV): \$191,782

The major goal of this project is to determine the mechanisms and consequences of HIF-1 expression in myocardial cells subjected to hypoxia or ischemia.

A Gene Therapy System with Potential to Heal Diabetic Foot Ulcers

1-05-RA-50, American Diabetes Association, 1/01/05-12/31/07

P.I.: J. Harmon; Co-investigator: G. L. Semenza

The goal is to test whether HIF-1 $\alpha$  gene therapy promotes wound healing.

Cellular Cardiomyoplasty for Acute and Chronic Ischemia

1 U54-HL081028-01, NIH/NHLBI, 9/01/2005-8/31/2007

Center P.I.: J. Hare; Co-investigator: G.L. Semenza

The goal is the establishment of the Johns Hopkins Specialized Center for Cell-based Therapy.

In Vivo Cellular and Molecular Imaging Center

P50-CA103175-04, NIH/NCI, 8/10/03-7/31/08

P.I.: Z. Bhujwala; Project 2 P.I.: G. L. Semenza

Total federal award amount: \$1,605,757 (Project 2 only)

The goal of this project is to investigate the role of HIF-1 in breast cancer using molecular imaging techniques.

Johns Hopkins FAMRI Center of Excellence

Flight Attendant Medical Research Institute, 7/01/05-6/30/08

P.I.: C. Rudin; Project 1 P.I.: G. L. Semenza  
Current year direct costs (Project 1): \$102,126  
The goal of Project I is to identify small molecule inhibitors of HIF-1.

Interaction of Diabetes, Aging, and HIF-1 Deficiency in Peripheral Vascular Disease  
1-06-RA-121, American Diabetes Association, 1/01/06-12/31/08  
P.I.: G. L. Semenza, 5% effort  
Current year direct costs: \$99,918  
The major goal of this project is to investigate factors that contribute to peripheral vascular disease in diabetes and to explore novel strategies for the treatment of critical limb ischemia.

Analysis of Stem Cell Function in Mouse Models of Tissue Injury  
RNL Biostar, Inc., 5/10/07-5/14/09  
P.I.: G. L. Semenza, 5% effort  
Current year direct costs: \$122,341  
The goal of this project is to test the hypothesis that administration of human stem cells will promote repair in mouse models of tissue injury.

Regulation of Hemangiogenesis by Hypoxia-Inducible Factor 1 and microRNAs  
R03-HL096201-01, NIH/NHLBI, 12/1/08-5/31/09  
P.I.: G. L. Semenza, 5% effort  
Total direct costs: \$25,000  
The goal of this planning grant is to prepare an application to participate in the NHLBI Progenitor Cell Biology Consortium.

Vascular Aging: The Link that Bridges Age to Atherosclerosis (The VALIDATE Study)  
N01-AG-3-1003, NIH/NIA, 08/01/03 - 07/31/10  
Center P.I.: G. Gersteinblith; Co-investigator: G.L. Semenza, 1% effort  
The goal is to relate parameters of vascular age to the presence and extent of coronary atherosclerosis as assessed by MDCT scanning in different patient populations.

Proteomics of Adaptation to Ischemia/Hypoxia in Heart, Lung, and Blood  
N01-HV28180-06, NIH/NHLBI, 9/30/02-9/29/09; 9/30/09-3/29/10 (no cost extension)  
Center P.I.: J. van Eyk; Project 1 P.I.: G.L. Semenza  
Total federal award amount: \$18M  
The goal of Project 1 is to identify post-translational modifications of HIF-1 $\alpha$  and their effects on protein-protein interactions.

Hypoxia-Inducible Factor 1 and Oxygen Homeostasis  
R01-HL55338-14, NIH/NHLBI, 06/1/05-05/31/10; 05/31/10-05/31/11 (no cost extension)  
P.I.: G. L. Semenza  
Total federal award amount: \$1,244,012  
The broad, long-term goal of the proposed research is to increase our understanding of the role of HIF-1 in the maintenance of oxygen homeostasis.

HIF-1-Regulated Endothelial Progenitor Cell Recruitment in Burn Wound Healing

P20-GM78494-04, NIH/NIGMS, 08/01/06-07/31/10; 08/01/10-07/31/11 (no cost extension)

P.I.: G. L. Semenza, 20% effort

Total federal award amount: \$3,235,903

The goal is to establish the Johns Hopkins Center for Innovative Wound Healing Research, which will investigate the role of HIF-1 in promoting burn wound healing.

Treatment of Human Breast Cancer with Drugs that Inhibit HIF-1

Emerald Foundation, 12/15/09 – 12/01/11

P.I.: G. L. Semenza, 5% effort

Total direct costs: \$250,000

The goal is to analyze the effect of HIF-1 inhibitors on breast cancer growth and metastasis.

Oxidants and Nitric Oxide in Post-ischemic Heart Injury

P01-HL65608-08, NIH/NHLBI, 6/1/06-3/31/11; 4/01/11-3/31/12 (no cost extension)

P.I.: L. C. Becker; Project 4 P.I.: G. L. Semenza, 10% effort

Current year direct costs: \$239,158; Total federal award amount: \$2,174,773 (Project 4 only)

The major goal of this project is to determine mechanisms by which HIF-1 and EPO mediate protective responses against cardiac ischemia-reperfusion injury.

Synta/JHU Research Agreement

Synta Pharmaceuticals Corp., 12/20/12-12/19/13

P.I.: G. L. Semenza, 5% effort

Total direct costs: \$25,000

The goal was to analyze the effects of ganetespib in a mouse model of metastatic breast cancer.

Postdoctoral Fellowship Award

KG111254, Susan G. Komen for the Cure Research Programs, 7/01/11-2/28/14

P.I.: G. L. Semenza

Direct costs: \$180,000

The goal is to mentor postdoctoral trainee Daniele Gilkes for a career in breast cancer research.

Cigarette Restitution Fund Research Grant

FH-B33-CRF, State of Maryland Department of Health and Mental Hygiene, 7/01/13-6/30/14

P.I.: G. L. Semenza, 5% effort

Direct costs: \$69,852

The goal is to test the effect of combining chemotherapy with HIF-1 inhibitors in breast cancer.

Center for Cancer Physics

U54-CA143868-05, NIH/NCI, 9/28/09-7/31/14 (NCE: 8/1/14-10/31/14)

Center P.I.: D. Wirtz; Project 1 P.I.: G. L. Semenza, 25% effort

Current (year 5) direct costs (to G.L.S.): \$125,000

The goal of the Center is to investigate the role of mechanical forces in cancer metastasis.

Gas Biology Project

Japan Science and Technology Agency, 4/01/10–3/31/15

P.I.: M. Suematsu; Project P.I.: G. L. Semenza, 5% effort

Current (year 5) direct costs (to G.L.S.): \$38,198  
The goal was to perform a JST-JHU International Cooperative Research Project on gas biology.

Johns Hopkins Innovative Proteomics Center on Heart Failure  
Contract No. HHS-N268201000032C, NIH/NHLBI, 08/15/10-08/14/15  
P.I.: J. van Eyk; Co-investigator: G. L. Semenza, 10% effort  
Current (year 5) direct costs (to G.L.S.): \$87,223  
The goal of the Center was to use proteomics to investigate the pathobiology of heart failure.

Characterization of PKA as a Critical Regulator of HIF-1  
F32-GM116326-01, NIH/NIGMS, 8/16/15 – 11/27/15  
P.I.: J. Bullen (Postdoctoral trainee)  
The goal was to analyze the mechanisms by which protein kinase A regulates HIF-1 activity.

Research Professor Award  
122437-RP-12-090-01-COUN, American Cancer Society, 1/01/12-12/31/16  
P.I.: G. L. Semenza, 20% effort  
Total direct costs: \$400,000  
The goal was to study the role of HIF-1 in cancer metastasis.

Role of HIF-1 in Prostate Cancer Progression  
Armstrong Family Foundation, 08/31/15-08/30/17  
PI: G. L. Semenza, 5% effort  
Total direct costs: \$250,000  
The goal was to investigate whether HIF-1 promotes prostate cancer treatment failure.

Breast Cancer Research Program Impact Award  
W81XWH-12-1-0464, Congressionally Directed Medical Research Programs, 9/30/12-9/29/17  
P.I.: G. L. Semenza, 40% effort  
Total award amount: \$3,120,283  
The goal was to target metabolism for the treatment of breast cancer.

Multicomponent Inhibition of Hypoxia-Inducible Factor to Treat Ocular Neovascularization  
Maryland Technology Development Corporation, 10/10/17-06/30/18  
PI: J. G. Green; Co-investigator: G. L. Semenza, 2% effort  
Direct costs (total award): \$115,000  
The goal was to demonstrate utility and plan commercialization of a controlled release preparation of a HIF inhibitor to treat ocular neovascularization.

Integrative Consequences of Hypoxia  
P01-HL090554, NIH/NHLBI, 09/26/13-06/30/18  
PI: N. R. Prabhakar; Co-investigator: G. L. Semenza, 5% effort  
Current (year 4) direct costs (to G.L.S.): \$45,402  
The goal was to analyze transcriptional responses to chronic intermittent hypoxia.



## EDUCATIONAL ACTIVITIES

### Teaching:

#### Classroom instruction

Course Director: Introduction to Human Genetics (1993-1994)  
Genetic Analysis of Malformation Syndromes (1996-1997)  
Developmental Genetics (2001)

Lecturer: Advanced Topics in Human Genetics course (Human Genetics)  
Stem Cells: Unit of Development and Unit of Regeneration (ME:440.815)  
Cellular and Molecular Basis of Disease (ME:800.709)  
Fundamentals of Cancer: Cause to Cure (ME:150.706)  
Intro to Biomedical Research and Careers (Biophysics 250:106/300/306)  
Topics in Interdisciplinary Medicine: Regenerative Medicine (ME:800.xx)  
JHU Divisional/Departmental Grand Rounds and Seminars (see below)

### Mentoring:

#### Former Postdoctoral Trainees and Research Associates (49)

Guang L. Wang, Ph.D. (Arizona State University, 1991)  
Position: Postdoctoral Fellow, 1992-1995  
Support: NIH R01-DK39869  
Currently: Director, Data Management, Bioanalytical Systems, Inc.

