

Stanford




Vivek Bhalla, MD

Assistant Professor of Medicine (Nephrology) at the Stanford University Medical Center

Medicine - Nephrology

 NIH Biosketch available Online

 Curriculum Vitae available Online

CLINICAL OFFICES

- **Nephrology Clinic**

300 Pasteur Dr Rm A156

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Stanford, CA 94305

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Bio

CLINICAL FOCUS

- Nephrology
- Hypertension
- Resistant Hypertension
- Diabetic Kidney Disease
- Electrolyte Disorders

ACADEMIC APPOINTMENTS

- Assistant Professor - Med Center Line, Medicine - Nephrology
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Director, Renal Physiology, Pre-Clinical Curriculum, (2012- present)
- Director, Stanford Hypertension Center, (2015- present)
- Member, Stanford Diabetes Research Center, (2017- present)

HONORS AND AWARDS

- Fellow, American Society of Nephrology (2003)
- Mentored Clinical Scientist Award (K08), NIH/NIDDK (2005-2010)
- Teaching Awardee, Halie T. Debas Academy of Medical Educators, UCSF (2007)
- Shaul G. Massry Young Investigator's Award, National Kidney Foundation (2008)
- Carl W. Gottschalk Research Grant, American Society of Nephrology (2010-2012)

- Faculty Mentor Award, Stanford Biodesign Program (2012)
- Henry J Kaiser Family Foundation Award for Excellence in Preclinical Teaching, Stanford University School of Medicine (2012)
- Fellow, American Heart Association (2017)
- Outstanding Lecture / Presentation, Stanford University School of Medicine (2017)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Biosciences Research Advisory Group, American Society of Nephrology (2014 - 2016)
- Vice-Chair, Kidney in Cardiovascular Disease Council, American Heart Association (2016 - 2018)
- Member, Hypertension Council, American Heart Association (2016 - present)
- Chair, Kidney in Cardiovascular Disease Council, American Heart Association (2018 - present)

PROFESSIONAL EDUCATION

- Residency: Harbor UCLA Internal Medicine Residency (2001) CA
- Fellowship: UCSF Nephrology Training Program (2005) CA
- Medical Education: University of California San Diego Medical School (1998) CA
- Board Certification, American Society of Hypertension , Clinical Hypertension (2015)
- Board Certification: Nephrology, American Board of Internal Medicine (2003)
- Board Certification: Internal Medicine, American Board of Internal Medicine (2001)
- Fellowship, University of California San Francisco , Nephrology (2005)
- Residency, Harbor-UCLA Medical Center , Internal Medicine (2001)
- M.D., Univ of California San Diego , Medicine (1998)
- B.S., Univ of California Berkeley , Electrical Engineering (1994)

LINKS

- Stanford Hypertension Center: <http://med.stanford.edu/hypertension.html>
- Bhalla Laboratory Website: <http://www.stanford.edu/~vbhalla/>
- Research Gate Profile: https://www.researchgate.net/profile/Vivek_Bhalla

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Dr. Bhalla received his training in molecular biology at UC San Francisco. His postdoctoral work centered on the regulation of aldosterone-mediated sodium transport in health and disease. In his laboratory he uses both in vitro and in vivo approaches for several projects related to the role of the kidney in health, diabetes, and hypertension.

(1) Diabetic kidney disease is costly and consequential. Diabetic kidney disease is the most common form of chronic kidney disease in the world, yet no curative therapy is available. Studies of the susceptibility of diabetic kidney disease led to the discovery of differential regulation of endothelial-specific molecule-1, Esm-1 (endocan) in susceptible strains of mice. Esm-1 is a secreted proteoglycan that is enriched in glomerular endothelium and inhibits LFA-1 : ICAM-1 interaction and decreases infiltration in glomeruli in the setting of diabetes and other inflammatory diseases. Ongoing rescue and deletion experiments explore the role of Esm-1 in diabetes and diabetic kidney disease. We also study the regulation of Esm-1 transcription and protein stability.

(2) Investigation of the mechanisms of hypertension in the setting of obesity and insulin resistance using renal tubular epithelial insulin receptor deletion challenged the role of insulin in the hypertension of obesity, insulin resistance, and the metabolic syndrome. These studies also shed light on the role of insulin in control of glucose reabsorption via SGLT2. Ongoing studies focus on molecular mechanisms of insulin-regulated SGLT2 and its contrast with insulin resistant pathways in other cell types and tissues.

