

**The Johns Hopkins University School of Medicine**

DAN E. BERKOWITZ, M.B.BCh

7/20/07

**DEMOGRAPHIC INFORMATION**

**Current Appointments**

2000-Present      Associate Professor, The Johns Hopkins University School of Medicine

**Personal Data**

Business Address	Department of Anesthesiology & Critical Care Medicine The Johns Hopkins Hospital - Tower 711 600 North Wolfe Street Baltimore, Maryland 21287-8711
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**Education/Training/Professional Experience**

1984	M.B.BCh	University of the Witwatersrand Medical School, Johannesburg, South Africa
1985		Intern, Medicine, Coronation Hospital, Johannesburg, South Africa
1986		Fellow, Human Genetics, South African Institute Medical Research
1987		Part-Time Medical Officer, Johannesburg Hospital
1987		General Practitioner/Medical Officer, Leader Union Hospital Leader, Saskatchewan, Canada
1987-1988		Research Fellow, Microbiology, Long Island Jewish Med Center
1988-1989		Intern, Medicine, Long Island Jewish Medical Center
1989-1991		Resident, Anesthesia, Duke University Medical Center
1991-1993		Fellow, Cardiac Anesthesia, Duke University Medical Center
1994-2000		Assistant Professor, Anesthesia/Critical Care Medicine, JHU School of Medicine
2000-Present		Associate Professor, The Johns Hopkins University School of Medicine

## RESEARCH ACTIVITIES

### Peer Reviewed Publications

1. **Berkowitz DE**. A study of the rational use of antibiotics in a Johannesburg Hospital. The Leech (J Univ Witwatersrand Med Sch Med Grad Assn) 1982;52:24-26.
2. Kromberg JGR, **Berkowitz DE**. Managing genetic disorders. SA Fam Pract 1986;7:279-285.
3. DeRavel TJL, **Berkowitz DE**, Wagner JM, Jenkins T. Bradydactyl type B with its distinct facies and "Cooks Syndrome" are the same entity. Clin Dysmorphol 1998;8:41-45.
4. **Berkowitz DE**, Schwinn DA. New advances in receptor pharmacology. Curr Opin Anesth 1991;4:486-496.
5. Gandhi CR, **Berkowitz DE**, Watkins WD. Endothelins: biochemistry and pathophysiologic actions. Anesthesiology 1994;80:892.
6. Price DT, Lefkowitz RJ, Caron MG, **Berkowitz DE**, Schwinn DA. Localization of mRNA for three distinct 1-adrenergic receptor subtypes in human tissues: implications for human-adrenergic physiology. Mol Pharmacol 1994;45:171-175.
7. **Berkowitz DE**, Price DT, Page SO, Schwinn DA. Localization of mRNA for three distinct  $\alpha_2$ -adrenergic receptor subtypes in human tissues: evidence for species heterogeneity and implications for human pharmacology. Anesthesiology 1994;81:1235-1244.
8. Price DT, Chari RS, **Berkowitz DE**, Meyers WC, Schwinn DA. Expression of  $\alpha_1$ -adrenergic receptor subtype mRNA in rat tissues and human SK-N-MC neuronal cells: implications for  $\alpha_1$ -adrenergic receptor subtype classification. Mol Pharmacol 1994;46:221-226.
9. **Berkowitz DE**, Nardone N, Smiley R, Price DT, Fremeau RT, Schwinn DA. The distribution of  $\beta_3$  -adrenergic receptor mRNA in human tissues. Eur J Pharmacol 1995;289:223-228.
10. Davies MG, **Berkowitz DE**, Hagen PO. Constitutive nitric oxide synthase is expressed and nitric oxide-mediated relaxation is preserved in retrieved human aortocoronary vein grafts. J Surg Res 1995;48:732-738.
11. **Berkowitz DE**, Richardson C, Elliott DA, Leslie JB, Schwinn DA. Hypotension resistant to therapy with alpha receptor agonists complicating cardiopulmonary bypass: lithium as a potential cause. Anesth Analg 1996;82:1082-1085.
12. Elbein SC, Hoffman M, Barrett K, Wegner K, Miles C, Bachman K, **Berkowitz DE**, Shuldiner AR, Leppert MF, Hasstedt S. Role of the beta-3 adrenergic receptor locus in obesity and non-insulin dependent diabetes among members of Caucasian families with a diabetic sibling pair. J Clin Endocrinol Metabol 1996;81:4422-4427.
13. Breslow MJ, An Y, **Berkowitz DE**. Beta-3 adrenergic receptor (beta-3AR) expression in leptin treated ob/ob mice. Life Sci 1997;61:59-64.
14. **Berkowitz DE**, Brown D, Lee KM, Emala C, Palmer D, An Y, Breslow M. Endotoxin-induced alteration in the expression of leptin and  $\beta_3$ -adrenergic receptor in adipose tissue. Am J Physiol 1998;274:E992-E997.
15. Breslow MJ, Min-Lee K, Brown DR, Chacko VP, Palmer D, **Berkowitz DE**. Effect of leptin deficiency on metabolic rate in ob/ob mice. Am J Physiol 1999;276:E443-E449.