Bing-Hua Jiang, Ph.D. (Mississippi State University, 1994)  
Position: Postdoctoral Fellow, 1994-1997  
Support: NIH R01-DK39869  
Currently: Professor, Jefferson Medical College

Xin Xu, Ph.D. (Graduate University for Advanced Studies, Okazaki, Japan, 1994)  
Position: Postdoctoral Fellow, 1994-1995  
Support: NIH P50-DE11131

Jonathan Winograd, M.D. (Harvard University, 1994)  
Position: Postdoctoral Fellow, 1994-1996  
Support: NIH P50-DE11131  
Currently: Assistant Professor, Harvard Medical School

Faton H. Agani, M.D., Ph.D. (University of Prishtina, Yugoslavia, 1980, 1990)  
Position: Postdoctoral Fellow, 1995-1998  
Support: NIH R01-HL55338

Aimee Yu, M.D. (New York University, 1992)

Position: Postdoctoral Fellow, 1995-1998  
Support: Multidisciplinary Training Program in Lung Disease, NIH T32-HL07534; American Lung Association Individual Postdoctoral Fellowship  
Currently: private practice in pulmonary and critical care medicine

Narayan V. Iyer, Ph.D. (Indian Institute of Science, 1990)  
Position: Postdoctoral Fellow, 1995-1999  
Support: NIH R01-DK39869  
Currently: Senior Molecular Biology Development Scientist, Corning Inc.

Xing Sun, M.D. (Tongji Medical University, 1995)  
Position: Postdoctoral Fellow, 1998  
Support: China Scholarship Council

Carrie L. Hayes, Ph.D. (Johns Hopkins University, 1996)  
Position: Postdoctoral Fellow, 1996-1999  
Support: JHU Training Program in Hematology  
Currently: Research Assistant Professor, University of Memphis

Lori E. Kotch, Ph.D. (University of North Carolina, 1992)  
Position: Postdoctoral Fellow, 1996-2000  
Support: NIH P50-DE11131  
Currently: Toxicologist, U. S. Food and Drug Administration

Huasheng Lu, M.D. (Fujian Medical University), Ph.D. (University of South Carolina, 1999)  
Position: Postdoctoral Fellow, 1999-2001  
Support: NIH P01-HL65608

Zhijiang Yan, Ph.D. (Shanghai Institute of Cell Biology, 1998)  
Position: Postdoctoral Fellow, 2000-2001  
Support: NIH R01-HL55338

Kiichi Hirota, M.D. (Kyoto University, 1988), Ph.D. (Kyoto University, 1998)  
Position: Visiting Scientist, 1999-2002  
Support: Sabbatical, Kyoto University  
Currently: Assistant Professor, Kyoto University

Ryo Fukuda, M.D. (Kansai Medical University, 1983), Ph.D. (Shimane Medical Univ., 1987)  
Position: Visiting Scientist, 2000-2002  
Support: Sabbatical, Shimane Medical University  
Currently: private practice

Shaowei Li, M.D., Ph.D. (Norman Bethune University of Medical Sciences, 1992)  
Position: Instructor, 2002-2003  
Support: NIH R01-DK39869

Connor P. Mahon, Ph.D. (University of Aberdeen, 1997)  
Position: Postdoctoral Fellow, 1999-2003  
Support: NIH R01-DK39869  
Currently: Scientist, Vernalis

Dominador J. Manalo, Ph.D. (Rutgers University, 1999)  
Position: Postdoctoral Fellow, 1999-2004  
Support: JHU Multidisciplinary Training Program in Lung Disease; Pulmonary Hypertension Association Postdoctoral Fellowship Award; NIH R01-HL55338  
Currently: Staff Scientist, U. S. Food and Drug Administration

Yifu Zhou, M.D. (Shanghai Medical University, 1974)  
Position: Instructor, 2004-2005  
Support: JHU Institute for Cell Engineering  
Currently: Staff Scientist, National Institutes of Health

Hideo Kimura, M.D. (University of Tokyo, 1990), Ph.D. (Univ. of Tokyo, 2000)  
Position: Postdoctoral Fellow, 2003-2005  
Support: Institute for Cell Engineering  
Currently: Assistant Professor, Department of Surgery, University of Tokyo

Hideko K. Nagasawa, Ph.D. (Kyoto University, 1988)  
Position: Visiting Professor, 2004-2005  
Support: The University of Tokushima  
Currently: Professor, Gifu Pharmaceutical University

Balaji Krishnamachary Ph.D. (V.V. Nagar Gujarat University, 1995)  
Position: Postdoctoral Fellow, 2000-2005  
Support: Children's Brain Tumor Foundation; NIH P50-CA103175  
Currently: Research Associate, Dept of Radiology, Johns Hopkins University

Hiroaki Okuyama, M.D., Ph.D. (Kyoto University, 2003)  
Position: Postdoctoral Fellow, 2003-2006  
Support: NIH R01-HL55338

Zheqing Cai, Ph.D. (Medical College of Georgia, 2001)  
Position: Postdoctoral Fellow, 2001-2006  
Support: NIH P01-HL65608

Hua Zhong, M.D. (Jiangxi Medical College, 1984), Ph.D. (Beijing Medical University, 1996)  
Position: Research Associate, 2006-2007  
Support: NIH P01-HL65608

Jin Hyen Baek, Ph.D. (Pusan National University, 2000)  
Position: Postdoctoral Fellow, 2001-2007  
Support: Boehringer Ingelheim Austria; NIH R01-HL55338

Currently: Research Fellow, U.S. Food and Drug Administration

Ye Liu, Ph.D. (Wayne State University, 2003)

Position: Postdoctoral Fellow, 2003-2007; Research Associate, 2007

Support: NIH N01-HV28180

Award: 2007 W. Barry Wood Jr. Postdoctoral Research Award

Currently: Director of Gene Transfer Technologies, REGENXBIO Inc.

David Qian, Ph.D. (Johns Hopkins University, 2002)

Position: Research Associate, 2006-2007

Support: Flight Attendant Medical Research Institute

Currently: Assistant Professor, University of Oregon Health Sciences Center

Ryo Fukuda, M.D. (Kansai Medical University, 1983), Ph.D. (Shimane Medical Univ., 1987)

Position: Visiting Assistant Professor, 2004-2007

Support: NIH P50-CA103175

Marta Bosch-Marce, Ph.D. (University of Barcelona, 1999)

Position: Postdoctoral Fellow, 2003-2007

Support: NIH R01-HL55338, Johns Hopkins Institute for Cell Engineering

Currently: ORISE Fellow, U.S. Food and Drug Administration

Kotaro Miyake, M.D., Ph.D. (University of Tokushima, 1999, 2006)

Position: Postdoctoral Fellow, 2007-2008

Support: University of Tokushima

Wen-Chih Cheng, Ph.D. (Johns Hopkins University, 2008)

Position: Postdoctoral Fellow, 2008

Support: NIH P50-CA103175

Xiaofei Wei, M.D. (Peking Union Medical College, 2005)

Position: Postdoctoral Fellow, 2006-2008

Support: NIH P20-GM78494

Osamu Nakajima, Ph.D. (University of Tokyo, 1997)

Position: Visiting Associate Professor, 2008-2009

Support: Yamagata University

Shaoping Chen, M.D., Ph.D. (Second Military Medical University, 1991, 2000)

Position: Postdoctoral Fellow, 2008-2009

Support: RNL Biostar, Institute for Cell Engineering

KangAe Lee, Ph.D. (Michigan State University, 2007)

Position: Postdoctoral Fellow, 2007-2009

Support: NIH P50-CA103175; Flight Attendant Medical Research Institute; and Dr. Richard and Mavis Fowler Foundation for Advanced Research in the Medical Sciences, Inc.

Rigu Gupta, M.D. (University of Mumbai, 2001)  
Position: Research Associate, 2007-2009  
Support: NIH P01-HL65608

Lei Wang, Ph.D. (University of Michigan, 2007)  
Position: Postdoctoral Fellow, 2009-2010  
Support: Institute for Cell Engineering

Huafeng Zhang, Ph.D. (University of Tokyo, 2004)  
Position: Postdoctoral Fellow, 2005-2008; Research Associate, 2008-2010  
Support: NIH P50-CA103175, Flight Attendant Medical Research Institute  
Award: 2008 Albert Lehninger Postdoctoral Research Award  
Currently: Professor, University of Science and Technology of China

Sergio Rey, M.D., Ph.D. (Universidad Catolica de Chile, 2001, 2006)  
Position: Postdoctoral Fellow, 2007-2011  
Support: Presidential Award, Government of Chile; Universidad Catolica de Chile; NIH R01-HL55338; NIH P20-GM7849

Carmen Wong, Ph.D. (University of Hong Kong, 2009)  
Position: Postdoctoral Fellow, 2009-2011  
Support: Croucher Fellowship, University of Hong Kong, 2009-2011  
Currently: Research Assistant Professor, University of Hong Kong

Maimon Hubbi, Ph.D. (Johns Hopkins University, 2010)  
Position: Postdoc, 2010-2011 (2012 Alfred Blalock Postdoctoral Research Award recipient)  
Support: NIH T32-HL007525  
Currently: Medical Resident, University of Texas Southwestern Medical Center

Kakali Sarkar, Ph.D. (Indian Institute of Chemical Biology, 1998)  
Position: Research Associate, 2006-2011  
Support: American Diabetes Association; NIH P20-GM7849; NIH P01-HL65608  
Currently: Laboratory Manager, Johns Hopkins University School of Medicine

Weibo Luo, Ph.D. (Otto von Guericke Universitat Magdeburg, 2007)  
Position: Postdoc, 2007-2011  
Support: NIH N01-HV28180; HHS-N268201000032C; Japan Science and Technology Agency; Fowler Foundation for Advanced Research in the Medical Sciences, Inc.  
Award: 2012 Albert Lehninger Postdoctoral Research Award  
Currently: Assistant Professor, University of Texas Southwestern

Hong Wei, M.D. (Kunming Medical University, 1983)  
Position: Postdoctoral Fellow, 2008-2012  
Support: NIH R01-HL55338; HHS-N268201000032C

Luana Schito, Ph.D. (University of Rome, 2011)  
Position: Postdoctoral Fellow, 2011-2012  
Support: NIH U54-CA143868  
Currently: Postdoctoral Fellow, University of Toronto

Ting Wang, M.D. (Nanjing Medical Univ. 1997), Ph.D. (Shanghai Second Med. Univ. 2003)  
Position: Visiting Scientist, 2012-2014  
Support: Renji Hospital Shanghai Jiao Tong University School of Medicine  
Currently: Professor, Renji Hospital Shanghai Jiao Tong University School of Medicine

Pallavi Chaturvedi, Ph.D. (University of Nebraska, 2007)  
Position: Postdoctoral Fellow, 2010-2014  
Support: NIH U54-CA143868; American Cancer Society  
Currently: Research Instructor, University of Chicago

Naoharu Takano, Ph.D. (Hokkaido University, 2006)  
Position: Postdoctoral Fellow, 2011-2014  
Support: Japan Science and Technology Agency

