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| *Key qualifications**Contact information* | **Director of NIH-funded Lung Physiology Core for last 15 years****Exceptional productivity (average of 4.5 publications/year since 2000)****Specialist in lung permeability methods**E-mail, vogel@uic.edu; cellular, 219-742-8002 |
| *Education* | Cornell University, B.S. (Neurobiology & Behavior), 1967 – 71University of Virginia, Ph.D. (Physiology), 1975 ‑ 80Dissertation Sponsor: Nicholas Sperelakis |
| *Postgraduate**position* | Cornell UniversityResearch Sponsor: Bruce Halpern, 1971 ‑ 75 |
| *Postdoctoral**positions* | University of VirginiaTrainee with Nicholas Sperelakis, 1980 ‑ 81Northwestern University Medical SchoolFellow with Toshio Narahashi, 1981 ‑ 85 |
| *Faculty**appointments* | University of Illinois College of Medicine:Assistant Professor of Pharmacology, 1985 - 92Coordinator of Research in Anesthesiology, 1992 ‑ 96Adjunct Assistant Professor of Anesthesiology, 1992 ‑ 96Research Assistant Professor of Pharmacology, 1996 - 2008Research Associate Professor of Pharmacology, 2008 – 2016Northwestern University Medical School:Research Scientist, 2017 - |
| *Research**interests* | Lung physiology and pharmacology (isolated lung preparation, normal and transgenic mice); lung pathophysiology in sepsis and genetic determinants of lung microvessel permeability; electrophysiology of endothelial cells |
| *Medical school**teaching* | Medical Pharmacology: diuretic agents, antiarrhythmic agents, drug treatment of heart failure, antianginal agents, local anesthetic agents (nomination for Golden Apple Award, Outstanding Teaching, 1995) |
| *Graduate**teaching**Extramural**teaching* | Neuropharmacology course: calcium channels; Vascular Biology course: hypertension, vascular permeability, lung edemaIndiana University Northwest: Medical PharmacologyCalumet College (Whiting, IN): Organic Chemistry, Human Biology, General Biology, Anatomy & Physiology Valparaiso University: Advanced Physiology  |
| *Society**memberships* | American Physiological SocietyBiophysical SocietyAmerican Heart Association |
| *Awards* | 5 P01 HL077806-07 Malik (PD) 08/01/05-07/31/15Mechanisms of PMN-Mediated Lung Inflammation and Injury “Physiology and Imaging Core”, Core C Vogel (PI)The Core provides centralized physiological and imaging support for each of the 4 projects in the PPG.Role: PI. “Homeostatic Regulation of Neutrophil ROS Production and Lung Injury”, Project 2 Ye (PI)These studies aim to delineate the underlying mechanism for LPS priming of PMN oxidant production, and explore a novel negative regulatory mechanism for its therapeutic potential in controlling ALI.Role: Co-I5 P01 HL060678-12 Malik (PD) 03/01/01-02/29/16Signaling of Endothelial Permeability and Lung Vascular Injury “Imaging and Physiology Core”, Core D Minshall (PI) The overall goals of Core D are to provide (i) fluorescence, confocal, and electron microscopy support, (ii) image analysis, and (iii) physiological support for lung perfusion experiments proposed in all projects. Centralization of the imaging and physiological support within a single core reflects the emphasis that P.l.s have placed on imaging and physiological studies in lung models.Role: Co-I“TRPC6 Regulation of Lung Endothelial Barrier Function”, Project 3 Mehta (PI) A rise in intracellular calcium by activating cell contraction leads to formation of pores between endothelial cells through which blood proteins can gain access to interstitium and impair gas exchange in lungs thereby leading to acute lung injury (ALI). We believe proposed studies will provide novel insights into the role of a calcium channel TRPC6 in inducing ALI and will identify TRPC6 as a therapeutic target to prevent ALI.Role: Co-I1 P01 HL098050-01A1 Natarajan (PD) 06/01/11-5/31/16 Role of Sphingolipids in the Pathobiology of Lung Injury“Protective Role of Intracellular S1P in Lung Injury”, Project 1 Natarajan (PI)This project will evaluate sphingolipid metabolizing genes as ALI targets and address the role of intracellular S1P in protection against lung inflammation and injury.Role: Co-I |

BIBLIOGRAPHY - STEPHEN MARK VOGEL

 (a) Experimental Papers, Review Articles, and Book Chapters

1. Freer RJ, Pappano AJ, Peach MJ, Bing KT, McLean MJ, Vogel S & Sperelakis N. (1976). Mechanism for the postive inotropic effect of angiotensin II on isolated cardiac muscle. *Circ Res* **39,** 178-183. PMID: 939002.

2. Josephson I, Renaud JF, Vogel S, McLean M & Sperelakis N. (1976). Mechanism of the histamine-induced positive inotropic action in cardiac muscle. *Eur J Pharmacol* **35,** 393-398. PMID: 1248513.

3. Vogel S & Sperelakis N. (1977). Blockade of myocardial slow inward current at low pH. *Am J Physiol* **233,** C99-103. PMID: 20783.