16. O'Donnell CP, Schaub CD, Haines AS, **Berkowitz DE**, Tankersley C, Schwartz AR, Smith PL. Leptin prevents respiratory depression in obesity. Am J Resp Crit Care Med 1999;159:1477-1484.
17. **Berkowitz DE**. Molecular biology in cardiovascular anesthesiology: the brave new frontier. J Cardiothor Vasc Anesth 1999;13:744-751.
18. Nyhan D, Gaine S, Hales M, Zanaboni P, Simon B, **Berkowitz D**, Flavahan N. Pulmonary vascular endothelial responses are altered following cardiopulmonary bypass. J Cardiovasc Pharm 1999;34:518-525.
19. Rudner XL, **Berkowitz DE**, Booth JV, Funk BL, Cozart KL, D'Amico EB, El-Moalem H, Page SO, Richardson CD, Winters B, Marucci L, Schwinn DA. Subtype specific regulation of human vascular  $\alpha_1$ -adrenergic receptors by vessel bed and age. Circulation 1999;100:2336-2343.
20. Varghese PG, Harrison RW, Lofthouse RA, Georgakopoulos D, **Berkowitz DE**, Hare JM.  $\beta_3$ -adrenoceptor deficiency blocks nitric oxide-dependent inhibition of myocardial contractility. J Clin Invest 2000;106:697-703.
21. Winters B, Mo X, Brooks-Asplund E, Kim S, Shoukas A, Li D, Nyhan D, **Berkowitz DE**. Reduction of obesity, as induced by leptin, reverses endothelial dysfunction in leptin deficient obese (lep/ob) mice. J Appl Physiol 2000;89:2382-2390.
22. Shapiro RE, Winters B, Hales M, Barnett T, Schwinn DA, Flavahan N, **Berkowitz DE**. Endogenous circulating sympatholytic factor in orthostatic intolerance. Hypertension 2000;36:553-560.
23. Dunbar SL, **Berkowitz DE**, Brooks-Asplund EM, Shoukas AA. The effects of HLU on the pressure-diameter relationship of rat small mesenteric veins. J Appl Physiol 2000;89:2073-2077.
24. Brown DR, **Berkowitz DE**, Breslow MJ. Weight loss is not associated with hyperleptinemia in humans with pancreatic cancer. J Clin Endocrinol Metab 2001;86:162-166.
26. Dunbar SL, Tamhidi L, **Berkowitz DE**, Shoukas AA. Hindlimb unweighting affects rat vascular capacitance function. Am J Physiol (Heart Circ Physiol) 2001;281:H1170-H1177.
27. Monitto CL, **Berkowitz DE**, Lee KM, Pin S, Li D, Breslow M, O'Malley B, Schiller M. Differential gene expression in a murine model of cancer cachexia. Am J Physiol (Endocrinol Metab) 2001;281:E289-E297.
28. Nyhan D, Kim S, Dunbar S, Li D, Shoukas A, **Berkowitz D**. Impaired pulmonary artery contractile responses in a rat model of microgravity: role of nitric oxide. J Appl Physiol 2002;92:33-40.
29. Brooks-Asplund EM, Shoukas AA, Kim SY, Burke SA, **Berkowitz DE**. Estrogen has opposing effects on vascular reactivity in obese, insulin-resistant male Zucker rats. J Appl Physiol 2002;92:2035-2044.
30. Barouch LA, Harrison RW, Skaf MW, Rosas GO, Cappola TP, Kobeissi ZA, Hobai IA, Lemmon CA, Burnett AL, O'Rourke B, Rodriguez HR, Huang PL, Lima JA, **Berkowitz DE**, Hare JM. Nitric oxide regulates the heart by spatial confinement of nitric oxide synthase isoforms. Nature 2002;416:337-339.
31. Barouch LA, **Berkowitz DE**, Harrison RW, O'Donnell CP, Hare JM. Disruption of leptin signaling contributes to cardiac hypertrophy independently of body weight in mice. Circulation 2003;108:754-759.
32. Kahn S, Skaf MW, Harrison RW, Lee K, Minhas KM, Kumar A, Fradley M, Shoukas AA, **Berkowitz DE**, Hare JM. Nitric oxide regulation of myocardial contractility and calcium cycling: Independent impact of neuronal and endothelial nitric oxide synthase. Circ Res 2003;92:1322-1329.