(3) An unexpected finding of aberrant regulation of potassium transport in obesity and insulin resistance has led to another project exploring the role of obesity and insulin in potassium transport in the cortical collecting duct.

(4) A major regulator of sodium reabsorption, Clcnkb, is mutated in humans with Bartter's syndrome, Type 3. However, surprisingly little is known about the regulation of this channel in health and disease. Ongoing experiments include the study of post-translational regulation of Clcnkb surface expression and activity using in vitro and in vivo approaches.

(5) Inhibition of sodium reabsorption using diuretics is a mainstay of therapy for hypertension and edema-forming states. Study on the consequences of diuretic therapy using tubular morphometry and single cell approaches have led to additional work on mechanisms of tubular remodeling in vivo.

CLINICAL TRIALS

- CALM- 2 - Controlling and Lowering Blood Pressure With the MobiusHD™, Recruiting

Teaching

COURSES

2018-19

- Science of Medicine II-A: INDE 222A (Aut)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

George Kunkel, Ying Shi

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Medicine (Masters Program)

Publications

PUBLICATIONS

- **Intercalated Cells of the Kidney Collecting Duct in Kidney Physiology.** *Seminars in nephrology*
Rao, R., Bhalla, V., Pastor-Soler, N. M.
2019; 39 (4): 353–67
- **Comparison of routine and automated office blood pressure measurement.** *Blood pressure monitoring*
Cheng, R. Z., Bhalla, V., Chang, T. I.
2019
- **Hypertension Hot Potato - Anatomy of the Angiotensin-Receptor Blocker Recalls** *NEW ENGLAND JOURNAL OF MEDICINE*
Byrd, J., Chertow, G. M., Bhalla, V.
2019; 380 (17): 1589–91
- **Cardiorenal Syndrome: Classification, Pathophysiology, Diagnosis, and Treatment Strategies A Scientific Statement From the American Heart Association** *CIRCULATION*

- Rangaswami, J., Bhalla, V., Blair, J. A., Chang, T., Costa, S., Lentine, K. L., Lerma, E., Mezue, K., Molitch, M., Mullens, W., Ronco, C., Tang, W., McCullough, et al
2019; 139 (16): E840–E878
- **Prospective Biopsy-Based Study of Chronic Kidney Disease of Unknown Etiology in Sri Lanka.** *Clinical journal of the American Society of Nephrology : CJASN*
Anand, S., Montez-Rath, M. E., Adasooriya, D., Ratnatunga, N., Kambham, N., Wazil, A., Wijetunge, S., Badurdeen, Z., Ratnayake, C., Karunasena, N., Schensul, S. L., Valhos, P., Haider, et al
2019
 - **Celebrating 40 Years of Accomplishments.** *Hypertension (Dallas, Tex. : 1979)*
Dominiczak, A. F., Kuo, D., Bhalla, V., Granger, J. P., Griffin, K. A.
2019; 73 (1): 3–6
 - **Renal tubule insulin receptor modestly promotes elevated blood pressure and markedly stimulates glucose reabsorption.** *JCI insight*
Nizar, J. M., Shepard, B. D., Vo, V. T., Bhalla, V.
2018; 3 (16)
 - **Age-Related Blood Pressure Sensitivity to Aldosterone in Blacks and Whites** *HYPERTENSION*
Tu, W., Li, R., Bhalla, V., Eckert, G. J., Pratt, J.
2018; 72 (1): 247–52
 - **Improved protocols for the study of urinary electrolyte excretion and blood pressure in rodents: use of gel food and stepwise changes in diet composition.** *American journal of physiology. Renal physiology*
Nizar, J. M., Bouby, N., Bankir, L., Bhalla, V.
2018
 - **A Novel High-Resolution Magnetic Resonance Imaging Protocol Detects Aldosterone-Producing Adenomas in Patients with Negative Computed Tomography.** *American journal of hypertension*
Raber, I., Isom, R. T., Louie, J. D., Vasanaawala, S., Bhalla, V.
2018
 - **Explaining the Coincidence Rule for Estimating Respiratory Compensation in Metabolic Acid-Base Disorders** *ANNALS OF INTERNAL MEDICINE*
Liu, G. S., Bhalla, V.
2017; 166 (8): 610-610
 - **Molecular Mechanisms of Sodium-Sensitive Hypertension in the Metabolic Syndrome.** *Current hypertension reports*
Nizar, J. M., Bhalla, V.
2017; 19 (8): 60
 - **Insights from direct renal insulin infusion: a new hammer for an age-old nail.** *American journal of physiology. Renal physiology*
Nizar, J. M., Bhalla, V.
2017; ajprenal.00532.2017
 - **Murine glomerular transcriptome links endothelial cell-specific molecule-1 deficiency with susceptibility to diabetic nephropathy.** *PloS one*
Zheng, X., Soroush, F., Long, J., Hall, E. T., Adishesha, P. K., Bhattacharya, S., Kiani, M. F., Bhalla, V.
2017; 12 (9): e0185250
 - **Pemetrexed-Induced Nephrogenic Diabetes Insipidus** *AMERICAN JOURNAL OF KIDNEY DISEASES*
Fung, E., Anand, S., Bhalla, V.
2016; 68 (4): 628-632
 - **New perspective of ClC-Kb/2 Cl- channel physiology in the distal renal tubule** *AMERICAN JOURNAL OF PHYSIOLOGY-RENAL PHYSIOLOGY*
Zaika, O., Tomilin, V., Mamenko, M., Bhalla, V., Pochynyuk, O.
2016; 310 (10): P923-P930
 - **Na+-sensitive elevation in blood pressure is ENaC independent in diet-induced obesity and insulin resistance** *AMERICAN JOURNAL OF PHYSIOLOGY-RENAL PHYSIOLOGY*
Nizar, J. M., Dong, W., McClellan, R. B., Labarca, M., Zhou, Y., Wong, J., Goens, D. G., Zhao, M., Velarde, N., Bernstein, D., Pellizzon, M., Satlin, L. M., Bhalla, et al
2016; 310 (9): F812-F820