4. Vogel S, Sperelakis N, Josephson I & Brooker G. (1977). Fluoride stimulation of slow Ca2+ current in cardiac muscle. *J Mol Cell Cardiol* **9,** 461-475. PMID: 196094.

5. Azuma J, Vogel S, Josephson I & Sperelakis N. (1978). Yohimbine blockade of ionic channels in myocardial cells. *Eur J Pharmacol* **51,** 109-119. PMID: 699977.

6. Vogel S & Sperelakis N. (1978). Valinomycin blockade of myocardial slow channels is reversed by high glucose. *Am J Physiol* **235,** H46-51. PMID: 677328.

7. Belardinelli L, Vogel SM, Sperelakis N, Rubio R & Berne RM. (1979). Restoration of slow responses in hypoxic heart muscle by alkaline pH. *J Mol Cell Cardiol* **11,** 877-892. PMID: 40040.

8. Sperelakis N, Belardinelli L & Vogel SM. (1979). Electrophysiological aspects during myocardial ischemia. From the Proceedings of the VIIth World Congress of Cardiology, Tokyo, 1978 In *Exerpa Medica*, ed. Hayase S & Murao S. Amsterdam.

9. Vogel S, Crampton R & Sperelakis N. (1979). Blockade of myocardial slow channels by bepridil (CERM-1978). *J Pharmacol Exp Ther* **210,** 378-385. PMID: 480188.

10. Pelleg A, Vogel S, Belardinelli L & Sperelakis N. (1980). Overdrive suppression of automaticity in cultured chick myocardial cells. *Am J Physiol* **238,** H24-30. PMID: 7356031.

11. Azuma J, Sperelakis N, Hasegawa H, Tanimoto T, Vogel S, Ogura K, Awata N, Sawamura A, Harada H, Ishiyama T, Morita Y & Yamamura Y. (1981). Adriamycin Cardiotoxicity: possible pathogenic mechanisms. *J Mol Cell Cardiol* **13,** 381-397. PMID: 6267303.

12. Azuma J, Sperelakis N & Vogel SM. (1981). [Myocardial action potentials and energy metabolism]. *Nihon Rinsho* **39,** 442-448. PMID: 7021911.

13. Lynch C, 3rd, Vogel S & Sperelakis N. (1981). Halothane depression of myocardial slow action potentials. *Anesthesiology* **55,** 360-368. PMID: 7294370.

14. Sperelakis N, Vogel SM, Azuma J & Yamamura Y. (1981). [Myocardial action potentials and myocardial energy metabolism (1)]. *Nihon Rinsho* **39,** 207-216. PMID: 7289052.

15. Vogel S & Sperelakis N. (1981). Induction of slow action potentials by microiontophoresis of cyclic AMP into heart cells. *J Mol Cell Cardiol* **13,** 51-64. PMID: 6265652.

16. Belardinelli L, Vogel S, Linden J & Berne RM. (1982). Antiadrenergic action of adenosine on ventricular myocardium in embryonic chick hearts. *J Mol Cell Cardiol* **14,** 291-294. PMID: 6290675.

17. Linden J, Vogel S & Sperelakis N. (1982). Sensitivity of Ca-dependent slow action potentials to methacholine is induced by phosphodiesterase inhibitors in embryonic chick ventricles. *J Pharmacol Exp Ther* **222,** 383-388. PMID: 6178816.

18. Lynch C, 3rd, Vogel S, Pratila MG & Sperelakis N. (1982). Enflurane depression of myocardial slow action potentials. *J Pharmacol Exp Ther* **222,** 405-409. PMID: 7097561.

19. Sperelakis N & Vogel SM. (1982). Development of electrical activity in cardiac pacemaker cells In *Cellular Pacemakers*, 1 edn, ed. Carpenter DO, pp. 9-66. John Wiley & Sons, Inc., New York.

20. Atchison WD, Narahashi T & Vogel SM. (1984). Endplate blocking actions of lophotoxin. *Br J Pharmacol* **82,** 667-672. PMID: 6146369.

21. Pratila M, Vogel S & Sperelakis N. (1984). Inhibition by enflurane and methoxyflurane of postdrive hyperpolarization in canine Purkinje fibers. *J Pharmacol Exp Ther* **229,** 603-607. PMID: 6716278.

22. Vogel SM, Watanabe S, Yeh JZ, Farley JM & Narahashi T. (1984). Current-dependent block of endplate channels by guanidine derivatives. *J Gen Physiol* **83,** 901-918. PMID: 6330282.

23. Wu CH, Huang JM, Vogel SM, Luke VS, Atchison WD & Narahashi T. (1985). Actions of Ptychodiscus brevis toxins on nerve and muscle membranes. *Toxicon* **23,** 481-487. PMID: 2411016.

24. Atchison WD, Luke VS, Narahashi T & Vogel SM. (1986). Nerve membrane sodium channels as the target site of brevetoxins at neuromuscular junctions. *Br J Pharmacol* **89,** 731-738. PMID: 2434175.