33. **Berkowitz DE**, White R, Li D, Minhas K, Cernetich A, Kim S, Burke S, Shoukas AA, Nyhan D, Champion HC, Hare JM. Arginase reciprocally regulates nitric oxide synthase activity and contributes to endothelial dysfunction in aging blood vessels. Circulation 2003;108:2000-2006.
34. Jhaveri R, Kim SY, White AR, Burke S, **Berkowitz DE**, Nyhan D. Enhanced vasodilatory responses to milrinone in catecholamine precontracted small pulmonary arteries. Anesth Analg 2004;98:1618-22.
35. Townsend SA, Jung A, Hoe YS, Lefkowitz RY, Kahn SA, Lemmon C, Harrison R, Li K, Barouch L, Cotecchia S, Shoukas A, Nyhan D, Hare JM, **Berkowitz DE**. Critical role for the alpha-1B adrenergic receptor at the sympathetic neuroeffector junction. Hypertension 2004;44:776-782.
36. Khan SA, Lee K, Minhas KM, Gonzales D, Raju SVY, Tejani A, Li D, **Berkowitz DE**, Hare JM. Neuronal nitric oxide synthase negatively regulates xanthine oxidoreductase inhibition of cardiac excitation-contraction coupling. Proc Natl Acad Sci USA 2004;101:15944-15948.
37. Jeon BH, Gupta G, Park YC, Qi B, Haile Z, Khanday FA, Liu Y-X, Kim JM, Ozaki M, White R, **Berkowitz DE**, Irani K. Apurinic/apuridinic endonuclease 1 regulates endothelial NO production and vascular tone. Circ Res 2004;95:902-910.
38. Minhas KM, Khan SA, Raju SVY, Phan AC, Gonzalez DR, Skaf MW, Lee K, Tejani A, Saliaris AP, Barouch LA, O'Donnell CP, Emala CW, **Berkowitz DE**, Hare JM. Leptin repletion restores depressed (beta)-adrenertgic contractility in ob/ob mice independently of cardiac hypertrophy. J Physiol 2005;565:463-474.
39. Jung AS, Harrison R, Lee KH, Ganut J, Nyhan D, Brooks-Asplund EM, Hare JM, Shoukas AA, **Berkowitz DE**. Simulated microgravity produces attenuated baroreflex-mediated pressor, chronotropic, and inotropic responses in mice. Am J Physiol (Heart Circ Physiol) 2005;289:H600-H607.
40. Townsend S, **Berkowitz DE**. Response. Hypertension 2005;45:e20-e21.
41. White AR, Li D, Champion H, Wang DM, Nyhan D, Shoukas A, Hare JM, **Berkowitz DE**. Knockdown of arginase 1 restores NO signaling in the vasculature of old rats. Hypertension 2006;47:245-251.
42. Shubha V, Raju Y, Zheng M, Schuleri KH, Phan AC, Bedja D, Saraiva RM, Yiginer O, Vandegaer K, Gabrielson KL, O'Donnell CP, **Berkowitz DE**, Barouch LA, Hare JM. Activation of the novel cardiac ciliary neurotrophic factor receptor reverses LVH in leptin deficient and leptin resistant obesity. Proceed Nat Acad Sci USA. 2006;103:4222-4227.
43. Steppan J, Ryoo S, Gregg C, White AR, Bugaj L, Khan M, Santham L, Nyhan D, Shoukas A, Hare J, **Berkowitz DE**. Arginase modulates myocardial contractility by a NOS-1 dependent mechanism. Proceed Nat Acad Sci USA. 2006;103:4759-4764.
44. Barouch LA, Gao D, Chen L, Phan AC, Kittleson MM, Minhas KM, **Berkowitz DE**, Wei C, Hare JM. Cardiac myocyte apoptosis is associated with increased DNA damage and decreased survival in murine models of obesity. Circ Res 2006;98:119-124.
45. Ryoo S, Lemmon C, White R, Nyhan D, Shoukas A, Romer LH, **Berkowitz DE**. Ox-LDL-dependent arginase activation contributes to impaired NO signaling and endothelial dysfunction. Circ Res. 2006;99:951-960.

Editorial based on #45: Brandes RP. Roads to dysfunction. Arginase II contributes to oxidized low-density lipoprotein-induced attenuation of endothelial NO production. Circ Res 2006;99:918-920.

46. Soucy KG, Elser J, Ryoo S, Benjo A, Gupta G, Aon MA, Nyhan D, Shoukas AA, **Berkowitz DE**. Impaired shear stress-induced nitric oxide production through decreased Akt phosphorylation contributes to age-related vascular stiffening. J Appl Physiol. 2006;101:1751-1759.
47. Tuday EC, Meck JV, Nyhan D, Shoukas AA, **Berkowitz DE**. Microgravity induced changes in aortic stiffness and its role in orthostatic intolerance, J Appl Physiol, 2007;102:853-858.
- Editorial based on #48: Delp MD. Arterial adaptations in microgravity contribute to orthostatic tolerance. J Appl Physiol 2007;102:836.
48. Soucy KG, Lim HK, Benjo A, Santhanam L, Ryoo S, Shoukas AA, Vazquez ME, **Berkowitz DE**. Single exposure gamma-irradiation amplifies xanthine oxidase activity and induces endothelial dysfunction in rat aorta. Radiat Environ Biophys. 2007;46:179-186.
49. Nyhan D, **Berkowitz DE**. Arginine, arginase and nitric oxide. XXII Annual Congress of the Brazilian Federation of the Societies for Experimental Biology, Águas de Lindóia, São Paulo, Brazil. In Press.
50. Nyhan D, **Berkowitz DE**. Vascular stiffness and cardiovascular health. XXII Annual Congress of the Brazilian Federation of the Societies for Experimental Biology, Águas de Lindóia, São Paulo, Brazil. In Press.
51. Santhanam L, Lim HKI, Lim HK, Miriel V, Brown T, Patel M, Balanson S, Ryoo S, Anderson M, Irani K, Khanday F, Di Constanzo L, Nyhan D, Hare JM, Christianson D, Rivers R, Shoukas A, **Berkowitz DE**. iNOS-dependent S-nitrosylation and activation of arginase 1 contributes to age related endothelial dysfunction. Circ Res. In press.
52. Benjo A, Thompson RE, Fine D, Hogue CW, Alejo D, Kaw A, Gerstenblith G, Shah A, **Berkowitz DE**, Nyhan D. Pulse pressure is an age-dependent predictor of stroke development following cardiac surgery. Hypertension. In press.