- **Regulation of the Water Channel Aquaporin-2 via 14-3-3? and -?.** *journal of biological chemistry*
Moeller, H. B., Slengerik-Hansen, J., Aroankins, T., Assentoft, M., MacAulay, N., Moestrup, S. K., Bhalla, V., Fenton, R. A.
2016; 291 (5): 2469-2484
- **Regulation of the Water Channel Aquaporin-2 via 14-3-3 theta and-zeta** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Moeller, H. B., Slengerik-Hansen, J., Aroankins, T., Assentoft, M., MacAulay, N., Moestrup, S. K., Bhalla, V., Fenton, R. A.
2016; 291 (5): 2469-2484
- **Harvest and primary culture of the murine aldosterone-sensitive distal nephron.** *American journal of physiology. Renal physiology*
Labarca, M., Nizar, J. M., Walczak, E. M., Dong, W., Pao, A. C., Bhalla, V.
2015; 308 (11): F1306-15
- **The missing link: studying the alternative TGF-β pathway provides a unifying theory for different components of diabetic nephropathy.** *Diabetes*
Zheng, X., Bhalla, V.
2015; 64 (6): 1898-1900
- **Is there a sweet spot for Nrf2 activation in the treatment of diabetic kidney disease?** *Diabetes*
Hall, E. T., Bhalla, V.
2014; 63 (9): 2904-2905
- **Racial/Ethnic differences in the prevalence of proteinuric and nonproteinuric diabetic kidney disease.** *Diabetes care*
Bhalla, V., Zhao, B., Azar, K. M., Wang, E. J., Choi, S., Wong, E. C., Fortmann, S. P., Palaniappan, L. P.
2013; 36 (5): 1215-1221
- **A transcriptional blueprint for human and murine diabetic kidney disease.** *Diabetes*
Bhalla, V., Velez, M., Chertow, G. M.
2013; 62 (1): 31-33
- **Low-Level Lead Exposure and the Prevalence of Gout An Observational Study** *ANNALS OF INTERNAL MEDICINE*
Krishnan, E., Lingala, B., Bhalla, V.
2012; 157 (4): 233-?
- **Neural Precursor Cell-expressed Developmentally Down-regulated Protein 4-2 (Nedd4-2) Regulation by 14-3-3 Protein Binding at Canonical Serum and Glucocorticoid Kinase 1 (SGK1) Phosphorylation Sites** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Chandran, S., Li, H., Dong, W., Krasinska, K., Adams, C., Alexandrova, L., Chien, A., Hallows, K. R., Bhalla, V.
2011; 286 (43): 37830-37840
- **In diabetic nephropathy, high doses of vitamin B decrease glomerular filtration rate and increase risk of the composite outcome of a vascular event or all-cause mortality compared with placebo.** *Evidence-based medicine*
Bhalla, V.
2011; 16 (1): 14-15
- **Renal sympathetic denervation in patients with treatment-resistant hypertension (The Symplicity HTN-2 Trial): a randomised controlled trial** *LANCET*
Esler, M. D., Krum, H., Sobotka, P. A., Schlaich, M. P., Schmieder, R. E., Boehm, M., Mahfoud, F., Sievert, H., Wunderlich, N., Rump, L. C., Vonend, O., Uder, M., Lobo, et al
2010; 376 (9756): 1903-1909
- **Phosphopeptide Screen Uncovers Novel Phosphorylation Sites of Nedd4-2 That Potentiate Its Inhibition of the Epithelial Na⁺ Channel** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Hallows, K. R., Bhalla, V., Oyster, N. M., Wijngaarden, M. A., Lee, J. K., Li, H., Chandran, S., Xia, X., Huang, Z., Chalkley, R. J., Burlingame, A. L., Pearce, D.
2010; 285 (28): 21671-21678
- **Phosphopeptide Screen Uncovers JNK1 as a Potentiator of Nedd4-2-Mediated Epithelial Na⁺ plus Channel Inhibition**
Bhalla, V., Oyster, N. M., Wijngaarden, M., Lee, J., Li, H., Xia, X., Huang, Z., Chalkley, R., Burlingame, A., Pearce, D., Hallows, K.
FEDERATION AMER SOC EXP BIOL.2010
- **Lead poisoning from an Ayurvedic herbal medicine in a patient with chronic kidney disease** *NATURE REVIEWS NEPHROLOGY*
Prakash, S., Hernandez, G. T., Dujaili, I., Bhalla, V.
2009; 5 (5): 297-300