Daniele Gilkes, Ph.D. (University of South Florida, 2008)  
Position: Postdoctoral Fellow, 2009-2014  
Support: Nanotechnology for Cancer Medicine Postdoctoral Training Program; Susan B. Komen Foundation Postdoctoral Fellowship  
Postdoc Award: NIH/NCI K99  
Currently: Assistant Professor, Johns Hopkins University School of Medicine

Weibo Luo, Ph.D. (Otto von Guericke Universitat Magdeburg, 2007)  
Position: Instructor, 2012-2014  
Postdoc Support: HHS-N268201000032C; Japan Science and Technology Agency  
Postdoc Award: NIH/NCI 1K99CA168746  
Currently: Assistant Professor, University of Texas Southwestern Medical School

John Bullen, Ph.D. (Johns Hopkins University, 2012)  
Position: Postdoctoral Fellow, 2012-2015  
Support: HHS-N268201000032C  
Currently: Scientist, Novavax

Shweta Krishnan, Ph.D. (Duke University, 2014)  
Position: Postdoctoral Fellow, 2014-2016  
Support: W81XWH-12-1-0464, Congressionally Directed Medical Research Programs

Debangshu Samanta, Ph.D. (Vanderbilt University, 2012)  
Position: Postdoctoral Fellow, 2012-2018  
Support: W81XWH-12-1-0464, Congressionally Directed Medical Research Programs  
Award: Daniel Nathans Postdoctoral Research Award, JHU Young Investigators Day

### Current Postdoctoral Trainees and Research Associates (6)

Debangshu Samanta, Ph.D. (Vanderbilt University, 2012)

Position: Research Associate, 2018-present

Haiquan Lu, Ph.D. (University of Texas MD Anderson Cancer Center, 2013)

Position: Postdoctoral Fellow, 2013-present

Support: W81XWH-12-1-0464, Congressionally Directed Medical Research Programs

Award: 2017 Johns Hopkins Postdoctoral Association Retreat Best Poster Presentation Award

Walter Jackson, Ph.D. (Pennsylvania State University, 2016)

Position: Postdoctoral Fellow, 2017-present

Support: Johns Hopkins Hematology Training Grant T32-HL007525

Shaima Salman, Ph.D. (McMaster University, 2013)

Position: Postdoctoral Fellow, 2017-present

Yongkang Yang, Ph.D. (Peking University, 2013)

Position: Postdoctoral fellow, 2018-present

Yousang Hwang, Ph.D. (Korea Advanced Institute of Science and Technology, 2001)

Position: Research Associate, 2018-present

### Sabbaticals by Visiting Scientists (7)

Gloria Ferreira, Associate Professor, University of South Florida, 1998

Kiichi Hirota, Assistant Professor, Kyoto University, Japan, 1999-2002

Ryo Fukuda, Assistant Professor, Shimane Medical University, Japan, 2000-2002; 2004-2007

Hideko Nagasawa, Associate Professor, University of Tokushima, Japan, 2004-2005

Osamu Nakajima, Associate Professor, Yamagata University, Japan, 2008-2009

Ting Wang, Associate Professor, Shanghai Jiao Tong Univ. Sch. of Medicine, China, 2012-2014

Nikolaos Papanikolaou, Aristotle Univ. of Thessaloniki School of Medicine, Greece, 2014-2015

### Predocctoral Students (27)

Will Lowther, Human Genetics and Molecular Biology, 1992

Hon-Ming Fang, Human Genetics and Molecular Biology, 1994

Jo A. Forsythe, Physiology, University of Maryland at Baltimore, 1995-1996 (dissertation)

Qing Li, Cellular and Molecular Medicine, 1996

Panthea Taghavi, Free University of Amsterdam, The Netherlands, 2000

Jessica LaRusch, Human Genetics and Molecular Biology, 2000-2001

Ronald Miller, Human Genetics and Molecular Biology, 2003-2004

Alireza Rabi, MD/PhD program, 2006

Scott Vandiver, MD/PhD program, 2006

Youn Na, Cellular and Molecular Medicine, 2006

Allison Sharrow, Pathobiology, 2006-2007

Maimon Hubbi, Cellular and Molecular Medicine, 2007-2010 (dissertation)  
Audrey Moshfeghian, Human Genetics and Molecular Biology, 2008-2009  
Nupura Bhise, Biomedical Engineering, 2008  
Matt Knabel, Human Genetics and Molecular Biology, 2008-2009  
Luana Schito, University of Rome, 2008-2011 (dissertation)  
Hongxia Hu, Human Genetics and Molecular Biology, 2009-2014 (dissertation)  
Rosalind Bogan, Cellular and Molecular Medicine, 2011  
Yuchuan Miao, Biological Chemistry, 2011-2012  
Benjamin Kang, Cellular and Molecular Medicine, 2012  
Jillian Phallen, Cellular and Molecular Medicine, 2012  
Lisha Xiang, 3<sup>rd</sup> Military Medical University, Chongqing, China, 2012-2014 (CSC Award)  
David Zhan, Biological Chemistry, 2013-2014  
Huimin Zhang, Xi'an Jiaotong University College of Medicine, Xi'an, China, 2014-2015  
Chuanzhao Zhang, Sun Yat-sen University, Guangzhou, China, 2014-2016 (CSC Award)  
Jie Lan, Sichuan University School of Medicine, Chengdu, China, 2016-2018 (CSC Award)  
Lauren Evans, Human Genetics and Molecular Biology, 2017  
Caroline Vissers, Biochemistry, Cellular and Molecular Biology, 2017-present

#### Undergraduate Tutorial Program (31)

Johnson Chiu, 1994-95  
Gregory Dolin, 1995  
Jeremy Lutz, 1995-97  
Adrian Cuenca, 1997  
Clare Zhang, 1997  
Tania Menard, 1997-98  
Shivani Desai, 1997  
Allison Durango, 1998  
Eric Edwards, 1999  
Yeowon Kim (Williams College), 1999  
Richard Huggins, 1999-2000  
Arnold Tsai (University of Southern California), 2000  
Kathy Williams, 2000  
Jane Oh, 2000-2002 (Provost Undergraduate Research Award recipient)  
Yoona Rhee, 2001  
Bo Gu, 2005-2006  
Sarah Yee, 2005-2007 (Provost Undergraduate Research Award recipient)  
Marianne Strazza, 2005-2007  
Hweejo Byun, 2005-2008  
Lee Ouyang, 2007  
Budri Abubaker-Sharif, 2007  
Lana Tong, 2007-2009  
Daniel Chang, 2007-2010  
Matthew Dapas, 2008  
Irina Usach, 2008-2009  
Alexandra McMillan, 2008-2010



Ryan Chang, 2008-2011  
Ross Liao, 2012-2013  
Sun Joo Lee, 2012-2014 (Provost Undergraduate Research Award recipient)  
Ivan Chen, 2012-2015 (Woodrow Wilson Fellowship recipient; Provost Award recipient)  
Youngrok Park, 2014-2016  
Tina Huang, 2015-present  
Kain Kim, 2016-2017  
Linh Tran, 2016-present (STAR Award recipient)

Department of Oncology Junior Faculty Mentoring Committee

Hans Hammers, M.D., 2013-2016  
Sushant Kachhap, Ph.D., 2014-2016

K08 Advisory Committee

Gabriel Ghiaur, M.D., Oncology, 2014-present  
John Huetsch, M.D., Pulmonary and Critical Care Medicine, 2016-present

K08 Mentor

Lawrence V. Hofmann, Vascular and Interventional Radiology, 2004-2005  
Akrit Sodhi, Ophthalmology, 2012-2016

Training Program Participation

Training Program in Medical Genetics, 1990-present  
Director: T. Wang

Predoctoral Training Program in Human Genetics and Molecular Biology, 1990-present  
Director: D. Valle

Graduate Program in Cellular and Molecular Medicine, 1993-present  
Director: R. Rao

Multidisciplinary Training Program in Pulmonary Diseases (T32-HL07534), 1995-present  
Director: R. A. Wise

Hematology Training Program (T32-HL007525), 1997-present  
Director: R. Brodsky

Johns Hopkins Comprehensive Cancer Center, 2007-present  
Director: W. Nelson

Graduate Training Program in Nanotechnology for Biology and Medicine, 2008-present  
Director: D. Wirtz

Training in Orthopedic Team Science (T32-AR067708), 2015-present  
Director: T. Clemens

The Short Course in Medical and Experimental Mammalian Genetics, 1990-present  
The Jackson Laboratory, Bar Harbor, ME

Preliminary/Comprehensive Oral Examinations (since 1998)

Amit Golding, Cellular and Molecular Medicine  
Joseph Hanna, Human Genetics and Molecular Biology  
Jessa Jones, Human Genetics and Molecular Biology  
Ina Rhee, Human Genetics and Molecular Biology  
Tim Chan, Human Genetics and Molecular Biology  
Jenna Roberts, Toxicological Sciences  
Michele Nealen, Cellular and Molecular Medicine  
Anding Shen, Cellular and Molecular Medicine  
Emily Niemitz, Human Genetics and Molecular Biology  
Wei Chen, Human Genetics and Molecular Biology  
Kimberly Briggs, Cellular and Molecular Medicine  
Molly Sheridan, Cellular and Molecular Medicine  
Kristina Krasnov, Cellular and Molecular Medicine  
Rebecca Leary, Cellular and Molecular Medicine  
Zachary Stine, Human Genetics  
Tejasvi Niranjana, Human Genetics  
Sam Gilbert, Human Genetics  
Anh-Thu Ngoc Lam, Human Genetics

Thesis Committees (since 1998)

Christine Dolde, Human Genetics and Molecular Biology  
Eileen Emison, Human Genetics and Molecular Biology  
Elizabeth Cameron, Human Genetics and Molecular Biology  
Jean Regard, Cellular and Molecular Medicine  
Anding Shen, Cellular and Molecular Medicine  
Qingliang Wang, Human Genetics and Molecular Biology  
Lisa Olsen, Human Genetics and Molecular Biology  
Wen-Chien Chou, Human Genetics and Molecular Biology  
Cynthia DeRenzo, Human Genetics and Molecular Biology  
Liangfen Han, Human Genetics and Molecular Biology  
Rebecca Osthus, Human Genetics and Molecular Biology  
Jay Kim, Pathobiology  
Courtney Silverthorn, Pharmacology  
Jing Xu, Pharmacology  
Zachary Stine, Human Genetics and Molecular Biology  
Stephen Page, Human Genetics and Molecular Biology

Benjamin Nacev, Pharmacology  
Rebecca Deering Brose, Human Genetics and Molecular Biology  
Tzu-Lan Yeh, Biophysics  
David Gorkin, Human Genetics and Molecular Biology  
Kshitiz Gupta, Biomedical Engineering  
Kah Suan Lim, Pathobiology  
Jee Hoon Song, Cellular and Molecular Medicine  
Benjamin Park, Immunology  
Eric Mills, Biochemistry, Cellular, and Molecular Biology  
Arianna Franca Anzmann, Human Genetics and Molecular Biology  
Caroline Vissers, Biochemistry Cellular and Molecular Biology  
Maria Del Carmen Vitery, Cellular and Molecular Physiology