25. Farley JM, Vogel SM & Narahashi T. (1986). Block of single acetylcholine-activated channels in chick myotubes by alkylguanidines. *Pflugers Arch* **406,** 629-635. PMID: 2423963.

26. Silinsky EM & Vogel SM. (1986). The effects of an adenylate cyclase inhibitor on the electrophysiological correlates of neuromuscular transmission in the frog. *Br J Pharmacol* **88,** 799-805. PMID: 3017493.

27. Joy RM, Vogel SM & Narahashi T. (1987). Effects of lindane upon transmitter release and end-plate responsiveness in the neuromuscular junction of the frog. *Neuropharmacology* **26,** 1223-1229. PMID: 2443872.

28. Silinsky EM, Hirsh JK & Vogel S. (1987). Intracellular calcium mediating the actions of adenosine at neuromuscular junctions. In *Topics and Perspectives in Adenosine Research Proceedings of the 3rd International Symposium on Adenosine, (Munich; June, 1986)*, ed. Gerlach E & Becker BF, pp. 537-548. Springer-Verlag, Berlin, Heidelberg.

29. Silinsky EM & Vogel SM. (1987). Independent control of channel closure and block of open channels by methylxanthines at acetylcholine receptors in frog. *J Physiol* **390,** 33-44. PMID: 2450993.

30. Ogata N, Vogel SM & Narahashi T. (1988). Lindane but not deltamethrin blocks a component of GABA-activated chloride channels. *Faseb J* **2,** 2895-2900. PMID: 2458984.

31. Vogel SM. (1988). Patch clamp analysis of chemically activated and modulated ionic channels in isolated mammalian cardiomyocytes. *Mol Cell Biochem* **80,** 37-47. PMID: 2459600.

32. Watson JM, Vogel SM, Cotterell DJ & Dubocovich ML. (1988). Cholinergic antagonism of beta-adrenergic stimulated action potentials and adenylate cyclase activity in rabbit ventricular cardiomyocytes. *Eur J Pharmacol* **155,** 101-108. PMID: 2468508.

33. Vogel SM & Terzic A. (1989). Alpha-adrenergic regulation of action potentials in isolated rat cardiomyocytes. *Eur J Pharmacol* **164,** 231-239. PMID: 2547634.

34. Mitrius JC & Vogel SM. (1990). Doxorubicin-induced automaticity in cultured chick heart cell aggregates. *Cancer Res* **50,** 4209-4215. PMID: 2364378.

35. Terzic A & Vogel SM. (1990). Amiloride-sensitive actions of an alpha-adrenoceptor agonist and ouabain in rat atria. *J Mol Cell Cardiol* **22,** 391-402. PMID: 1696995.

36. Lu MC, Noble GD, Thompson EB & Vogel SM. (1991). Molecular modification of anticholinergics as probes for muscarinic receptors. Part 4. Ileal selective muscarinic antagonists. *Drug Des Deliv* **7,** 269-278. PMID: 1930620.

37. Terzic A, Anagnostopoulos T & Vogel SM. (1991). Opposite modulation of ouabain cardiotoxicity by hexamethyleneamiloride and phenylephrine. *Naunyn Schmiedebergs Arch Pharmacol* **343,** 511-518. PMID: 1652698.

38. Terzic A & Vogel SM. (1991). On the mechanism of the positive inotropic action of the alpha adrenoceptor agonist, phenylephrine, in isolated rat left atria. *J Pharmacol Exp Ther* **257,** 520-529. PMID: 1850478.

39. Puceat M, Terzic A, Clement O, Scamps F, Vogel SM & Vassort G. (1992). Cardiac alpha 1-adrenoceptors mediate positive inotropy via myofibrillar sensitization. *Trends Pharmacol Sci* **13,** 263-265. PMID: 1354902.

40. Terzic A, Puceat M, Vassort G & Vogel SM. (1993). Cardiac alpha 1-adrenoceptors: an overview. *Pharmacol Rev* **45,** 147-175. PMID: 8103925.

41. Minshall RD, Yelamanchi VP, Djokovic A, Miletich DJ, Erdos EG, Rabito SF & Vogel SM. (1994). Importance of sympathetic innervation in the positive inotropic effects of bradykinin and ramiprilat. *Circ Res* **74,** 441-447. PMID: 8118952.

42. Vogel SM, Weinberg GL, Djokovic A, Miletich DJ & Albrecht RF. (1995). Analysis of halothane effects on myocardial force-interval relationships at anesthetic concentrations depressing twitches but not tetanic contractions. *Anesthesiology* **83,** 1055-1064. PMID: 7486156.

43. Minshall RD, Erdos EG & Vogel SM. (1997). Angiotensin I-converting enzyme inhibitors potentiate bradykinin's inotropic effects independently of blocking its inactivation. *Am J Cardiol* **80,** 132A-136A. PMID: 9293966.