### **INVITED EDITORIALS**

1. **Berkowitz DE**. Myocyte nitroso-redox imbalance in sepsis: NO simple answer. Circ Res. 2007;100:1-4.
2. Tuday EC, **Berkowitz DE**. Microgravity and cardiac atrophy: no sex discrimination. J Appl Physiol. 2007; 103:1-2.

### **Manuscripts in Review/Preparation**

1. Gregg C, Phan A, Barouch L, Nyhan D, Shoukas A, Hare, JM, **Berkowitz DE**. Beta-2 AR-coupled P13 kinase constrains cAMP/PKA dependent increases in cardiac inotropy through cAMP dependent PDE activation. Br J Pharmacol. In review.
2. Gupta G, Benjo A, Lim H, Ryoo S, Pellakuru L, Sohi J, Santhanam L, Soucy K, Tuday E, Nyhan D, Shoukas A, Huso D and **Berkowitz DE**. Endothelial Arginase II A novel target for atheroprevention and treatment. Circ Res. In review.
3. Lim H, Lim J, Ryoo S, Shuleri K, Benjo A, Soucy K, Nyhan D, Shoukas A, **Berkowitz DE**. Mitochondrial arginase II constrains/regulates endothelial NOS activity. Am J Physiol. Accepted with revision.
4. Nyhan D, **Berkowitz DE**, Benjo A. Emerging concepts in vascular health/disease. Anesth Analg. In review.

5. Steppan J, **Berkowitz D**, Champion H, Santhanam L, Soucy K, Elser J, Li D, Pearse D, Dodd-O JM. NADPH oxidase-independent relaxation of aortic rings by the plant extract apocynin. Br J Pharmacol. In review.
6. Santhanam L, Gucek M, Brown TR, Ryoo S, Lemmon C, Romer L, Shoukas AA, **Berkowitz DE**, Cole RN. Selective fluorescent labeling of S-nitrosothiols (S-FLOS): A novel method for studying the nitrosoproteome. Nature Methods. In review.
7. Champion HC, Bivalacqua TJ, Vandegaer K, Stewart G, White RA, Minhas K, Cernetich A, **Berkowitz D**, Hare JM. Role of arginase in altering isovolumic relaxation and response to beta-adrenergic signaling in the aging rat. In Preparation.
8. White AR, Bugaj L, Attwater S, Abbot B, Li D, Champion HC, Shoukas AA, Nyhan D, Hare JM, **Berkowitz DE**. Early changes in vasoreactivity in a terrestrial model of microgravity are due to an upregulation of the endothelium dependent nitric oxide/cGMP pathway. In Preparation.
9. Uribe J, Ahuja A, White AR, Nyhan SM, Shoukas A, **Berkowitz DE**. Intracellular signaling and vasopression: mechanisms governing low-dose vasopressin's augmentation of the norepinephrine contractile response in rat vascular smooth muscle. In Preparation.

### **Books/Book Chapters**

1. Reves JG, **Berkowitz DE**. Pharmacology of intravenous anesthetic induction drugs. IN: Cardiac Anesthesia 3rd edition. J Kaplan, ed. WB Saunders, Philadelphia, 1993.
2. Sladen RN, **Berkowitz DE**. Pulmonary effects of cardiopulmonary bypass, IN: Cardiopulmonary Bypass: Principles and Practice. GP Gravlee, RF Davis, JR Utley, eds. Williams & Wilkins, Baltimore, MD, 1993.
3. **Berkowitz DE**, Schwinn DA. Basic pharmacology and alpha and beta adrenergic receptors. IN: The Pharmacological Basis of Anesthesiology. TA Bowdle, A Horita, ED Kharasch, eds. Churchill-Livingston, New York, 1994.
4. **Berkowitz DE**. Cellular signal transduction. IN: Slide Atlas of Clinical Anesthesiology, Vol 2. RD Miller, DA Schwinn, eds. Current Medicine, Inc, Philadelphia. 1998.
5. **Berkowitz DE**. Vascular Function: From Human Physiology to Molecular Biology. IN: New Advances in Vascular Biology and Molecular Cardiovascular Medicine (SCA Monograph). D Schwinn, ed. Williams & Wilkins, Baltimore, 1998.
6. Reves JG, **Berkowitz DE**. Pharmacology of intravenous anesthetic induction drugs. IN: Cardiac Anesthesia, 4th edition. J Kaplan, ed. WB Saunders, Philadelphia, 1998.
7. Oster JB, Sladen RN, **Berkowitz DE**. Cardiopulmonary bypass and the lung. IN: Cardiopulmonary Bypass, Principles and Practice. GP Gravlee, RF Davis, M Kurusz, Utley JR, eds. Lippincott-Williams & Wilkins. 2000.
8. **Berkowitz D**, Gaine S. Perioperative management issues in patients with primary pulmonary hypertension. IN: Problems in Anesthesia, D Nyhan, ed. 2001.
9. Grogan K, Nyhan D, **Berkowitz D**. Pharmacology of anesthetic drugs. IN: Cardiac Anesthesia, 5<sup>th</sup> Edition. JA Kaplan, D Reich, S Konstade, C Lake, eds. Elsevier/Saunders, New York.2006.
10. Simmonds P, Nyhan D, **Berkowitz DE**. Cardiovascular pharmacological agents. IN: ICU Update. J Conte,

ed. Elsevier, Philadelphia, 2006.

