2017 Young Investigator Award of the American Physiological Society
Renal Section

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Dr. Oleh Pochynyuk, Ph.D., Associate Professor with tenure at the University of Texas Health Science Center at Houston (Fig. 1), is the recipient of the 2017 Young Investigator Award of the American Physiological Society (APS) Renal Section. Dr. Pochynyuk, a member of the Department of Integrative Biology and Pharmacology, is an expert physiologist. His research program focuses on understanding the cellular and molecular mechanisms that regulate renal ion transport and excretion, and the role this plays in control of blood pressure, acid-base balance, urinary concentrating ability and the pathology of cystic diseases. Dr. Pochynyuk earned B.S. and M.S. degrees from the National Taras Shevchenko University of Kiev, Kiev, Ukraine. He then completed Ph.D. research in Physiology and Biophysics at the Bogomoletz Institute of Physiology, National Academy of Sciences, Kiev, Ukraine earning his degree in 2003. This latter institute is the premier research center in the Ukraine. Upon completing his Ph.D. studies, Dr. Pochynyuk joined the laboratory of James D. Stockand at the University of Texas Health Science Center at San Antonio for fellowship training. After completing a very successful fellowship, Dr. Pochynyuk joined the faculty of the University of Texas Health Science Center at Houston. Here he continued his success being promoted to his current position, Associate Professor with tenure, in 2015.

Dr. Pochynyuk is a very active and well respected research scientist: Over the course of his career he has averaged ~4 publications a year (publishing in total, to date, over 70 communications and chapters); his fellowship studies produced over 25 peer-reviewed manuscripts; and since starting his independent research program in 2010, he has published the results of over 30 studies. Dr. Pochynyuk’s research accomplishments are manifold and widely appreciated. This is evidenced by the excellence of his research being recognized by several prestigious awards to include the current YIA award but also the 2014 Lazaro J. Mandel Young Investigator Award (APS); 2013 S&R Foundation Ryuji Ueno Award for Ion Channels or Barrier Function Research Award (APS); 2012 Renal Section New Investigator Award (APS); and the 2011 Carl W. Gottschalk Research Scholar Award (ASN). Dr. Pochynyuk’s research program is supported by the National Institutes of Health, American Heart Association, and American Society of Nephrology.

Dr. Pochynyuk first came to research in the kidney during his fellowship training. During this period he made important contributions to understanding the role played by the epithelial Na⁺ channel (ENaC) during regulation of blood pressure. He was the first to demonstrate and delineate a feedback system intrinsic to the distal nephron that ties sodium intake to urinary sodium excretion. As shown by Dr. Pochynyuk, this inhibitory purinergic regulatory system intrinsic...
to the distal nephron functions in parallel with the renin-angiotensin-aldosterone system to control blood pressure. Dr. Pochynyuk demonstrated that paracrine inhibitory purinergic regulation of ENaC by urinary ATP via apical P2Y2 purinergic receptors in principal cells allows a full pressure natriuresis response, unopposed by any distal compensation that would result from an increase in sodium delivery to the collecting duct, in response to elevated blood pressure and/or increased renal perfusion pressure. Elaborating this regulatory system, Dr. Pochynyuk and colleagues demonstrated that increased urinary flow in the distal nephron, acting as a surrogate for increased blood pressure/perfusion pressure, provokes ATP secretion from intercalated cells. This ATP secretion is flow-sensitive and through apical connexin 30 hemichannels (Cx30) mediated by a mechanism involving electrochemical coupling with the secretion of K\(^+\) through intercalated cell BK\(_{\text{Ca}}\) channels containing the beta4 subunit. The latter possibly functions as the flow sensor in this feedback system. Loss of this inhibitory purinergic system intrinsic to the distal nephron, as observed by Dr. Pochynyuk and others in P2Y2 receptor, Cx30 and BKbeta4 subunit knockout mice, compromises the normal regulation of blood pressure causing salt-sensitive elevations in arterial pressure resulting from inappropriate sodium retention due to decreases in renal sodium excretion. The importance of this work lies, in part, in the fact that most of these studies where performed in live animals and in native tissue. Dr. Pochynyuk is one of a few scientists to routinely employ the isolated, split-open tubule preparation to investigate renal ion channels and regulatory mechanisms in situ.

Through strong leadership and doggedness combined with the continued use and pioneering of cutting-edge experimental approaches, Dr. Pochynyuk has consistently asked important questions about renal ion channels and their involvement in health and disease. As an independent investigator, Dr. Pochynyuk has defined the contribution made by TRPV4 channels to mechano-sensitivity in the distal nephron and cystogensis; the role played by store-operated calcium channels during nephrogenic diabetes insipidus; the role played by bradykinin and AngII receptors to the control of renal sodium excretion and, thus, blood pressure as mediated by ENaC; the role of Kir4.1 and 5.1 channels in the renopathy of EAST/SeSAME syndromes; the function of SK3 K\(^+\) channels in the renal tubule; and the contribution and regulation of ClC-K chloride channels with respect to urinary acidification in the distal nephron.

In addition to being a talented investigator, Dr. Pochynyuk is also an excellent teacher and mentor. Already he is producing excellent young scientists prepared to conquer the world and direct their own independent research programs. One of his trainees, Dr. Mamenko, has recently joined the faculty at Augusta University, Medical College of Georgia as a young Assistant Professor full of promise. Another of his fellows, Dr. Tomilin, is soon to follow.

Throughout the course of his burgeoning career, Dr. Pochynyuk has successfully demonstrated that no challenge or question is too great for him to address. As a community we have come to expect great things form Dr. Pochynyuk and anticipate that he will continue to excel. As consistent with his achievement as an independent investigator over the last six years, Dr. Pochynyuk is well deserving of the 2017 Young Investigator Award.