BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
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NAME	POSITION TITLE
Moss, Nicholas G.	Research Associate Professor
eRA COMMONS USER NAME NICHOLAS_MOSS	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Wales, Bangor UK	B Sc	1971	Zoology
University of Wales, Bangor UK	PhD	1976	Renal Physiology

A. Personal Statement: My experience in renal physiology amounts to more than 30 years of research into the ways in which animals overcome challenges to electrolyte and water homeostasis. I was trained in micropuncture techniques under professors Pierre Morel and Christian de Rouffignac at the CEN de Saclay in France, where I investigated the urinary concentrating mechanism and the hypertrophic effects of unilateral nephrectomy. I then participated in a series of micropuncture studies in rats to investigate renal failure following obstructive jaundice with Dr. Marjorie Allison in Glasgow. In Dr. Carl Gottschalk's laboratory in Chapel Hill I investigated neural renorenal reflexes using micropuncture and electrophysiological recording techniques. This work led to the discovery of several novel modalities in renal afferent nerves and showed how their responsiveness is influenced by age (mature vs. immature), rat strain (SHR vs. WKY) and the renin angiotensin system (ACE inhibition). More recently I have investigated the natriuretic factors that enable rats with a 5/6 nephrectomy to maintain sodium balance in the face of considerably reduced nephron numbers. The skills and experience gained in these studies have enabled me to quickly incorporate the **C**ontrast **E**nhanced **U**ltrasound technique into studies of renal function following surgical reductions in renal mass. In these respects, I am eminently qualified to conduct this ground breaking research program that will be the first application of this powerful imaging technique to study intrarenal perfusion during the development and progression of renal disease.

B. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

Postdoctoral training:

1976 – 1978 Career Investigator Research Fellow, University of North Carolina at Chapel Hill, Chapel Hill, N C

Academic appointments:

1979–1981 Research Associate, University of North Carolina at Chapel Hill, NC
1981–1997 Research Assistant Professor, University of North Carolina at Chapel Hill, NC
1997–present Research Associate Professor, University of North Carolina at Chapel Hill, NC

Awards / Honors / Service

1971–1972 Stagière, Centre d'Etudes Nucleaire, Saclay, France
1990 Invited reviewer for NIH SCORE grant Applications in Hypertension
1992 Co-organizer "Neuromediators and the Kidney" International Union of Physiological Sciences Glasgow, Scotland, August 1993
1990–1992 Member, Editorial Board American Journal of Physiology, Comparative, Regulatory

and Integrative Physiology.

1993 Ad Hoc reviewer, NIH Respiratory and Applied Physiology Study Section

1993–1997 Grant Reviewer, Paul Teschan Kidney Research Fund

2003–2008 Member, National Dental Board Examination test construction committee for Physiology and Biochemistry