11. Steppan J, **Berkowitz DE**, Martinez E, Nyhan D. Diastolic heart function in the elderly. IN: Aging and Anesthesia. F Sieber, ed. McGraw-Hill, Philadelphia, 2006.

### **INVENTIONS and PENDING PATENTS**

**Patent Pending: Berkowitz DE**, Ryoo, S, Shoukas AA, Gupta G, Romer L. Arginase II: A target for the prevention of atherosclerosis.

**Patent Pending:** Shoukas AA, **Berkowitz DE**. Peristaltic non-invasive blood flow assist device.

**Patent Pending: Berkowitz DE**, Shoukas AA, Hare J, Champion H, Steppan J. Arginase: a target enzyme for the treatment of myocardial dysfunction in aging and heart failure.

**Patent Pending:** Cole RN, Santhanam L, **Berkowitz DE**, Shoukas A. Selective fluorescent labeling of S-nitrosothiols: S-FLOS. Provisional patent filed.

**Patent:** Hare J, **Berkowitz DE**. Treatment of cardiac hypertrophy by activation of ciliary neurotrophic factor receptor.

### **EXTRAMURAL SPONSORSHIP**

#### **Active Grants**

NIH - 1 RO1 AG021523-01A1 (07/01/03–06/30/08)

Title	Arginase and the Aging Cardiovascular System		
Sponsor	NIH	Role	Principal Investigator
Total direct cost	\$1,250,000		(3.6 calendar)

NASA – NNH04ZUU005N (04/01/05–03/31/09)

Title	Ionizing Radiation and its Effects on Cardiovascular Function in the Context of Space Flight		
Sponsor	NASA	Role	Principal Investigator
Total direct cost	\$1,200,000		(2.4 calendar)

National Space Biomedical Research Institute – CA00405 (03/01/04-02/28/08)

Title	Mechanics of Cardiovascular Deconditioning		
Sponsor	NSBRI	Role	Co-Investigator
Total direct cost	\$1,400,000		(2.4 calendar)

NIH – HL077785 (07/01/04-06/30/09)

Title	Sleep Apnea Links Obesity to Cardiovascular Dysfunction		
Sponsor	NIH	Role	Co-Investigator
Total direct cost	\$1,250,000		(1.2 calendar)

NIH – AG17479 (01/01/06-12/31/10)

Title	Aging, Fitness, & Failure: Mechanisms of Diastolic Dysfunction (with University of Texas)		
Sponsor	NIH	Role	Subcontract Principal Investigator \$130,000/yr
Total direct cost	\$1,113,368		(1.2 calendar)

NIH – RO1 HL089301-01 (7/1/07-6/30/12) (0.6 calendar)

Title	Hypercholesterolemia and Human Skin Blood Flow (with Pennsylvania State University)		
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Sponsor	NIH	Role	Co-Investigator
Total direct cost	\$1,755,258		

Maryland Technology Development Corporation (TEDCO) UTDF Grant (07/01/07-06/30/08)

Title	Arginase: A Novel Target for the Prevention and Treatment of Atherosclerosis		
Sponsor	TEDCO	Role	Principal Investigator
Total direct cost	\$50,000		

### **Grants in Review**

NIH (01/01/07-12/31/12)

Title	Arginase II, A Novel Target in Atherosclerosis		
Sponsor	NIH	Role	Principal Investigator
Total direct cost	\$1,250,000		(3.6 calendar)

National Space Biomedical Research Institute – NSBRI-RFA-07-01-S2-0007 (10/01/07-09/30/12)

Title	Radiation, Endothelial Cell Senescence, Accelerated Aging, and Atherosclerosis		
Sponsor	NSBRI	Role	Co-Investigator
Total direct cost	\$280,000/year x 5 years		

NIH (01/01/07-12/31/12)

Title	Aging, Vascular Health and Outcomes Following Cardiac Surgery		
Sponsor	NIH	Role	Co-Investigator
Total direct cost	\$1,250,000		(1.2 calendar)

NIH (01/01/07-12/31/12)

Title	Vascular Basis for Brain Injury from Cardiac Surgery in Elderly Women		
Sponsor	NIH	Role	Co-Investigator
Total direct cost	\$1,250,000		(0.6 calendar)

### **Previous Funding**

National Space Biomedical Research Institute (10/01/97-09/30/00)

Title	Rodent Studies of Cardiovascular Deconditioning		
Sponsor	NSBRI	Role	Co-Investigator
Total direct cost	\$175,000/year x 3 years		

AHA – Mid-Atlantic Affiliate – 0151581 U (07/01/01-06/30/03)