- **Melamine nephrotoxicity: an emerging epidemic in an era of globalization** *KIDNEY INTERNATIONAL*
Bhalla, V., Grimm, P. C., Chertow, G. M., Pao, A. C.
2009; 75 (8): 774-779
- **Mechanisms of ENaC regulation and clinical implications** *JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY*
Bhalla, V., Hallows, K. R.
2008; 19 (10): 1845-1854
- **NH2 terminus of serum and glucocorticoid-regulated kinase 1 binds to phosphoinositides and is essential for isoform-specific physiological functions** *AMERICAN JOURNAL OF PHYSIOLOGY-RENAL PHYSIOLOGY*
Pao, A. C., McCormick, J. A., Li, H., Siu, J., Govaerts, C., Bhalla, V., Soundararajan, R., Pearce, D.
2007; 292 (6): F1741-F1750
- **Disinhibitory pathways for control of sodium transport: regulation of ENaC by SGK1 and GILZ** *AMERICAN JOURNAL OF PHYSIOLOGY-RENAL PHYSIOLOGY*
Bhalla, V., Soundararajan, R., Pao, A. C., Li, H., Pearce, D.
2006; 291 (4): F714-F721
- **AMP-activated kinase inhibits the epithelial Na⁺ channel through functional regulation of the ubiquitin ligase Nedd4-2** *JOURNAL OF BIOLOGICAL CHEMISTRY*
Bhalla, V., Oyster, N. M., Fitch, A. C., Wijngaarden, M. A., Neumann, D., Schlattner, U., Pearce, D., Hallows, K. R.
2006; 281 (36): 26159-26169
- **Serum- and glucocorticoid-regulated kinase 1 regulates ubiquitin ligase neural precursor cell-expressed, developmentally down-regulated protein 4-2 by inducing interaction with 14-3-3** *MOLECULAR ENDOCRINOLOGY*
Bhalla, V., Daidie, D., Li, H. Y., Pao, A. C., LaGrange, L. P., Wang, J., VANDEWALLE, A., Stockand, J. D., Staub, O., Pearce, D.
2005; 19 (12): 3073-3084
- **SGK1: A rapid aldosterone-induced regulator of renal sodium reabsorption** *PHYSIOLOGY*
McCormick, J. A., Bhalla, V., Pao, A. C., Pearce, D.
2005; 20: 134-139
- **Recurrent and de novo diabetic nephropathy in renal allografts** *TRANSPLANTATION*
Bhalla, V., Nast, C. C., Stollenwerk, N., Tran, S., Barba, L., Kamil, E. S., Danovitch, G., Adler, S. G.
2003; 75 (1): 66-71