#### Applicant Interviews

Cellular and Molecular Medicine  
Human Genetics and Molecular Biology  
Medical Scientist Training Program

#### Sabbaticals by Visiting Scientists

Gloria Ferreira, Associate Professor, University of South Florida, 1998  
Kiichi Hirota, Assistant Professor, Kyoto University, Japan, 1999-2002  
Ryo Fukuda, Assistant Professor, Shimane Medical University, Japan, 2000-2002; 2004-2007  
Hideko Nagasawa, Associate Professor, University of Tokushima, Japan, 2004-2005  
Osamu Nakajima, Associate Professor, Yamagata University, Japan, 2008-2009  
Ting Wang, Associate Professor, Shanghai Jiao Tong Univ. Sch. of Medicine, China, 2012-2014  
Nikolaos Papanikolaou, Aristotle Univ. of Thessaloniki School of Medicine, Greece, 2014-2015

#### **Editorial Activities:**

Deputy Editor, *Journal of Clinical Investigation*, 2018-present

Associate Editor, *Journal of Clinical Investigation*, 2017-2018

Editorial Board, *Oncogenesis*, 2015-present

Editorial Board, *Proceedings of the National Academy of Sciences*, 2013-2018

Editorial Board, *Cancer and Metabolism*, 2012-present

Editorial Board Founding Member, *Oncotarget*, 2010-present

Editorial Board, *Oncogene*, 2009-present

Editor-in-Chief, *Journal of Molecular Medicine*, 2007-2017

Editorial Board, *Cancer Biology and Therapy*, 2006-present

Executive Editor, *Antioxidants & Redox Signaling*, 2003-present

Consulting Editor, *Journal of Clinical Investigation*, 2002-2017

Consultant Editor, *Experimental Physiology*, 2010-2017

Associate Editor, *American Journal of Physiology – Cell Physiology*, 2012-2016

Editorial Board, *Clinical and Translational Science*, 2007-2015

Editorial Board, *Molecular and Cellular Biology*, 2008-2012

Editorial Board, *Molecular Cancer Therapeutics*, 2005-2012

Board of Consulting Editors, *Cardiovascular Research*, 2003-2012

Editorial Board, *Cancer Research*, 2003-2012

Editorial Board, *Circulation Research*, 2003-2010

Editorial Board, *Journal of Biological Chemistry*, 2011

Editorial Board, *Experimental Physiology*, 2009-2010

Editorial Board, *Biochemical Journal*, 2006-2008

Editorial Board, *American Journal of Physiology: Lung, Cellular, and Molecular Physiology*, 2000-2005

Communicating Editor, *Human Mutation*, 1992-2003

Guest Editor, issue on Cancer Energy Metabolism, *Drug Discovery Today: Disease Mechanisms*, Volume 2, Issue 2, 2005

Guest Editor, issue on Hypoxia and Cancer, *Cancer Metastasis Reviews*, 2007

Guest Editor, multi-issue review series on Hypoxia, *American Journal of Physiology: Cell Physiology*, 2011.

Invited Reviewer, 1990-present (221 journals; accepted invitations only):  
ACS Chemical Biology; ACS Medicinal Chemistry Letters; American Journal of Human Genetics; American Journal of Pathology; American Journal of Physiology–Cell Physiology;

American Journal of Physiology–Heart and Circulatory Physiology; American Journal of Physiology–Lung, Cellular, and Molecular Physiology; American Journal of Physiology–Regulatory, Integrative and Comparative Physiology; American Journal of Respiratory and Critical Care Medicine; American Journal of Respiratory Cell and Molecular Biology; Analytical Biochemistry; Annals of Internal Medicine; Annals of Neurology; Anti-Cancer Drugs; Antioxidants & Redox Signaling; Applied Immunohistochemistry & Molecular Morphology; Archives of Biochemistry and Biophysics; Arteriosclerosis, Thrombosis, and Vascular Biology; Autophagy; BBA-Clinical; BBA-Gene Structure and Expression; BBA-Molecular Cell Research; BBA-Reviews on Cancer; Biochemical Journal; Biochemical Pharmacology; Biochemistry; Biochimica et Biophysica Acta; Bioessays; Biology of Reproduction; Biology of the Cell; Bioorganic and Medicinal Chemistry; Blood; BMC Bioinformatics; BMC Cancer; BMC Cell Biology; Brain; Brain Research; Breast Cancer Research; British Journal of Cancer; British Journal of Clinical Pharmacology; British Journal of Pharmacology; Cancer; Cancer Biology and Therapy; Cancer Cell; Cancer Cell International; Cancer Discovery; Cancer Epidemiology Biomarkers and Prevention; Cancer Immunology Research; Cancer Letters; Cancer Research; Cancer Science; Cancers; Carcinogenesis; Cardiovascular Drugs and Therapy; Cardiovascular Research; Cell; Cell Communication and Signaling; Cell Cycle; Cell Death and Differentiation; Cell Death and Disease; Cell Growth and Differentiation; Cell Metabolism; Cell Reports; Cell Research; Cell Stem Cell; Cellular and Molecular Biology; Cellular and Molecular Life Sciences; Cellular Physiology and Biochemistry; Cell Stem Cell; Circulation; Circulation: Cardiovascular Genetics; Circulation Research; Clinical Cancer Research; Clinical Science; Critical Reviews in Oncology/Hematology; Current Biology; Cytokine; Development; Developmental Cell; eLife; EMBO Journal; EMBO Reports; Emerging Therapeutic Targets; European Journal of Biochemistry; European Journal of Cancer; European Journal of Cell Biology; European Journal of Dermatology; European Journal of Pharmacology; European Respiratory Journal; Experimental Biology and Medicine; Experimental Cell Research; Experimental Eye Research; Experimental Hematology; Experimental Physiology; Expert Opinion on Therapeutic Patents; FASEB Journal; FEBS Letters; Free Radical Biology and Medicine; Future Microbiology; Gastroenterology; Gene; Gene Therapy; Genes & Development; Genome Biology; Genome Research; Genomics; Haematologica; Hepatology; High Altitude Medicine and Biology; Human Genetics; Human Immunology; Human Mutation; Hypertension; Immunity; Intensive Care Medicine; International Journal of Biochemistry & Cell Biology; International Journal of Cancer; International Journal of Cardiology; International Journal of Gynecological Cancer; International Journal of Molecular Sciences; International Journal of Radiation Oncology, Biology, and Physics; IUBMB Life; Journal of the American College of Cardiology; Journal of the American Medical Association; Journal of the American Society of Nephrology; Journal of Applied Physiology; Journal of Biological Chemistry; Journal of Cancer Research and Clinical Oncology; Journal of Carcinogenesis and Mutagenesis; Journal of Cardiac Failure; Journal of Cell Biology; Journal of Cell Science; Journal of Cellular Physiology; Journal of Cerebral Blood Flow and Metabolism; Journal of Clinical Investigation; Journal of Clinical Pathology; Journal of Dental Research; Journal of Endocrinology; Journal of Experimental Medicine; Journal of General Physiology; Journal of Histochemistry & Cytochemistry; Journal of Investigative Dermatology; Journal of Laboratory and Clinical Medicine; Journal of Molecular and Cellular Cardiology; Journal of Molecular Medicine; Journal of the National Cancer Institute; Journal of Neurochemistry; Journal of Neuroscience; Journal of Pathology; Journal of Vascular Research;

Kidney International; Lancet; Lancet Oncology; Liver International; Molecular and Cellular Biology; Molecular and Cellular Neuroscience; Molecular Biology of the Cell; Molecular Brain Research; Molecular Cancer; Molecular Cancer Research; Molecular Cancer Therapeutics; Molecular Carcinogenesis; Molecular Cell; Molecular Genetics and Metabolism; Molecular Medicine Today; Molecular Oncology; Molecular Pharmacology; Molecular Therapy; Nature; Nature Biotechnology; Nature Cell Biology; Nature Chemical Biology; Nature Communications; Nature Genetics; Nature Insight; Nature Medicine; Nature Reviews Cancer; Nature Reviews Drug Discovery; Nature Reviews Molecular Cell Biology; Nature Reviews Immunology; Neuro-Oncology; Neuroscience Letters; New England Journal of Medicine; Nucleic Acids Research; Oncogene; Oncology; Pediatric Research; Physiological and Biochemical Zoology; Physiological Genomics; Physiological Reviews; Physiology; Pigment Cell and Melanoma Research; PLoS Biology; PLoS Medicine; PLoS ONE; Proceedings of the National Academy of Sciences USA; Proteomics; Respiratory Physiology & Neurobiology; Respiratory Research; Science; Science Immunology; Science Signaling; Science Translational Medicine; Science's STKE; Scientific Reports; SpringerPlus; Stem Cells; Stem Cells and Development; Stroke; Targeted Oncology; Teratology; The Prostate; Thrombosis and Haemostasis; Translational Oncology; Trends in Biochemical Sciences; Trends in Cell Biology; Trends in Cardiovascular Medicine; Trends in Endocrinology and Metabolism; Trends in Molecular Medicine; Trends in Pharmacological Sciences; Tumor Biology.