44. Minshall RD, Vogel SM & Rabito SF. (1997). Are the inotropic and antiarrhythmic effects of bradykinin due to increases in coronary flow? *Am J Cardiol* **80,** 148A-152A. PMID: 9293969.

45. Gao X, Kouklis P, Xu N, Minshall RD, Sandoval R, Vogel SM & Malik AB. (2000). Reversibility of increased microvessel permeability in response to VE-cadherin disassembly. *Am J Physiol Lung Cell Mol Physiol* **279,** L1218-1225. PMID: 11076812.

46. Malik AB, Vogel SM, Minshall RD & Tiruppathi C. (2000). Pulmonary Circulation and Regulation of Fluid Balance. In *Textbook of Respiratory Medicine*, ed. Murray JF & Nadel JA, pp. 119-154. W.B. Saunders Co., Philadelphia.

47. Minshall RD, Tiruppathi C, Vogel SM, Niles WD, Gilchrist A, Hamm HE & Malik AB. (2000). Endothelial cell-surface gp60 activates vesicle formation and trafficking via G(i)-coupled Src kinase signaling pathway. *J Cell Biol* **150,** 1057-1070. PMID: 10973995.

48. Pietrzyk Z, Vogel S, Dietze GJ & Rabito SF. (2000). Augmented sympathetic response to bradykinin in the diabetic heart before autonomic denervation. *Hypertension* **36,** 208-214. PMID: 10948079.

49. Srinivasan HB, Vogel SM, Vidyasagar D & Malik AB. (2000). Protective effect of lung inflation in reperfusion-induced lung microvascular injury. *Am J Physiol Heart Circ Physiol* **278,** H951-957. PMID: 10710364.

50. Vogel SM, Gao X, Mehta D, Ye RD, John TA, Andrade-Gordon P, Tiruppathi C & Malik AB. (2000). Abrogation of thrombin-induced increase in pulmonary microvascular permeability in PAR-1 knockout mice. *Physiol Genomics* **4,** 137-145. PMID: 11120874.

51. John TA, Vogel SM, Minshall RD, Ridge K, Tiruppathi C & Malik AB. (2001). Evidence for the role of alveolar epithelial gp60 in active transalveolar albumin transport in the rat lung. *J Physiol* **533,** 547-559. PMID: 11389211.

52. John TA, Vogel SM, Sekosan M & Malik AB. (2001). Reversible temperature-sensitive alterations in lung fluid balance. *Shock* **16,** 294-297. PMID: 11580113.

53. Vogel SM, Easington CR, Minshall RD, Niles WD, Tiruppathi C, Hollenberg SM, Parrillo JE & Malik AB. (2001). Evidence of transcellular permeability pathway in microvessels. *Microvasc Res* **61,** 87-101. PMID: 11162199.

54. Vogel SM, Minshall RD, Pilipovic M, Tiruppathi C & Malik AB. (2001). Albumin uptake and transcytosis in endothelial cells in vivo induced by albumin-binding protein. *Am J Physiol Lung Cell Mol Physiol* **281,** L1512-1522. PMID: 11704548.

55. Minshall RD, Tiruppathi C, Vogel SM & Malik AB. (2002). Vesicle formation and trafficking in endothelial cells and regulation of endothelial barrier function. *Histochem Cell Biol* **117,** 105-112. PMID: 11935286.

56. Tiruppathi C, Freichel M, Vogel SM, Paria BC, Mehta D, Flockerzi V & Malik AB. (2002). Impairment of store-operated Ca2+ entry in TRPC4(-/-) mice interferes with increase in lung microvascular permeability. *Circ Res* **91,** 70-76. PMID: 12114324.

57. Tiruppathi C, Minshall RD, Paria BC, Vogel SM & Malik AB. (2002). Role of Ca2+ signaling in the regulation of endothelial permeability. *Vascul Pharmacol* **39,** 173-185. PMID: 12747958.

58. Vogel SM & Malik AB. (2002). Albumin transcytosis in mesothelium: further evidence of a transcellular pathway in polarized cells. *Am J Physiol Lung Cell Mol Physiol* **282,** L1-2. PMID: 11741809.

59. John TA, Vogel SM, Tiruppathi C, Malik AB & Minshall RD. (2003). Quantitative analysis of albumin uptake and transport in the rat microvessel endothelial monolayer. *Am J Physiol Lung Cell Mol Physiol* **284,** L187-196. PMID: 12471015.

60. Ahmmed GU, Mehta D, Vogel S, Holinstat M, Paria BC, Tiruppathi C & Malik AB. (2004). Protein kinase Calpha phosphorylates the TRPC1 channel and regulates store-operated Ca2+ entry in endothelial cells. *J Biol Chem* **279,** 20941-20949. PMID: 15016832.

61. Hadkar V, Sangsree S, Vogel SM, Brovkovych V & Skidgel RA. (2004). Carboxypeptidase-mediated enhancement of nitric oxide production in rat lungs and microvascular endothelial cells. *Am J Physiol Lung Cell Mol Physiol* **287,** L35-45. PMID: 14977629.