C. Peer-Reviewed Publications (selected, in chronological order).

- **Moss NG**, Powell SL and Falk RJ. Intravenous cyclosporine activates afferent and efferent renal nerves and causes sodium retention in innervated kidneys in rats. *Proc Natl Acad Sci.* 82: 8222-8226, 1986.
- Barber JD and **Moss NG**. Reduced renal perfusion pressure causes a prostaglandin-dependent excitation of R2 chemoreceptors in rats. *Am J Physiol* 259 (*Regulatory Comp Integrative Physiol* 28): R1243-R1249, 1990.
- **Moss NG** and Scoltock AB. Age-dependent changes in afferent renal nerve activity in genetically hypertensive rats. *Am J Physiol* 262 (*Regulatory Comp Integrative Physiol* 31): R834-R841, 1992,
- Doutova EA and **Moss NG**. Age-related changes in calcitonin gene-related peptide and substance P in renal afferent nerve soma in the rat. Association with afferent renal nerve activity. *Dev Brain Res* 97: 260-268, 1996.
- **Moss NG** and Karastoianova IV. Static and dynamic responses of renal chemoreceptor neurons to intrapelvic pressure increases in the rat. *J. Autonom Nerv Syst* 63: 107-114, 1997.
- Moss NG, Harrington WW and Tucker MS. Pressure, volume, and chemosensitivity in afferent innervation of urinary bladder in rats. *Am J Physio.* 272 (*Regulatory, Integrative Comp Physiol 41)*: R695-R703, 1997.
- **Moss NG** and Karastoianova IV. Static and dynamic responses of renal chemoreceptor neurons to intrapelvic pressure increases in the rat. *J. Autonom Nerv Syst.* 63: 107-114, 1997.
- Zhong Z, Conner H, Yin M, **Moss N**, Mason R, Bunzendahl H, Forman D and Thurman RG. Dietary glycine and renal denervation prevents cyclosporin A-induced hydroxyl radical production in the rat kidney. *Mol Pharmacol.* 56: 455-463, 1999.
- Zhong Z, Enomoto N, Connor HD, **Moss N**, Mason RP, and Thurman RG. Glycine improves survival after hemorrhagic shock in the rat. *Shock* 12:54-62, 1999.
- Qian X, **Moss NG**, Fellner RC, Goy MF. Circulating prouroguanylin is processed to its active natriuretic form exclusively within the renal tubules. *Endocrinology* 149: 4499-509, 2008.
- **Moss NG**, Fellner RC, Qian X, Yu SJ, Li Z, Nakazato M and Goy MF. Uroguanylin, an intestinal natriuretic peptide, is delivered to the kidney as an unprocessed propeptide. *Endocrinology.* 149: 4486-98, 2008.
- **Moss, NG**, Riguera DA, Solinga RM, Kessler MM, Zimmer, DP, Arendshorst WJ, Currie MG, and Goy MF. The natriuretic peptide uroguanylin elicits physiologic actions through two distinct topoisomers. *Hypertension* 53: 867-76, 2009.
- Wang Y, Yao HL, Cui CB, Wauthier E, Barbier C, Costello MJ, **Moss N**, Yamauchi M, Sricholpech M, Gerber D, Loboa EG and Reid LM. Paracrine signals from mesenchymal cell populations govern the expansion and differentiation of human hepatic stem cells to adult liver fates. *Hepatology* 52: 1443-1454, 2010.
- **Moss NG**, Riguera DA, Fellner RC, Cazzolla C and Goy MF. Natriuretic and antikaliuretic effects of uroguanylin and prouroguanylin in the rat. *Am J Physiol Renal Physiol* 299: F1433-1442, 2010.
- Qian X, **Moss NG**, Fellner RC, Qian X, Taylor-Blake B and Goy MF. The rat kidney contains high levels of prouroguanylin, (the uroguanylin precursor), but does not express GC-C (the enteric uroguanylin receptor). *Am J Physiol Renal Physiol 300:F561-F573,* 2011.

D. <u>Ongoing Research Support</u>

- NIH RO1 HL-02334-54. "Renal Vascular Reactivity in Hypertension"
  PI: W.J. Arendshorst. 12/15/2010 – 11/30/2014. Role: Investigator.

CD38 ADP ribosyl (ADPR) cyclase is a membrane-bound enzyme that produces metabolites known to promote Ca^{2+} mobilization mediated by ryanodine receptors (RyR) in arteriolar smooth muscle cells. We postulate that renal CD38 is central to the development of angiotensin II-induced hypertension and that

CD38-deficient mice exhibit less pronounced renal vasoconstriction, Na^+ retention and hypertension than do wild-type (WT) mice infused with Ang II. The goals are to test the hypotheses that: 1) CD38 ADPR cyclase participates in the development of Ang II-induced hypertension such that Ang II produces less pronounced hypertension in $CD38^{-/-}$ (global genetic deficiency) vs. WT mice, with less severe hypertension predicted in WT mice with targeted, renal-specific partial knockdown of CD38 induced by siRNA; 2) CD38 ADPR cyclase contributes to renal vasoconstriction and the rightward shift in the pressure-natriuresis relation in Ang II-induced hypertension; and 3) CD38 is the major ADPR cyclase mediating G-protein coupled receptor-elicited Ca^{2+} signaling involving RyR Ca^{2+}-induced Ca^{2+} release in isolated afferent arterioles and renal vasoconstriction *in vivo*.

Completed Projects (last three years)

NIH RO1 HL078980-A1 Intestinal peptides involved in volume homeostasis
Michael Goy (PI) 9/1/05-8/31/10. Role: Co-PI
This is the project investigates the hypothesis that uroguanylin is an intestinally-produced natriuretic peptide that activates renal salt excretion in response to oral salt intake.

American Heart Association Grant-in-Aid 0755397U Prouroguanylin: An endocrine mediator of excretory function in normal and diseased kidneys
Michael Goy (PI) 7/1/07 – 6/30/09. Role: Co-PI
This project investigates the hypothesis that uroguanylin plays a beneficial role in an animal model of chronic renal failure (5/6 nephrectomy).