## **CLINICAL ACTIVITIES**

### **Certification:**

- 1992 Founding Fellow of the American College of Medical Genetics
- 1990 Licensed Physician, State of Maryland
- 1990 Diplomate of American Board of Medical Genetics (Lifetime Certificate Holder)
- 1989 Diplomate of the American Board of Pediatrics
- 1985 Diplomate of the National Board of Medical Examiners

## **ORGANIZATIONAL ACTIVITIES**

### **Institutional Administrative Appointments (Johns Hopkins University)**

Founding Director, Vascular Program, Institute for Cell Engineering, 2003-present

Member, Institutional Stem Cell Research Oversight Committee, 2008-present

Member, Johns Hopkins Medicine Research Council, 2014-present

Member, Admissions Committee, Human Genetics and Molecular Biology Graduate Program, 2014-present

Member, Appointments and Promotions Committee, Department of Radiation Oncology and Molecular Radiation Sciences, 2004-present

Member, Committee on Faculty Advancement, Institute of Genetic Medicine, 2001-present

Member, Young Investigators' Day Awards Committee, 2007-2009

Founding Director, Johns Hopkins Center for Innovative Wound Healing Research, 2006-2011

Member, Johns Hopkins University Animal Care and Use Committee, 2000-2011

Member, JHU Task Force on Molecular Imaging, 2002-2004

Member, Committee on Faculty Recruitment, Institute of Genetic Medicine, 2001-2004

Member, Curriculum Committee, Predoctoral Training Program in Human Genetics and Molecular Biology, 2002

Assistant Director, JHU Center for Craniofacial Development and Disorders, 1999-2004

Subcommittee member, JHU Professorial Promotions Committee, 2001-2002, 2007-2008, 2009, 2012, 2014, 2016

### **Professional Society Elections/Participation:**

Fellow of the Society for Redox Biology and Medicine (elected 2017)

National Academy of Medicine (formerly, Institute of Medicine; elected 2012)

National Academy of Sciences USA (elected 2008). Member, Class IV Temporary Nominating Group (2011-present)

Association of American Physicians (elected 2008)

American Society for Clinical Investigation (elected 1995)

American College of Medical Genetics (elected 1993 as a founding fellow)

Society for Pediatric Research (elected 1991); reviewer and moderator for annual meeting; E. Mead Johnson Award Committee member (2006-2009) and chair (2008-2009)

American Association for Cancer Research, Annual Meeting Program Committee (2005, 2010, 2013), Education Committee (2012)

American Society of Human Genetics, reviewer and moderator for annual meeting; symposium organizer and moderator (1997); symposium participant (2001)

American Heart Association, reviewer for annual meeting (2001)

### **Advisory Committees/Review Groups:**

Ad Hoc Grant Reviewer (1993-present): Alaska-INBRE, Alliance for Cancer Gene Therapy, Arizona Biomedical Research Commission, Arthritis Research Campaign (UK), Association for International Cancer Research, Austrian Science Fund, Dutch Cancer Society, Florida Department of Health, Foundation against Cancer (Belgium), Genesis Oncology Trust (NZ), Health Research Board of Ireland, Israel Science Foundation, Medical Research Council (UK), Michael Smith Foundation for Health Research (Canada), Istituto Toscano Tumori, National Health and Medical Research Council (Australia), NIH Molecular Biology Study Section, NIH Myocardial Ischemia and Metabolism IRG, NIH Pathology-A Study Section, NSF Biochemical Genetics Program, Pennsylvania Department of Health, Research Grants Council of Hong Kong, Singapore National Medical Research Council, Swiss National Science Foundation, Veterans Administration Merit Review Board, and Wellcome Trust (UK).

Member, Pathobiology-2 Review Panel, USAMRMC Breast Cancer Research Program, 1999

Member, Site Visit and Special Emphasis Panel, NIGMS, 2000

Ad Hoc Member, Hematology-I NIH Study Section, 2000

Member, NIH Special Emphasis Panel, NHLBI RFA HL-00-004, 2000

Member, NIH Special Emphasis Panel, NICHD/NIEHS RFA HD-99-008, 2000

Member, NIH Special Emphasis Panel, ZRG1 CONC (2), 2001

Member, NIH Special Emphasis Panel, ZHD1-DSR-R-011, 2001

Member, NHLBI Vascular Program Project Review, 2002

Ad Hoc Member, NIH Myocardial Ischemia and Metabolism IRG, 2004

Preferred Reviewer, Italian Association for Cancer Research (AIRC), 2006-2012

### **Consultancies and Advisory Board Memberships:**

Consultant, Akebia, 2018

Tumor Hypoxia Steering Committee Member, EMD-Serono, 2015

Consultant, Santaris Pharma, 2014

Scientific Advisory Board Member, Vesalius Research Center, University of Leuven, 2013

Consultant, Cerulean Pharmaceutical Corp., 2012-2013

Consultant, Aveo Pharmaceuticals, 2009

Consultant, AMAG Pharmaceuticals, 2009

Scientific Advisory Board Member, Cornerstone Pharmaceuticals, 2008-present

Consultant, GlaxoSmithKline, 2008-2009

Consultant, GeneBlue Corporation, 2007

Consultant, Merck and Company, 2006

Consultant, EntreMed Inc., 2005

Advisory Board Member, Novartis Pharmaceuticals, 2005

Advisory Board Member, Johnson & Johnson Pharmaceutical Services, 2005



Consultant, Cell Therapeutics Inc., 2005  
Consultant, Alnylam Pharmaceuticals, 2004  
Consultant, Threshold Pharmaceuticals, 2004  
Consultant, Corgentech, Inc., 2004  
Consultant, PTC Therapeutics, 2003  
Advisory Board Member, Dept. of Biochemistry, U. Texas Southwestern Med. Sch., 2002-2006  
Consultant, Novus Biologicals, Inc. 1999-present  
Consultant, Boehringer Ingelheim International, 1997-2003  
Consultant, Robert Wood Johnson Pharmaceutical Research Institute, 1999-2001  
Consultant, Genzyme Corporation, 1998-2001  
Consultant, Procter and Gamble Pharmaceuticals, 1996-1998

## **RECOGNITION**

### **Awards/Honors:**

University of Mississippi Medical Center Physiologists in Training Distinguished Lecture, 2018  
Wilkins Visiting Professor, Dept. of Medicine, Boston University School of Medicine, 2018  
Massry Prize, 2018  
Tinsley Randolph Harrison Society Visiting Professor, Vanderbilt University Sch of Med, 2018  
Hoopes Lecturer, Dept of Plastic & Reconstructive Surgery, Johns Hopkins University, 2018  
Nelson Lecturer, University of California at Davis, 2017  
Research to Prevent Blindness Sybil B. Harrington Stein Innovation Award, 2017  
Discovery Award, Society for Redox Biology and Medicine, 2017  
Ulf van Euler Lecturer, Karolinska Institute, Stockholm, Sweden, 2017  
Albert Lasker Basic Medical Research Award, 2016  
9<sup>th</sup> Annual Jeffrey M. Isner Memorial Lecture, Tufts University School of Medicine, 2014  
Thompson Reuters Highly Cited Researcher, 2014  
Connell Memorial Lecture, Dept of Cell, Molec & Devel Biology, University of Michigan, 2014  
Wiley Prize in Biomedical Sciences, 2014  
Luis Melo Memorial Lecture, Queen's University, 2013  
Elected member, National Academy of Medicine (formerly, Institute of Medicine), 2012  
Einstein Professorship, Chinese Academy of Sciences, 2012  
Grand Prix Scientifique de la Fondation Lefoulon-Delalande, Institut de France, 2012  
3<sup>rd</sup> Marvin L. Sears Endowed Lecture, Yale University School of Medicine, 2012  
Stanley J. Korsmeyer Award, American Society of Clinical Investigation, 2012  
11<sup>th</sup> Annual Krop Lecture in Pharmacology, Georgetown University, 2012  
American Cancer Society Research Professor Award, 2011  
Research Pioneer Award, *Antioxidants & Redox Signaling*, 2010  
John T. Reeves Memorial Lecture, University of Colorado School of Medicine, 2010  
Canada Gairdner International Award, 2010  
Gilbert B. Forbes Visiting Scholar, University of Rochester, 2009  
18<sup>th</sup> Annual Pritchett Lecture in Pathology, University of Alabama, Birmingham, 2009  
21<sup>st</sup> Annual C.R. Stephen Lecture, Dept of Anesthesiology, Washington University, 2009  
C. Michael Armstrong Endowed Professorship, The Johns Hopkins University, 2008

Daniel L. Gilbert Lecture, Oxygen Club of Washington DC, 2008  
Elected member, National Academy of Sciences USA, 2008  
Elected member, Association of American Physicians, 2008  
Claude Amiel Lecture, International Society of Nephrology, Rio de Janeiro, Brazil, 2007  
Elizabeth Weitzenhoffer Blass Lecture in Cancer Genetics, University of Arkansas, 2006  
Distinguished Lecture in Cardiovascular Biology, University of Texas Southwestern, 2006  
Jacques Gielen Memorial Lecture, Cell Signaling World, Luxembourg, 2006  
Cherniack Lecture in Physiology & Pulmonary Medicine, Case Western Reserve Univ., 2005  
17<sup>th</sup> Annual Donald Ware Waddell Award, Arizona Cancer Center, 2005  
Second Annual Allan J. Erslev Memorial Lecture, Jefferson Medical College, 2005  
7<sup>th</sup> Annual Fisher Distinguished Lecture, Tulane University School of Medicine, 2003  
Chancellor's Award in Neuroscience, Louisiana State Univ. Health Sciences Center, 2002  
Nobel Forum Lecturer, Karolinska Institute, 2002  
Woznicki Lecturer in Cardiovascular Pathology & Genetics, Baylor College Medicine, 2001  
Abelson Memorial Visiting Professor, Washington University School of Medicine, 2001  
Iyengar Memorial Lecture, University of Pennsylvania School of Veterinary Medicine, 2001  
E. Mead Johnson Award for Research in Pediatrics, 2000  
Jean and Nicholas Leone Award, Children's Brain Tumor Foundation, 1999  
Students' Choice Visiting Professor, Dept. of Physiology, Med. Coll. of Wisconsin, 1998  
Elected member, American Society for Clinical Investigation, 1995  
Established Investigator Award, American Heart Association, 1994  
Elected Founding Fellow, American College of Medical Genetics, 1993  
Elected member, Society for Pediatric Research, 1991  
Lucille P. Markey Scholar Award in Biomedical Science, 1989  
Elected member, Alpha Omega Alpha Honor Medical Society, 1981

**Invited Lectures (accepted invitations only):**

International Meetings/Symposia/Workshops, 1990-2018

- 48<sup>th</sup> International Symposium of the Princess Takamatsu Cancer Research Fund, Tokyo, 2017
- Gordon Conference on Angiogenesis, Newport RI, 2017 (Keynote)
- XXth Meeting, International Society for Arterial Chemoreception, Baltimore, 2017 (Keynote)
- Symposium on High Altitude Medicine, Xining, China, 2017
- ATS2017, American Thoracic Society, Washington DC, 2017
- Keystone Symposium on Hypoxia, Whistler BC, Canada, 2017
- Pulmonary Vascular Research Institute 11<sup>th</sup> Annual World Congress (Keynote) Miami, 2017
- Society for Redox Biology and Medicine, San Francisco CA, 2016 (Keynote)
- American Cancer Society-Jiler Professors and Fellows Conference, Salt Lake City UT, 2016
- International Society on Oxygen Transport to Tissue, Chicago IL, 2016 (Keynote)
- Canada Gairdner Symposium: Cancer Discoveries-Molecules to Man, Edmonton AB, 2016
- Experimental Biology, San Diego CA, 2016
- Gordon Research Conference on Oxygen Radicals, Ventura CA, 2016 (Keynote)
- ARVO Education Conference: Diabetic Retinopathy, Bethesda MD, 2015 (Keynote)
- World Congress on Gastrointestinal Cancer, Barcelona, Spain, 2015
- Keystone Symposium on Hypoxia, Dublin, Ireland, 2015