Title	Role of alpha-1 B-adrenergic Receptor in Orthostatic Tolerance		
Sponsor	AHA	Role	Principal Investigator
Total direct cost	\$150,000		

American Heart Association (MDBG6996) (07/01/97-06/31/99)

Title	Endothelial Dysfunction Following Cardiopulmonary Bypass & Deep Hypothermia Arrest		
Sponsor	AHA	Role	Principal Investigator
Total direct cost	\$56,942		

The Johns Hopkins School of Medicine (07/01/97-06/31/98)

Title	Richard S. Ross Clinical Scientist Award		
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Sponsor	JH SOM	Role	Principal Investigator
Total direct cost	\$130,000		

NIH – RO1HL-65455-05	(12/01/04-11/30/06)		
Title	Oxidative Stress in Heart Failure: Mechanisms and Manifestations		
PI	J Hare	Co-I	DE Berkowitz
Total direct cost	\$250,000		

Foundation for Education and Research; Schering-Plough Award (1992-1993)			
Title	Characterization of alpha-1 adrenergic receptor subtypes in human vessels. Initial studies using chimeric receptors		
Total direct cost	\$60,000	Role	Principal Investigator

Society of Cardiovascular Anesthesiologists. Starter Grant (1996)			
Title	The effect of weightlessness on alpha-1 adrenergic receptor regulation		
Sponsor	SCA	Role	Principal Investigator
Total direct cost	\$10,000		

The Johns Hopkins Institutional Research Grant Projects Committee (1997-1998)			
Title	Alpha-1 adrenergic receptor subtype specific regulation of venous capacitance <u>in vivo</u>		
Sponsor	JHMI	Role	Principal Investigator
Total direct cost	\$11,610		

#### **MENTORSHIP: Research Students**

2000-2002	Chris Lemon Calcium and neuroeffector signaling in blood vessels Current Position: Ph.D. Candidate, Biomedical Engineering, JHU
2000-2003	Mike Skaf Spatial confinement of NO signaling in cardiac myocytes Current Position: Cardiology Fellow, JHU
2002-2004	Seth Townsend (Howard Hughes Summer Research Scholar) Role of alpha-1 B-adrenergic receptor in neuroeffector signaling Current Position: Ph.D. candidate, MIT
2002-2004	Ayushi Ahuja (Howard Hughes Summer Research Scholar) Vascular signaling and Award) B-3 adrenergic receptor: crystallizing vasopressin Current Position: Emory Univ, Medical School
2003-2005	Chris Gregg (JH Provost Summer Research) Function and fundamental second messenger pathways Current Position: Ph.D. candidate, UCSD
2003-2006	Gavra Gupta (JH Provost Summer Research Award, Howard Hughes Summer Research Scholar) The role of klotho in the cardiovascular biology of aging Current Position: Masters Graduate Student, Biomedical Engineering, JHU/

Stanford Medical School, 2007

- 2004-2005 Jochen Steppan, Heidelberg, Germany  
Arginase and myocardial function  
Current Position: Univ of Heidelberg Medical School
- 2005-Present Lucasz Bugaj (Howard Hughes Summer Research Scholar)  
Arginase modulates myocardial contractility by a NOS-1 dependent mechanism  
Current Position: Masters Graduate Student, Biomedical Engineering, JHU
- 2006-Present Tashalee Brown (JH Provost Undergraduate Research Award)  
A novel technique of detecting S-nitrosylation of proteins in multiple systems  
Current Position: Undergraduate, biomedical engineering, JHU
- 2005-2007 Mehnaz Khan  
Aging/Arginase and contractile function  
Current Position: Vanderbilt Univ School of Medicine, 2007
- 2005-Present Kevin Soucy  
Cardiovascular effects of radiation/oxidant stress  
Current Position: BME PhD candidate, JHU
- 2005-Present Eric Taday, BME PhD candidate, JHU  
Mechanism of arthostasis in microgravity/aging.  
BME PhD candidate, JHU
- 2005-Present Jeremy Elser (JH Provost Undergraduate Award)  
Changes in the phosphorylation of myosin light chain as a result of microgravity simulation  
Current Position: BME undergraduate, JHU

**MENTORSHIP: Research, Postdoctoral**

- 1998-2000 Constance Monitto, M.D. (FAER Grant primary mentor)  
Mechanisms of cancer cachexia (1999)  
Current Position: Assistant Professor, Johns Hopkins Medical Institutions
- 1998-2000 Bradford Winters M.D., Ph.D. (IRGC Grant, FAER Grant primary mentor)  
Vascular Effects of Leptin, (1999-2000)  
Current Position: Assistant Professor, Johns Hopkins Medical Institutions
- 1997-1998 Kyoung Min Lee, M.D.  
Mechanisms of cachexia  
Current Position: Staff Anesthesiologist, Yonsei Univ, Wonju College of Medicine, Wonju, Korea
- 1999-2000 Soon Yul Kim, M.D.  
Mechanisms of cardiovascular preconditioning  
Current Position: Staff Anesthesiologist, Yonsei Univ, Wonju College of Medicine, Wonju, Korea
- 2001-2003 Kwong Ho Li, M.D.  
Xanthine oxidase and oxidant stress in cardiac myocytes  
Current Position: Staff Anesthesiologist, Yonsei Univ, Wonju College of Medicine, Wonju, Korea
- 2001-2006 A. Ron White, Ph.D. (NIH Training Grant)  
Mechanisms of cardiovascular aging