62. Kouklis P, Konstantoulaki M, Vogel S, Broman M & Malik AB. (2004). Cdc42 regulates the restoration of endothelial barrier function. *Circ Res* **94,** 159-166. PMID: 14656933.

63. Paria BC, Vogel SM, Ahmmed GU, Alamgir S, Shroff J, Malik AB & Tiruppathi C. (2004). Tumor necrosis factor-alpha-induced TRPC1 expression amplifies store-operated Ca2+ influx and endothelial permeability. *Am J Physiol Lung Cell Mol Physiol* **287,** L1303-1313. PMID: 15347566.

64. Predescu D, Vogel SM & Malik AB. (2004). Functional and morphological studies of protein transcytosis in continuous endothelia. *Am J Physiol Lung Cell Mol Physiol* **287,** L895-901. PMID: 15475492.

65. Tiruppathi C, Naqvi T, Wu Y, Vogel SM, Minshall RD & Malik AB. (2004). Albumin mediates the transcytosis of myeloperoxidase by means of caveolae in endothelial cells. *Proc Natl Acad Sci U S A* **101,** 7699-7704. PMID: 15136724.

66. Joseph A, Montiague R, Effendi AR, Urbanska RA, Vogel S, Winnie AP & Rabito SF. (2005). Effect of bupivacaine and levobupivacaine on exocytotic norepinephrine release from rat atria. *Anesthesiology* **102,** 977-984. PMID: 15851885.

67. Minshall RD & Vogel SM. (2005). Lung Edema and Microvascular Permeability, Chapter 76. In *Microvascular Research: Biology and Pathology*, ed. Shepro D, pp. 471-475. Elsevier Science, Burlington MA.

68. Garrean S, Gao XP, Brovkovych V, Shimizu J, Zhao YY, Vogel SM & Malik AB. (2006). Caveolin-1 regulates NF-kappaB activation and lung inflammatory response to sepsis induced by lipopolysaccharide. *J Immunol* **177,** 4853-4860. PMID: 16982927.

69. Hu G, Schwartz DE, Shajahan AN, Visintine DJ, Salem MR, Crystal GJ, Albrecht RF, Vogel SM & Minshall RD. (2006). Isoflurane, but not sevoflurane, increases transendothelial albumin permeability in the isolated rat lung: role for enhanced phosphorylation of caveolin-1. *Anesthesiology* **104,** 777-785. PMID: 16571974.

70. Maniatis NA, Brovkovych V, Allen SE, John TA, Shajahan AN, Tiruppathi C, Vogel SM, Skidgel RA, Malik AB & Minshall RD. (2006). Novel mechanism of endothelial nitric oxide synthase activation mediated by caveolae internalization in endothelial cells. *Circ Res* **99,** 870-877. PMID: 16973909.

71. Orrington-Myers J, Gao X, Kouklis P, Broman M, Rahman A, Vogel SM & Malik AB. (2006). Regulation of lung neutrophil recruitment by VE-cadherin. *Am J Physiol Lung Cell Mol Physiol* **291,** L764-771. PMID: 16782751.

72. Tiruppathi C, Ahmmed GU, Vogel SM & Malik AB. (2006). Ca2+ signaling, TRP channels, and endothelial permeability. *Microcirculation* **13,** 693-708. PMID: 17085428.

73. Vogel SM, Orrington-Myers J, Broman M & Malik AB. (2006). De novo ICAM-1 synthesis in the mouse lung: model of assessment of protein expression in lungs. *Am J Physiol Lung Cell Mol Physiol* **291,** L496-501. PMID: 16714332.

74. Yamaoka K, Vogel SM & Seyama I. (2006). Na+ channel pharmacology and molecular mechanisms of gating. *Curr Pharm Des* **12,** 429-442. PMID: 16472137.

75. Bachmaier K, Toya S, Gao X, Triantafillou T, Garrean S, Park GY, Frey RS, Vogel S, Minshall R, Christman JW, Tiruppathi C & Malik AB. (2007). E3 ubiquitin ligase Cblb regulates the acute inflammatory response underlying lung injury. *Nat Med* **13,** 920-926. PMID: 17618294.

76. Gorovoy M, Neamu R, Niu J, Vogel S, Predescu D, Miyoshi J, Takai Y, Kini V, Mehta D, Malik AB & Voyno-Yasenetskaya T. (2007). RhoGDI-1 modulation of the activity of monomeric RhoGTPase RhoA regulates endothelial barrier function in mouse lungs. *Circ Res* **101,** 50-58. PMID: 17525371.

77. Hecquet CM, Ahmmed GU, Vogel SM & Malik AB. (2008). Role of TRPM2 channel in mediating H2O2-induced Ca2+ entry and endothelial hyperpermeability. *Circ Res* **102,** 347-355. PMID: 18048770.

78. Hu G, Vogel SM, Schwartz DE, Malik AB & Minshall RD. (2008). Intercellular adhesion molecule-1-dependent neutrophil adhesion to endothelial cells induces caveolae-mediated pulmonary vascular hyperpermeability. *Circ Res* **102,** e120-131. PMID: 18511851.