- Experimental Biology 2015, Boston MA, 2015
- 19<sup>th</sup> International Hypoxia Symposium, Lake Louise, Canada, 2015
- TERMIS-AM Annual Conference, Washington DC, 2014
- Seville Molecular Medicine Workshop, Seville, Spain 2014
- Forbeck Forum on Invasion and Metastasis, Hilton Head SC, 2014
- ENDO2014 Endocrine Society Annual Meeting, Chicago IL, 2014
- 16<sup>th</sup> International Symposium on Anti-Angiogenic Therapy, La Jolla CA, 2014
- Keystone Symposium on Hypoxia, Breckenridge CO, 2014
- Gordon Research Conference on Angiogenesis, Newport RI, 2013 (Keynote)
- American Society of Clinical Oncology, Chicago IL, 2013
- American Physiological Society/Experimental Biology, Boston MA, 2013
- 18<sup>th</sup> International Hypoxia Symposium, Lake Louise, Canada, 2013
- IDIBELL Conference on Personalized Cancer Medicine, Barcelona, Spain, 2012
- Herrenhausen-Nature Medicine Symposium on Metastasis, Kloster Seeon, Germany, 2012
- Gordon Res. Conference on Endothelial Cells, Castelvecchio Pascoli, Italy, 2012 (Keynote)
- Cell Symposia: Angiogenesis, Metabolic Regulation, Cancer Biology, Leuven, Belgium, 2012
- 33<sup>rd</sup> Naito Conference: Oxygen Biology, Sapporo, Japan, 2012
- Korean Society for Biochemistry and Molecular Biology, Seoul, S. Korea 2012
- American Society for Clinical Investigation, Chicago IL, 2012
- American Association for Cancer Research Annual Meeting, Chicago IL, 2012
- Keystone Symposia on Hypoxia & Cancer Metabolism, Banff Canada, 2012
- Keystone Symposium on Angiogenesis, Snowbird UT, 2012 (Keynote)
- San Antonio Breast Cancer Symposium, San Antonio TX, 2011
- American College of Veterinary Pathology Annual Meeting, Nashville TN, 2011
- AACR Meeting on Metabolism and Cancer, Baltimore MD, 2011
- European Society for Microcirculation, Munich, Germany, 2011 (Keynote)
- American Chemical Society, Denver CO, 2011
- International Society for Arterial Chemoreception, Hamilton, Canada, 2011 (Keynote Speaker)
- Champalimaud Foundation Cancer Symposium, Lisbon, Portugal, 2011
- Genes & Cancer, Warwick University, UK, 2010 (Keynote Speaker)
- Cancer & Metabolism: Pathways to the Future, Edinburgh, Scotland, 2010
- Wound Healing Society 2010 Annual Meeting, Orlando FL, 2010
- Keystone Symposium on Hypoxia, Keystone CO, 2010 (Keynote)
- Japanese Association for Cancer and Hypoxia Research Symposium, Kyoto, Japan, 2009
- The Energy of Cancer, Spanish National Cancer Research Centre, Madrid, Spain, 2009
- 5<sup>th</sup> International Conference on Tumor Cell Metabolism, Louisville KY, 2009
- National Cancer Research Institute NCRI Cancer Conference, Birmingham, UK, 2009
- European Cancer Organization ECCO 15 – ESMO 34 Congress, Berlin, Germany, 2009
- AACR Metabolism and Cancer Special Conference, La Jolla, CA, 2009
- Society for Heart and Vascular Metabolism 7<sup>th</sup> Annual Scientific Sessions, Padua Italy, 2009
- Physiology 2009 (Annual Meeting of The Physiological Society [UK]), Dublin Ireland, 2009
- New York Academy of Sciences: Hypoxia and Consequences, New York NY, 2009
- 25<sup>th</sup> Annual Meeting Internatl Society for Heart Research, Japanese Section, Yokohama 2008
- Oxygen Sensing in the Vascular Tree, Fondation Ipsen, Paris, France, 2008
- Stems of the Heart: Myocardial and Vascular Rebirth, Cambridge MA, 2008
- Workshop: Biology of Signaling in the Cardiovascular System, Hyannis MA, 2008

- American Society of Bone and Mineral Research Annual Meeting, Montreal, Canada, 2008
- Teratology Society 48<sup>th</sup> Annual Meeting, Monterey CA, 2008
- 11th Beatson International Cancer Conference, Glasgow, Scotland, 2008
- American Society of Clinical Oncology 2008 Annual Meeting, Chicago IL, 2008
- American Association for Cancer Research, San Diego CA, 2008
- Fondation Ipsen Symposium on Metabolism and Cancer, Costa Rica, 2007
- Keystone Symposium on Hypoxia, Vancouver, Canada, 2008 (Meeting organizer)
- American Heart Association Scientific Sessions 2007, Orlando FL, 2007
- Paget Foundation Symposium: Skeletal Complications of Malignancy, Philadelphia PA, 2007
- 19<sup>th</sup> Annual Usha Mahajani Symposium on Molecular Medicine, La Jolla CA, 2007
- 33<sup>rd</sup> Annual Meeting of Korean Cancer Association, Seoul, Korea, 2007 (Plenary Lecture)
- Experimental Biology 2007, Washington, DC, 2007 (Symposium organizer)
- 2007 World Congress of Nephrology, Rio de Janeiro, Brazil, 2007 (Plenary Lecture)
- American Association for Cancer Research 98<sup>th</sup> Annual Meeting, Los Angeles CA, 2007
- 2006 Radiation Research Society Annual Meeting, Philadelphia PA, 2006
- From Oxygen Sensing to Heart Failure, National Institutes of Health, Bethesda MD, 2006
- Gordon Res. Conf.: Endothelial Cell Phenotypes in Health and Disease, Biddeford ME, 2006
- 20<sup>th</sup> IUBMB Internat'l Congress of Biochemistry & Molecular Biology, Kyoto, Japan, 2006
- IUBMB Satellite Symposium: Frontiers in Redox Sciences, Kyoto, Japan, 2006
- Keystone Symposium, Metabolomics, Snowbird, UT, 2006
- Experimental Biology 2006, San Francisco, CA, 2006
- Signal Transduction Pathways as Therapeutic Targets, Luxembourg, 2006 (Keynote speaker)
- Keystone Symposium, Biology of Hypoxia, Breckenridge CO, 2006
- Targeted Therapies for Treatment of Head and Neck Cancer Conf., Key Biscayne FL, 2006
- American Society of Nephrology 38<sup>th</sup> Annual Meeting, Philadelphia PA, 2005
- Second International Tumor Metabolism Summit: Exploiting the Tumor Microenvironment for Therapeutics, Genoa, Italy, 2005 (Meeting co-organizer)
- Basic Helix-Loop-Helix Genes: Regulators of Normal Development and Indicators of Malignant Transformation, Rome, Italy, 2005
- First ARVO/Pfizer Ophthalmics Research Institute Symposium, Ft. Lauderdale FL, 2005
- American Association for Cancer Research 96<sup>th</sup> Annual Meeting, Anaheim CA, 2005
- XXXV International Congress of Physiological Sciences, San Diego CA, 2005
- 7th International Symposium on Anti-Angiogenic Agents: Recent Advances and Future Directions in Cell Biology and Clinical Research, La Jolla CA, 2005
- Novartis Found Symp: Signaling Pathways in Acute Oxygen Sensing, London, UK, 2005
- 41st Nobel Conference: Oxygen Biology, Stockholm, Sweden, 2004
- American Society of Nephrology Research Conference: Vascular Biology, St. Louis, 2004
- 1st Annual Symposium of the American Heart Association Council on Basic Cardio-vascular Sciences: Stress Signals, Molecular Targets and the Genome, Stevenson WA, 2004
- Aspen Lung Conference (State-of-the-Art Speaker), Aspen CO, 2004
- NIH Trans-Institute Angiogenesis Research Program Workshop, Towson MD, 2004
- AstraZenica COPD Symposium, Lund, Sweden, 2004
- NCI US/Japan Cancer Therapeutics Meeting, Bethesda MD, 2004
- 6<sup>th</sup> International Symposium on Anti-Angiogenic Agents, San Diego CA, 2004
- Keystone Symposium, Biology of Hypoxia, Steamboat Springs CO, 2004
- American Association for Cancer Research Annual Meeting, Orlando FL, 2004

- National Cancer Institute Hypoxia Imaging Workshop, Phoenix AZ, 2004
- American Heart Association Annual Meeting, Orlando FL, 2003
- Oxygen and the Cell, Berlin, Germany, 2003
- American Heart Association Scientific Conference on Molecular Mechanisms of Growth, Death, and Regeneration in the Myocardium, Snowbird, UT, 2003
- CTEP/DTP/NCI Critical Molecular Pathways Retreat, Queenstown, MD, 2003
- American Transplant Congress, Washington DC, 2003
- American Thoracic Society International Conference, Seattle, WA, 2003
- Symposium on Advanced Wound Care, Las Vegas, NV, 2003
- CTEP/DTP/NCI Oxygen Homeostasis/Hypoxia Working Group, Arlington, VA, 2003
- 5<sup>th</sup> International Symposium on Anti-Angiogenic Agents, San Diego, CA, 2003
- Gordon Research Conference: Radiation Oncology, Ventura, CA, 2003
- American Society of Nephrology Annual Meeting, Philadelphia, PA, 2002
- 66<sup>th</sup> American College of Rheumatology Annual Meeting, New Orleans, LA, 2002
- Wound Healing: Oxygen and Emerging Therapeutics, Columbus, OH, 2002
- Wound Healing Society/European Society of Tissue Repair Meeting, Baltimore, MD, 2002
- 11<sup>th</sup> Cancer Res Inst Symp, Seoul Natl Univ College of Medicine, Seoul, S. Korea, 2002
- 26<sup>th</sup> UNC-Lineberger Comprehensive Cancer Center Symposium, Chapel Hill, NC, 2002
- American Heart Association International Stroke Conference, San Antonio, TX, 2002
- Cell Signaling, Transcription, and Translation as Therapeutic Targets, Luxembourg, 2002.
- 4<sup>th</sup> International Symposium on Anti-Angiogenic Agents, Dallas, TX, 2002.
- UCSD-Salk-Nature Med Symposium: Days of Molecular Medicine, La Jolla, CA, 2002.
- First International Conference on Tumor Cell Metabolism, Point Clear, AL, 2001.
- American Society for Human Genetics 51<sup>st</sup> Annual Meeting, San Diego, CA, 2001.
- International Society on Oxygen Transport to Tissue, Philadelphia, PA, 2001.
- Gordon Conf: Chemotherapy of Experimental & Clinical Cancer, New London, NH, 2001.
- Angiogenesis and Direct Myocardial Revascularization, Washington, DC, 2001.
- Keystone Symposium: Hematopoiesis, Whistler, British Columbia, 2001.
- Keystone Symposium: Angiogenesis and Chronic Diseases, Keystone, CO, 2001.
- AHA Scientific Conference on Therapeutic Angiogenesis, Santa Fe, NM, 2001.
- 11<sup>th</sup> NCI-EORTC-AACR Symposia on New Drugs in Cancer Therapy, Amsterdam, 2000.
- Novartis Foundation Symposium on the Tumor Microenvironment: Causes and Consequences of Hypoxia and Acidity, London, UK, 2000.
- American Society for Pharmacology and Experimental Therapeutics, Boston, MA, 2000.
- Federation of European Physiological Sciences Symposium: Hypoxia and its Role in Angiogenesis, Ascona, Switzerland, 2000.
- NIEHS Symposium: PAS Proteins, Research Triangle Park, NC, 2000.
- Society for Gynecologic Investigation, Chicago, IL, 2000.
- CTEP Drug Development Meeting, National Cancer Institute, Bethesda, MD, 2000.
- Heart Failure Society America, San Francisco, CA (State-of-the-Science Speaker), 1999.
- Rockefeller University Symposium: Controlling Red Cell Production, New York, 1999.
- Gordon Research Conference: Atherosclerosis, Meriden, NH, 1999.
- American Physiological Society: Experimental Biology '99, Washington, DC, 1999.
- Biochemical Pharmacology Symp: Redox-Controlled Gene Regulation, Oxford, UK, 1999.
- Oxygen Sensing: Molecule to Man, Philadelphia, PA (session chairman), 1999.
- Keystone Symposium: Inflammatory Paradigms & the Vasculature, Santa Fe, NM, 1999.