Current Position: Scientific Advisor, American Heart Association, Dallas, Texas

- 2005-2006 Carolina Heitmann Mares Azevado, Ph.D., Visiting Post-Doctoral Fellow  
Arginase II and myocardial contractility  
Current Position: Assistant Professor, University of São Paulo, Brazil
- 2004-Present Sungwoo Ryoo, Ph.D., Yonsei University, Korea  
Oxidative-LDL and arginase  
Currently funded, American Heart Association Post-Doctoral Fellowship Award  
Current Position: Post-Doctoral Fellow, ACCM, JHU
- 2005-Present Lakshmi Santham, Ph.D.  
Nitrosylation and modulation of protein function  
(K99R00 grant under review. S-nitrosylation and the aging cardiovascular system)  
Current Position: Post-Doctoral Fellow, ACCM, JHU
- 2006-Present Hyun Kyu Lim, M.D.  
Arginine II and endothelial function  
Current Position: Yonsei University, Wonju College of Medicine, Wonju, Korea
- 2006-Present Hyun Kyoung Lim, M.D.  
Arginine II and endothelial function  
Current Position: Yonsei University, Wonju College of Medicine, Wonju, Korea

#### **MENTORSHIP: Clinical Fellows**

- 2001-2003 Alá Haddadin (Cardiac), Assistant Professor, Yale University Medical Center, CT
- 2002-2003 Edward Verde (Cardiac), Assistant Professor, Loma Linda University Medical Center, CA
- 2002-2003 James Weller, Private practice, Cincinnati, OH
- 2003-2004 Kelly Grogan, Assistant Professor, Johns Hopkins Medical Institutions
- 2003-2004 Matthew Caldwell, Assistant Professor, Univ of Michigan, Ann Arbor, MI
- 2003-2004 Izumi Harukuni, Assistant Professor, Oregon University Medical Center, Portland, OR
- 2004-2005 Prasert Sawasdiwpachai (Cardiac), Pramongkutklo Hospital, Bangkok, Thailand
- 2005-2006 Muhammad Durrani, Assistant Professor, New Jersey Medical Center, NJ
- 2005-2006 Paul Simmonds, Private Practice, Phoenix, AZ
- 2006-2007 Nicholas Mantel, Instructor, Union Memorial, Baltimore, MD
- 2006-2007 Jay Levine, Instructor, ACCM, JHU
- 2006-2007 Brenda MacKnight, Assistant Professor, Univ. of Pittsburgh, PA
- 2006-2007 James DeMeester, Assistant Professor, Michigan State, Ann Arbor, MI
- 2007- Roy Kan
- 2007- Michelle Isac
- 2007- Ana Fernandez

**TEACHING RESPONSIBILITIES****Medical School:**

On-Going Medical Student Physiology Lecture Series: "Vascular smooth muscle and vascular biology"

On-Going Biomedical engineering undergraduate course – phys foundations

On-Going Lecturer for basic science curriculum, School of Perfusion

On-Going Medical Student EKG Lectures

**Biomedical Undergraduate Teaching**

Director of Cardiovascular Wet Lab

**Anesthesia Residents and Fellows****Resident Lecture Series – On-Going**

2000-2001 Ventricular Function/Dysfunction (systolic/diastolic)

2001-2002 Pro/Con: Preemptive use of inotropes is advantageous

2002-2003 Acute coronary syndromes

2004-2005 Vascular Stiffness, background & Clinical Studies  
Vascular Compliance/Stiffness; Clinical Importance  
Vascular Stiffness; Clinical Implications

2006-2007 Nicardipine

**Cardiac Conference – On-going**

2001-2002 Pro/Con: Preemptive use of inotropes is advantageous

2002-2003 Pro/Con: Preemptive use of inotropes is advantageous

2004-2005 Mechanisms & Implications of the Aging CVS

2006-2007 Nicardipine

**CURRENT EDITORIAL ACTIVITIES**

Anesthesia and Analgesia, Cardiovascular Section

Anesthesiology

American Journal of Physiology

Circulation Research

Nitric Oxide

The American Journal of Medical Sciences

Hypertension

Journal of Applied Physiology

**Grant Reviewer**

2003 National Institutes of Health (Clinical Cardiovascular Study Section)

2003 Society for Cardiovascular Anesthesiologists Starter Grant Committee Member

**CLINICAL ACTIVITIES****Certification**

North Carolina #34950

**Board**

Anesthesiology, 1993

California #A051623

Maryland #D45342

### **Clinical Cardiac Anesthesia**

Cardiac Anesthesiologist and management of patients undergoing cardiac surgery for coronary artery bypass surgery, valvular surgery, aortic surgery, heart failure surgery, and heart and lung transplantation.

### **TEE**

Performance and interpretation of TEE and communicate with surgeons regarding findings and interpretation.