79. Maniatis NA, Shinin V, Schraufnagel DE, Okada S, Vogel SM, Malik AB & Minshall RD. (2008). Increased pulmonary vascular resistance and defective pulmonary artery filling in caveolin-1-/- mice. *Am J Physiol Lung Cell Mol Physiol* **294,** L865-873. PMID: 18192592.

80. Ramchandran R, Mehta D, Vogel SM, Mirza MK, Kouklis P & Malik AB. (2008). Critical role of Cdc42 in mediating endothelial barrier protection in vivo. *Am J Physiol Lung Cell Mol Physiol* **295,** L363-369. PMID: 18515405.

81. Tauseef M, Kini V, Knezevic N, Brannan M, Ramchandaran R, Fyrst H, Saba J, Vogel SM, Malik AB & Mehta D. (2008). Activation of sphingosine kinase-1 reverses the increase in lung vascular permeability through sphingosine-1-phosphate receptor signaling in endothelial cells. *Circ Res* **103,** 1164-1172. PMID: 18849324.

82. Tiruppathi C, Shimizu J, Miyawaki-Shimizu K, Vogel SM, Bair AM, Minshall RD, Predescu D & Malik AB. (2008). Role of NF-kappaB-dependent caveolin-1 expression in the mechanism of increased endothelial permeability induced by lipopolysaccharide. *J Biol Chem* **283,** 4210-4218. PMID: 18077459.

83. Xu J, Gao XP, Ramchandran R, Zhao YY, Vogel SM & Malik AB. (2008). Nonmuscle myosin light-chain kinase mediates neutrophil transmigration in sepsis-induced lung inflammation by activating beta2 integrins. *Nat Immunol* **9,** 880-886. PMID: 18587400.

84. Bair AM, Thippegowda PB, Freichel M, Cheng N, Ye RD, Vogel SM, Yu Y, Flockerzi V, Malik AB & Tiruppathi C. (2009). Ca2+ entry via TRPC channels is necessary for thrombin-induced NF-kappaB activation in endothelial cells through AMP-activated protein kinase and protein kinase Cdelta. *J Biol Chem* **284,** 563-574. PMID: 18990707.

85. Gorovoy M, Han J, Pan H, Welch E, Neamu R, Jia Z, Predescu D, Vogel S, Minshall RD, Ye RD, Malik AB & Voyno-Yasenetskaya T. (2009). LIM kinase 1 promotes endothelial barrier disruption and neutrophil infiltration in mouse lungs. *Circ Res* **105,** 549-556. PMID: 19679840.

86. Wary KK, Vogel SM, Garrean S, Zhao YD & Malik AB. (2009). Requirement of alpha(4)beta(1) and alpha(5)beta(1) integrin expression in bone-marrow-derived progenitor cells in preventing endotoxin-induced lung vascular injury and edema in mice. *Stem Cells* **27,** 3112-3120. PMID: 19839056.

87. Zhao YD, Ohkawara H, Rehman J, Wary KK, Vogel SM, Minshall RD, Zhao YY & Malik AB. (2009). Bone marrow progenitor cells induce endothelial adherens junction integrity by sphingosine-1-phosphate-mediated Rac1 and Cdc42 signaling. *Circ Res* **105,** 696-704, 698 p following 704. PMID: 19696411.

88. Zhao YY, Zhao YD, Mirza MK, Huang JH, Potula HH, Vogel SM, Brovkovych V, Yuan JX, Wharton J & Malik AB. (2009). Persistent eNOS activation secondary to caveolin-1 deficiency induces pulmonary hypertension in mice and humans through PKG nitration. *J Clin Invest* **119,** 2009-2018. PMID: 19487814.

89. Di A, Kawamura T, Gao XP, Tang H, Berdyshev E, Vogel SM, Zhao YY, Sharma T, Bachmaier K, Xu J & Malik AB. (2010). A novel function of sphingosine kinase 1 suppression of JNK activity in preventing inflammation and injury. *J Biol Chem* **285,** 15848-15857. PMID: 20299461.

90. Minshall RD, Vandenbroucke EE, Holinstat M, Place AT, Tiruppathi C, Vogel SM, van Nieuw Amerongen GP, Mehta D & Malik AB. (2010). Role of protein kinase Czeta in thrombin-induced RhoA activation and inter-endothelial gap formation of human dermal microvessel endothelial cell monolayers. *Microvasc Res* **80,** 240-249. PMID: 20417648.

91. Mirza MK, Sun Y, Zhao YD, Potula HH, Frey RS, Vogel SM, Malik AB & Zhao YY. (2010). FoxM1 regulates re-annealing of endothelial adherens junctions through transcriptional control of beta-catenin expression. *J Exp Med* **207,** 1675-1685. PMID: 20660612.