- Gordon Research Conference: Radiation Oncology, Ventura, CA, 1999.
- AACR Special Conference: Gene Regulation and Cancer, Hot Springs, VA, 1998.
- Banbury Conference: Integrating Cellular Stress Responses, Cold Spring Harbor, 1998.
- NHLBI/ATS Workshop: Molecular and Genomic Effects of Tissue Oxygen Deprivation in Sleep Apnea, Bethesda, MD, 1998.
- III International Congress of Pathophysiology (NY Academy Sciences Symposium: Heart in Stress), Lahti, Finland, 1998.
- Radiation Research Society, Louisville, KY (Presidential Symposium), 1998.
- American Physiological Society: Experimental Biology '98, San Francisco, CA, 1998.
- Thomas L. Petty Aspen Lung Conference, Aspen, CO (State-of-the-Art Speaker), 1997.
- American Thoracic Society, San Francisco, CA, 1997.
- Keio University International Symposium for Life Sciences and Medicine: Oxygen Homeostasis and Its Dynamics, Tokyo, Japan (session chairman), 1996.
- American Heart Association 69th Scientific Sessions, New Orleans, LA, 1996.
- Gordon Research Conference: Mechanisms of Toxicity, Henniker, NH, 1996.
- International Society of Nephrology Forefront Symposium: Oxygen Sensing on the Cellular and Molecular Level, Regensburg, Germany, 1996.
- Gordon Research Conference: Red Cells, Plymouth, NH, 1995.
- Third Annual Lung Cell Biology Symposium at Woods Hole: Oxygen as a Regulator of Cell Function, Woods Hole, MA, 1993.
- NY Academy of Sciences International Workshop on the Molecular, Cellular, and Developmental Biology of Erythropoietin and Erythropoiesis, Irsee, Germany, 1993.
- Eighth International Hypoxia Symposium, Lake Louise, Canada, 1993.
- 4th International Workshop on the Molecular Physiology and Clinical Applications of rhEPO, Luzerne, Switzerland (session chairman), 1992.
- International Workshop Series Biology of Kidney: Biogenesis of Erythropoietin, Paris, 1990.

#### Invited Grand Rounds, Seminars, and Symposia, 1994-2018

- 2018 University of Mississippi Medical Center Physiologists in Training Distinguished Lecture
- 2018 Department of Medicine, Boston University School of Medicine, Boston MA
- 2018 Dept of Medicine Grand Rounds, Vanderbilt Univ School of Medicine, Nashville TN
- 2018 Dept of Pediatrics Research Symp, Univ of California, San Diego (Keynote Speaker)
- 2018 Hoopes Lecture, Dept Plastic/Reconstructive Surgery, Johns Hopkins Univ Sch Med
- 2018 Translational Research Conference, Johns Hopkins-Kimmel Cancer Center, Baltimore
- 2017 Ulf von Euler Lecture, Karolinska Institute, Stockholm, Sweden
- 2017 Symposium on Anti-Hypoxia-Adenosinergic Immunotherapies of Cancer, Boston MA
- 2017 Penn/CHOP Blood Center, Philadelphia PA
- 2017 Johns Hopkins Pediatric Pulmonary Division Grand Rounds, Baltimore MD
- 2017 Symposium in Honor of Stylianos Antonarakis, University of Geneva, Switzerland
- 2017 Beijing Institute of Genomics, Chinese Academy of Sciences, Beijing, China
- 2017 NHLBI K12 Clinical Hematology Research Scholars National Symposium, Baltimore
- 2017 Lectures in Life Sciences, Northwestern University, Chicago IL
- 2017 Johns Hopkins Postdoctoral Association Retreat, Baltimore MD (Keynote Speaker)
- 2017 215<sup>th</sup> Meeting of the Interurban Clinical Club, Baltimore MD
- 2017 Department of Pathology, University of Texas Southwestern Medical School, Dallas TX

2016 11<sup>th</sup> Annual Johns Hopkins Bayview Research Symposium, Baltimore MD  
 2016 Distinguished Lecture Series in Medicine, Stony Brook University, Stony Brook NY  
 2016 Department of Medicine Grand Rounds, University of Chicago, Chicago IL  
 2016 Dean's Lecture Series on Research Integrity, Johns Hopkins Univ. School of Medicine  
 2015 American Cancer Society Laureate Society Lecture, Palm Beach FL  
 2015 Benning Society Lecture, University of Utah School of Medicine, Salt Lake City UT  
 2015 Institute for Cancer Genetics, Columbia University, New York NY  
 2015 Pathology Research Day, University of Rochester (Keynote Speaker)  
 2015 Short Course in Medical and Experimental Mammalian Genetics, Bar Harbor ME  
 2015 Biology of Cancer Course, Johns Hopkins University School of Medicine  
 2015 Nephrology Grand Rounds, North Shore-Long Island Jewish Med Ctr, Great Neck NY  
 2014 9<sup>th</sup> Annual Jeffrey M. Isner Memorial Lecture, Tufts Univ. Sch. of Med., Boston MA  
 2014 17<sup>th</sup> Annual John B. Little Symposium, Harvard School of Public Health, Boston MA  
 2014 Department of Cancer Biology, University of Chicago School of Medicine, Chicago IL  
 2014 Department of Biomedical Engineering Distinguished Lecture, Johns Hopkins University  
 2014 Connell Memorial Lecture, Dept of Cell, Molec & Devel Biology, Univ. of Michigan  
 2014 Dept of Pathology, Anatomy, and Cell Biology, Jefferson Medical College, Philadelphia  
 2014 Short Course in Medical and Experimental Mammalian Genetics, Bar Harbor ME  
 2013 9<sup>th</sup> Annual Symposium on Translational Research, Univ of Maryland, Baltimore MD  
 2013 Cardiac, Circulatory, and Respiratory Program, Queen's Univ., Kingston ON, Canada  
 2013 Musculoskeletal Research Symposium, Johns Hopkins University School of Medicine  
 2013 Internal Medicine Grand Rounds, University of Michigan, Ann Arbor MI  
 2013 Pediatrics Grand Rounds, Johns Hopkins University School of Medicine (JHUSOM)  
 2013 Short Course in Medical and Experimental Mammalian Genetics, Bar Harbor ME  
 2012 Graduate Student Association, Johns Hopkins University School of Medicine  
 2012 Laureate Lecture, University of Pittsburgh School of Medicine, Pittsburgh PA  
 2012 18<sup>th</sup> Annual Penn State Hershey Cancer Institute Symposium, Hershey PA  
 2012 Department of Pathology, New York University, New York NY  
 2012 Max Delbruck Center for Molecular Medicine, Berlin, Germany  
 2012 Department of Experimental Pathology, University of Pisa, Pisa, Italy  
 2012 Short Course in Medical and Experimental Mammalian Genetics, Bar Harbor ME  
 2012 Institute of Biochemistry and Cell Biology, Shanghai Institute for Biological Sciences  
 2012 School of Life Science, University of Science and Technology of China, Hefei, China  
 2012 Biomedicum Helsinki, Helsinki, Finland  
 2012 Kyung Hee University Medical School, Seoul, Korea  
 2012 Department of Biological Sciences, Seoul National University, Seoul, Korea  
 2012 Department of Ophthalmology, Yale University School of Medicine, New Haven CT  
 2012 ME.510.701, New Approaches to Cancer Prevention and Therapy, JHUSOM  
 2012 Cardiovascular Basic Science Seminar Series, Texas Heart Institute, Houston TX  
 2012 Biophysics 250: Introduction to Biomedical Research, Johns Hopkins University  
 2012 Interurban Clinical Club, 205<sup>th</sup> Meeting, Baltimore MD  
 2012 Department of Pharmacology, Georgetown University, Washington DC  
 2011 Department of Pediatrics, University of California, San Diego  
 2011 Department of Anesthesiology, Univ of Colorado Health Sciences Ctr, Denver CO  
 2011 Gairdner Lecture, University of Alberta, Edmonton, Canada  
 2011 Gairdner Lecture, University of Calgary, Calgary, Canada