## **ORGANIZATIONAL/ADMINISTRATIVE ACTIVITIES**

### **Institutional Administrative Appointments**

- 2000-2006 Director, Cardiac Anesthesiology Fellowship Program, ACCM
- 2007-Present Member, ACCM Research Committee
- 2007-Present Member Steering Committee, Johns University Vascular Medicine Initiative
- 2007-Present Director Cardiovascular Research, ACCM, Johns Hopkins
- 2007-Present Health Professions Pre-Professional Program and Advising Committee Member

### **Professional Administrative Appointments**

- 2003-2005: Association of University Anesthesiologists Scientific Advisory Board
- 2001-2003: Society of Cardiovascular Anesthesiologists - Research Committee Member
- Advisory Panel on Year 2000 Request for Proposals - National Space Biomedical Research Institute

### **Professional Societies**

- American Association for the Advancement of Science
- American Heart Association
- The American Physiologic Society
- American Society of Anesthesiologists
- Association of University Anesthesiologists
- International Anesthesia Research Society
- Society of Cardiovascular Anesthesiologists

## **RECOGNITION**

### **Awards, Honors**

- 1997 Richard S. Ross Clinical Scientist Award, The Johns Hopkins University School of Medicine
- 1993 American Society of Anesthesiologists Residents Essay Competition: Second Prize
- 1992 Foundation for Anesthesia Education and Research/Schering-Plough Research Fellowship
- 1991 North Carolina Society of Anesthesiologists: Fellow
- 1991 American Society of Anesthesiologists Burroughs-Wellcome Resident Scholar
- 1988 Long Island Jewish Medical Center Research Essay Competition: Second Prize

1987 South African Medical Research Council Post Internship Research Scholarship

## VISITING PROFESSORSHIPS/INVITED LECTURES

American Society of Anesthesiologists, New Orleans, LA, October 1996.  
Molecular Biology in Anesthesiology: Brave New Frontier

Society of Cardiovascular Anesthesiologists, Baltimore, MD, May 1997.  
Vascular Function: From Human Physiology to Molecular Biology

Grand Rounds, The Johns Hopkins University School of Medicine, Baltimore, MD, 1998  
Man, Microgravity, and the Microvasculature

Anesthesiology Grand Rounds, Walter Reed Medical Center, Bethesda, MD, 2002  
Vasopressin: From Cell to CPR

Panel Speaker, Society for Cardiovascular Anesthesiologists, April, 2002, NY  
New ACLS Guidelines

8<sup>th</sup> International Congress of Cardiothoracic and Vascular Anesthesia in conjunction with the  
19<sup>th</sup> International Congress of The Israel Society of Anesthesiologists. November 10-13, 2002, Tel Aviv, Israel.  
Invited Speaker: Man in microgravity: the cardiovascular system in space. November 11, 2002  
Invited Speaker: New insights into the perioperative use of inotropes. November 12, 2002

25<sup>th</sup> Annual Meeting & Workshops, Soc Cardiovascular Anesthesiologists, April 26-30, 2003, Miami Beach FL  
Invited Speaker: Beyond fight or flight: emerging roles of the sympathetic nervous system, April 27, 2003

Grand Rounds Speaker, Rochester Medical Center, Anesthesiology, March, 2003.  
Arginase and Aging Cardiovascular System

Grand Rounds Speaker, Duke University Medical Center, Anesthesiology, March, 2003.  
Arginase and Aging Cardiovascular System

Visiting Professor, State University of New York at Stony Brook, March 9, 2004  
Vasopressin: From Cell to CRR

Visiting Professor, Brookhaven National Laboratory Medical Department, March 10, 2004  
Obesity and the Cardiovascular System

Invited Speaker, Knoll Physiology Research Laboratory, Pennsylvania State University, November 12, 2004  
The Aging Cardiovascular System

Cardiology Grand Rounds Speaker, University of Louisville, Kentucky, March 29, 2005  
Systolic Hypertension Syndrome

Grand Rounds Speaker, University of Maryland, Baltimore, Anesthesiology, July 21, 2005  
Vasoactive Therapy

Anesthesiology Grand Rounds Speaker, New York Medical College, Valhalla, New York, November 21, 2005. Vasoactive Therapy in Critically ill Patients

Critical Care Grand Rounds Speaker, Duke University Medical Center, Durham, NC, December 15, 2005. Vasoactive Therapy in Critically Ill Patients

Grand Rounds Speaker, Duke University Medical Center, Durham, NC, Anesthesiology, April 25, 2006  
Academic Anesthesia: Have Fun, Go Places, Meet Interesting People

NASA Space Radiation Summer School Lecture, Brookhaven National Labs, Utica, NY, June 28, 2006.  
Cardiovascular Tissue Responses

Society for Cardiac Anesthesiologists, Montreal, Canada, April 24, 2007  
Monograph Session: Advanced Cardiothoracic Pharmacology; Modulators of Vascular Tone

JHU Biennial Meeting (during the ACCM Academic Program) Speaker, Baltimore, MD; June 1, 2007.  
Arginase II: A Novel Target for Therapy in Atherosclerosis

Acute Neurosciences Research Seminar, Baltimore, MD; May 2007  
Role of Arginase in Endothelial Nitroso-Redox Balance

JHU School of Medicine Vascular Medicine Symposium, September 26, 2007  
Keeping the Balance: Arginase and Vascular Nitroso-Redox Regulation