92. Zhao YD, Ohkawara H, Vogel SM, Malik AB & Zhao YY. (2010). Bone marrow-derived progenitor cells prevent thrombin-induced increase in lung vascular permeability. *Am J Physiol Lung Cell Mol Physiol* **298,** L36-44. PMID: 19880506.

93. Di A, Gao XP, Qian F, Kawamura T, Han J, Hecquet C, Ye RD, Vogel SM & Malik AB. (2011). The redox-sensitive cation channel TRPM2 modulates phagocyte ROS production and inflammation. *Nat Immunol* **13,** 29-34. PMID: 22101731.

94. Garcia AN, Vogel SM, Komarova YA & Malik AB. (2011). Permeability of endothelial barrier: cell culture and in vivo models. *Methods Mol Biol* **763,** 333-354. PMID: 21874463.

95. Liu G, Vogel SM, Gao X, Javaid K, Hu G, Danilov SM, Malik AB & Minshall RD. (2011). Src phosphorylation of endothelial cell surface intercellular adhesion molecule-1 mediates neutrophil adhesion and contributes to the mechanism of lung inflammation. *Arterioscler Thromb Vasc Biol* **31,** 1342-1350. PMID: 21474822.

96. Siddiqui MR, Komarova YA, Vogel SM, Gao X, Bonini MG, Rajasingh J, Zhao YY, Brovkovych V & Malik AB. (2011). Caveolin-1-eNOS signaling promotes p190RhoGAP-A nitration and endothelial permeability. *J Cell Biol* **193,** 841-850. PMID: 21624953.

97. Aman J, van Bezu J, Damanafshan A, Huveneers S, Eringa EC, Vogel SM, Groeneveld AB, Vonk Noordegraaf A, van Hinsbergh VW & van Nieuw Amerongen GP. (2012). Effective treatment of edema and endothelial barrier dysfunction with imatinib. *Circulation* **126,** 2728-2738. PMID: 23099479.

98. Deng J, Wang X, Qian F, Vogel S, Xiao L, Ranjan R, Park H, Karpurapu M, Ye RD, Park GY & Christman JW. (2012). Protective role of reactive oxygen species in endotoxin-induced lung inflammation through modulation of IL-10 expression. *J Immunol* **188,** 5734-5740. PMID: 22547702.

99. Krishnamoorthy V, Hiller DB, Ripper R, Lin B, Vogel SM, Feinstein DL, Oswald S, Rothschild L, Hensel P, Rubinstein I, Minshall R & Weinberg GL. (2012). Epinephrine induces rapid deterioration in pulmonary oxygen exchange in intact, anesthetized rats: a flow and pulmonary capillary pressure-dependent phenomenon. *Anesthesiology* **117,** 745-754. PMID: 22902967.

100. Liu G, Place AT, Chen Z, Brovkovych VM, Vogel SM, Muller WA, Skidgel RA, Malik AB & Minshall RD. (2012). ICAM-1-activated Src and eNOS signaling increase endothelial cell surface PECAM-1 adhesivity and neutrophil transmigration. *Blood* **120,** 1942-1952. PMID: 22806890.

101. Naikawadi RP, Cheng N, Vogel SM, Qian F, Wu D, Malik AB & Ye RD. (2012). A critical role for phosphatidylinositol (3,4,5)-trisphosphate-dependent Rac exchanger 1 in endothelial junction disruption and vascular hyperpermeability. *Circ Res* **111,** 1517-1527. PMID: 22965143.

102. Sundivakkam PC, Freichel M, Singh V, Yuan JP, Vogel SM, Flockerzi V, Malik AB & Tiruppathi C. (2012). The Ca(2+) sensor stromal interaction molecule 1 (STIM1) is necessary and sufficient for the store-operated Ca(2+) entry function of transient receptor potential canonical (TRPC) 1 and 4 channels in endothelial cells. *Mol Pharmacol* **81,** 510-526. PMID: 22210847.

103. Tauseef M, Knezevic N, Chava KR, Smith M, Sukriti S, Gianaris N, Obukhov AG, Vogel SM, Schraufnagel DE, Dietrich A, Birnbaumer L, Malik AB & Mehta D. (2012). TLR4 activation of TRPC6-dependent calcium signaling mediates endotoxin-induced lung vascular permeability and inflammation. *J Exp Med* **209,** 1953-1968. PMID: 23045603.

104. Vandenbroucke St Amant E, Tauseef M, Vogel SM, Gao XP, Mehta D, Komarova YA & Malik AB. (2012). PKCalpha activation of p120-catenin serine 879 phospho-switch disassembles VE-cadherin junctions and disrupts vascular integrity. *Circ Res* **111,** 739-749. PMID: 22798526.

105. Vogel SM & Malik AB. (2012). Cytoskeletal dynamics and lung fluid balance. *Compr Physiol* **2,** 449-478. PMID: 23728978.

106. Han J, Zhang G, Welch EJ, Liang Y, Fu J, Vogel SM, Lowell CA, Du X, Cheresh DA, Malik AB & Li Z. (2013). A critical role for Lyn kinase in strengthening endothelial integrity and barrier function. *Blood* **122,** 4140-4149. PMID: 24108461.