2011 Department of Biochemistry, Univ of Texas Southwestern Med Ctr, Dallas TX  
2011 Pulmonary Division, Department of Pediatrics, Johns Hopkins Univ Sch of Medicine  
2011 Istituto Clinico Humanitas, Milan, Italy  
2011 Universita di Roma "Sapienza", Rome, Italy  
2011 Department of Pharmacology and Cancer Biology, Duke Univ Med Ctr, Durham NC  
2011 Short Course in Medical and Experimental Mammalian Genetics, Bar Harbor ME  
2010 John T. Reeves Lecture, University of Colorado School of Medicine  
2010 Gairdner Award Lecture, University of Toronto, Toronto, Canada  
2010 Gairdner Lecture, University of Guelph, Guelph, Canada  
2010 Gairdner Lecture, York University, Toronto, Canada  
2010 Gairdner Lecture, University of Ottawa Faculty of Medicine, Ottawa ON, Canada  
2010 Neil S. Cherniack Memorial Symposium, Case Western Reserve Univ, Cleveland OH  
2010 Winship Cancer Center, Emory University, Atlanta GA  
2010 Keynote Speaker, 2010 Breast SPORE Roundtable Meeting, National Cancer Institute  
2010 Hematology/Oncology Translational Grand Rounds, Northwestern University Sch Med  
2010 First Annual NCI Physical Sciences-Oncology Network Investigators Meeting  
2010 Lillehei Heart Institute, University of Minnesota Medical School, Minneapolis  
2010 Translational Research Conference, Johns Hopkins Kimmel Comprehensive Cancer Ctr  
2010 Tools & Technologies for Bottlenecks in Stem Cell Research, MD Stem Cell Res Fdn  
2010 Department of Biochemistry and Molecular Biology, Johns Hopkins Sch of Public Health  
2010 Center for Vascular and Inflammatory Diseases, University of Maryland at Baltimore  
2010 Department of Nutritional Science and Toxicology, University of California, Berkeley  
2010 Radiation Oncology Grand Rounds, Johns Hopkins University School of Medicine  
2010 Short Course in Medical & Experimental Mammalian Genetics, The Jackson Laboratory  
2009 Global COE Program "Meet the Professor", Keio University, Tokyo, Japan  
2009 AVEO Pharmaceuticals, Cambridge MA  
2009 Han-Mo Koo Memorial Seminar Series, Van Andel Research Institute, Grand Rapids MI  
2009 AMAG Pharmaceuticals, Lexington MA  
2009 Distinguished Scientist Seminar Series, National Cancer Institute, Frederick MD  
2009 Departments of Medicine and Pediatrics, University of Rochester  
2009 Department of Cancer Biology, Roswell Park Cancer Institute, Buffalo NY  
2009 Keynote Speaker, Cardiovascular Research Day, University of Chicago  
2009 Department of Pharmacology, University of Illinois, Chicago  
2009 Department of Physiology and Biophysics Symposium, Case Western Reserve Univ.  
2009 Carnegie Institution for Science Symposium: Cellular Strategies for Stress Response  
2009 Department of Anesthesiology, Washington University, St. Louis  
2009 Signaling Cell Cycle Series, Siteman Cancer Center, Washington University, St. Louis  
2009 Department of Pathology, University of Alabama at Birmingham  
2009 Indiana University Center for Vascular Biology and Medicine, Indianapolis IN  
2009 GlaxoSmithKline, King of Prussia PA  
2009 Department of Pathology, Medical University of South Carolina, Charleston SC  
2009 Department of Anesthesia and Critical Care Medicine, Johns Hopkins University  
2009 Short Course in Medical & Experimental Mammalian Genetics, The Jackson Laboratory  
2009 McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins Univ Sch of Medicine  
2008 Hematology Grand Rounds, Johns Hopkins University School of Medicine  
2008 Hamner Institutes for Health Sciences, Research Triangle Park NC



2008 McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins Univ Sch of Medicine  
 2008 GlaxoSmithKline, Collegeville PA  
 2008 Department of Pharmacology, Weill Medical College of Cornell University  
 2008 Department of Pathology, University of Utah  
 2008 Lankenau Medical Research Institute, Wynnewood PA  
 2008 McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins University  
 2008 Radiation Oncology Grand Rounds, Johns Hopkins University School of Medicine  
 2008 Merck Research Laboratories, Boston MA  
 2007 Frontiers in Pharmacology Seminar Series, University of Wisconsin, Madison WI  
 2007 Merck Research Laboratories, Rahway NJ  
 2007 Division of Biological Sciences Seminar Series, University of California, San Diego  
 2007 Department of Pediatrics Grand Rounds, Rady Children's Hospital, San Diego  
 2007 Translational Research Conference, Kimmel Cancer Center at Johns Hopkins  
 2007 Vascular Medicine Research Initiative, Johns Hopkins University  
 2007 Cancer and Developmental Biology Seminar Series, Univ. of Kansas Medical Center  
 2007 Institute of Molecular Medicine, Thomas Jefferson University, Philadelphia PA  
 2007 Division of Renal Medicine, Johns Hopkins Bayview Medical Center  
 2007 McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins University  
 2007 Hematology Grand Rounds, Johns Hopkins University School of Medicine  
 2007 In Vivo Cellular and Molecular Imaging Center, Johns Hopkins University  
 2007 Department of Pathology, New York University  
 2006 New York Society of Nephrology, New York NY  
 2006 Pathology Grand Rounds, Johns Hopkins University School of Medicine  
 2006 Arkansas Cancer Research Center, Little Rock AR  
 2006 Division of Cardiology, University of Texas Southwestern Medical Center, Dallas TX  
 2006 Department of Cellular and Molecular Physiology, Yale University, New Haven CT  
 2006 Department of Radiation Oncology, Johns Hopkins University School of Medicine  
 2006 Biomedicum Helsinki, Helsinki, Finland  
 2006 Merck Research Laboratories, Rahway, NJ  
 2005 Department of Physiology, Yale University School of Medicine  
 2005 Neonatology Research Conference, Johns Hopkins University School of Medicine  
 2005 Program in Stem Cell Biology and Regenerative Medicine, University of Florida  
 2005 Department of Pathology, Beth Israel-Deaconess Medical Center, Boston  
 2005 Cancer Center Blood Club, Case Western Reserve University  
 2005 Department of Physiology, Case Western Reserve University  
 2005 Drug Discovery and Development Series, National Cancer Institute, Frederick MD  
 2005 Molecular and Human Genetics Seminar Series, Baylor College of Medicine  
 2005 17<sup>th</sup> Annual Donald Ware Waddell Award Lecture, Arizona Cancer Center  
 2005 Department of Medicine Grand Rounds, Jefferson Medical College  
 2005 Distinguished Speaker Seminar Series, Fox Chase Cancer Center  
 2004 Keck School of Medicine, University of Southern California  
 2004 Department of Pathology and Laboratory Medicine, University of Pennsylvania  
 2004 Threshold Pharmaceuticals  
 2004 Department of Surgery, Johns Hopkins University School of Medicine  
 2004 Association of Medical School Pediatric Department Chairs Annual Meeting  
 2004 Corgentech, Inc.

2004 Distinguished Speaker Seminar Series, The Wistar Institute  
2004 Department of Pharmacology, Cornell-Weill Medical College  
2003 President's Lecture Series, Memorial Sloan Kettering Cancer Center  
2003 Department of Pharmacology, Tulane University School of Medicine  
2003 Winship Cancer Institute, Emory University School of Medicine  
2003 PTC Therapeutics  
2003 Molecular Biology Institute, University of California at Los Angeles  
2003 Cardeza Foundation, Thomas Jefferson University  
2003 Moffitt Cancer Center, University of South Florida  
2002 McKusick-Nathans Institute of Genetic Medicine, The Johns Hopkins University  
2002 Center for Organogenesis, University of Michigan  
2002 Division of Pulmonary and Critical Care Medicine, The Johns Hopkins University  
2002 Neuroscience Center, Louisiana State University  
2002 Berlex Biosciences, Richmond, CA  
2002 Center for Cancer Research, National Cancer Institute  
2002 University Lecture Series, University of Texas Southwestern at Dallas  
2002 Ruttenberg Cancer Center, Mount Sinai School of Medicine  
2002 Biomedical Sciences Graduate Program, University of California, San Francisco  
2001 Department of Pediatrics, Washington University School of Medicine  
2001 School of Veterinary Medicine, University of Pennsylvania  
2001 Department of Pathology, Baylor College of Medicine  
2001 Skirball Institute, New York University  
2001 Center for Vascular Biology, University of Connecticut Health Center  
2001 Dept of Cell and Molecular Pharmacology, Medical University of South Carolina  
2000 Greenebaum Cancer Center, University of Maryland at Baltimore  
2000 Dept of Molecular Medicine, University of Texas Health Science Center San Antonio  
2000 Department of Genetics, University of Pennsylvania  
2000 Boehringer Ingelheim GmbH, Vienna, Austria  
2000 Central Society for Clinical Research Annual Meeting, Chicago IL  
1999 Department of Cell Biology, The Cleveland Clinic Foundation  
1999 Dept of Anatomy, Cell Biology, and Injury Sciences, New Jersey Medical School  
1999 Boehringer Ingelheim GmbH, Stromberg, Germany  
1999 Department of Pathology, Yale University  
1999 Genzyme Corporation, Framingham, MA  
1999 Eccles Institute of Human Genetics, University of Utah  
1999 Department of Physiology and Biophysics, Case Western Reserve University  
1999 Institute for Environmental Medicine, University of Pennsylvania  
1999 Division of Nephrology, Johns Hopkins University  
1998 Cancer Biology 251, Stanford University  
1998 Interurban Clinical Club, Baltimore MD  
1998 Department of Biochemistry, University of Chicago  
1998 Division of Hematology, New York University Medical Center  
1998 Hematology/Oncology Research Conference, Univ. of Alabama at Birmingham  
1998 Cardiovascular Research Seminar Series, St. Elizabeth's Medical Center, Boston  
1998 Department of Physiology, Medical College of Wisconsin  
1998 Department of Pediatrics, New York University Medical Center

1998 Southern Blood Club Annual Meeting, New Orleans, LA  
1997 Integrated Metabolism and Physiology Seminars, Johns Hopkins University  
1997 Department of Pediatrics, Johns Hopkins University  
1997 Department of Molecular Biology, Bender/Boehringer Ingelheim, Vienna, Austria  
1997 Department of Pharmacology & Molecular Toxicology, Univ. of Massachusetts  
1996 Department of Neuroscience, Johns Hopkins University  
1996 Department of Embryology, Carnegie Institution of Washington  
1996 Vascular Biology and Hypertension Program, Univ. of Alabama at Birmingham  
1996 Procter & Gamble Pharmaceuticals, Inc., Cincinnati, OH  
1996 Division of Hematology, New York University Medical Center  
1996 Tulane Cancer Center, Tulane University Medical Center  
1995 Oncology Center Hematopoiesis Society, Johns Hopkins University  
1995 Division of Pulmonary and Critical Care Medicine, Johns Hopkins University  
1995 Department of Cell Biology and Anatomy, Johns Hopkins University  
1995 Genetics Institute, Inc., Cambridge, MA  
1995 Graduate Program in Cell and Developmental Biology, Rutgers University  
1995 Department of Molecular Genetics, Univ. of Texas Southwestern Medical Center  
1995 Department of Cellular and Molecular Physiology, University of Cincinnati  
1994 Division of Pulmonary and Critical Care Medicine, Johns Hopkins University  
1994 Department of Pathology, Johns Hopkins University  
1994 Division of Nephrology, Johns Hopkins University