107. Hecquet CM, Zhang M, Mittal M, Vogel SM, Di A, Gao X, Bonini MG & Malik AB. (2013). Cooperative Interaction of trp Melastatin Channel TRPM2 with its Splice Variant TRPM2-S is Essential for Endothelial Cell Apoptosis. *Circ Res*. PMID: 24337049.

108. Rusu L, Andreeva A, Visintine DJ, Kim K, Vogel SM, Stojanovic-Terpo A, Chernaya O, Liu G, Bakhshi FR, Haberichter SL, Iwanari H, Kusano-Arai O, Suzuki N, Hamakubo T, Kozasa T, Cho J, Du X & Minshall RD. (2013). G protein-dependent basal and evoked endothelial cell vWF secretion. *Blood*. PMID: 24081657.

109. DebRoy A, Vogel SM, Soni D, Sundivakkam PC, Malik AB, Tiruppathi C. Cooperative signaling via transcription factors NF-κB and AP1/c-Fos mediates endothelial cell STIM1 expression and hyperpermeability in response to endotoxin (2014). *J Biol Chem*. **289**: 24188-201. PMID: 25016017.

110. Thangavel J, Malik AB, Elias HK, Rajasingh S, Simpson AD, Sundivakkam PK, Vogel SM, Xuan YT, Dawn B, Rajasingh J (2014). Combinatorial therapy with acetylation and methylation modifiers attenuates lung vascular hyperpermeability in endotoxemia-induced mouse inflammatory lung injury. *Am J Pathol*. **184** :2237-49. PMID: 24929240.

111. Gong H, Gao X, Feng S, Siddiqui MR, Garcia A, Bonini MG, Komarova Y, Vogel SM, Mehta D, Malik AB (2014). Evidence of a common mechanism of disassembly of adherens junctions through Gα13 targeting of VE-cadherin. *J Exp Med*. **211**: 579-91. PMID: 24590762.

112. Huang X, Sun K, Zhao YD, Vogel SM, Song Y, Mahmud N, Zhao YY (2014). Human CD34+ progenitor cells freshly isolated from umbilical cord blood attenuate inflammatory lung injury following LPS challenge. *PLoS One* **9**: e88814. PMID: 24558433.

113. Tiruppathi C, Soni D, Wang DM, Xue J, Singh V, Thippegowda PB, Cheppudira BP, Mishra RK, Debroy A, Qian Z, Bachmaier K, Zhao YY, Christman JW, Vogel SM, Ma A, Malik AB. The transcription factor DREAM represses the deubiquitinase A20 and mediates inflammation. *Nat Immunol*. **15**: 239-47. PMID: 24487321.

114. Cai L, Yi F, Dai Z, Huang X, Zhao YD, Mirza MK, Xu J, Vogel SM, Zhao YY (2014). Loss of caveolin-1 and adiponectin induces severe inflammatory lung injury following LPS challenge through excessive oxidative/nitrative stress. *Am J Physiol Lung Cell Mol Physiol.* **306**: L566-73. PMID: 24441873.

115. Baig MS, Zaichick SV, Mao M, de Abreu AL, Bakhshi FR, Hart PC, Saqib U, Deng J, Chatterjee S, Block ML, Vogel SM, Malik AB, Consolaro ME, Christman JW, Minshall RD, Gantner BN, Bonini MG (2015). NOS1-derived nitric oxide promotes NF-κB transcriptional activity through inhibition of suppressor of cytokine signaling-1. *J Exp Med*. **212**:1725-38. PMID: 26324446.

116 Geyer M, Huang F, Sun Y, Vogel SM, Malik AB, Taylor CW, Komarova YA (2015). Microtubule-Associated Protein EB3 Regulates IP3 Receptor Clustering and Ca(2+) Signaling in Endothelial Cells. *Cell Rep*. **12**: 79-89. PMID: 26119739.

117. Chignalia AZ, Vogel SM, Reynolds AB, Mehta D, Dull RO, Minshall RD, Malik AB, Liu Y (2015). p120-catenin expressed in alveolar type II cells is essential for the regulation of lung innate immune response. *Am J Pathol*. **185**: 1251-63. PMID: 25773174.

118. Gong H, Rehman J, Tang H, Wary K, Mittal M, Chaturvedi P, Zhao YY, Komarova YA, Vogel SM, Malik AB (2015). HIF2α signaling inhibits adherens junctional disruption in acute lung injury. *J Clin Invest*. **125**: 652-64. PMID: 25574837.

119. Soni D, Regmi SC, Wang DM, DebRoy A, Zhao YY, Vogel SM, Malik AB, Tiruppathi C (2017).

Pyk2 phosphorylation of VE-PTP downstream of STIM1-induced Ca2+ entry regulates disassembly of adherens junctions. *Am J Physiol Lung Cell Mol Physiol*. 312: L1003-L1017. PMID: 28385807 PMCID: PMC5495943.

###  (b) Submitted Manuscripts