

1 **2017 Young Investigator Award of the American Physiological Society**
2 **Renal Section**

3
4 James D. Stockand, Ph.D.

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

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

41 Dr. Pochynyuk first came to research in the kidney during his fellowship
42 training. During this period he made important contributions to understanding the
43 role played by the epithelial Na⁺ channel (ENaC) during regulation of blood
44 pressure. He was the first to demonstrate and delineate a feedback system
45 intrinsic to the distal nephron that ties sodium intake to urinary sodium excretion.
46 As shown by Dr. Pochynyuk, this inhibitory purinergic regulatory system intrinsic

47 to the distal nephron functions in parallel with the renin-angiotensin-aldosterone
48 system to control blood pressure. Dr. Pochynyuk demonstrated that paracrine
49 inhibitory purinergic regulation of ENaC by urinary ATP via apical P2Y₂ purinergic
50 receptors in principal cells allows a full pressure natriuresis response, unopposed
51 by any distal compensation that would result from an increase in sodium delivery
52 to the collecting duct, in response to elevated blood pressure and/or increased
53 renal perfusion pressure. Elaborating this regulatory system, Dr. Pochynyuk and
54 colleagues demonstrated that increased urinary flow in the distal nephron, acting
55 as a surrogate for increased blood pressure/perfusion pressure, provokes ATP
56 secretion from intercalated cells. This ATP secretion is flow-sensitive and
57 through apical connexin 30 hemichannels (Cx30) mediated by a mechanism
58 involving electrochemical coupling with the secretion of K⁺ through intercalated
59 cell BK_{Ca} channels containing the beta4 subunit. The latter possibly functions as
60 the flow sensor in this feedback system. Loss of this inhibitory purinergic system
61 intrinsic to the distal nephron, as observed by Dr. Pochynyuk and others in P2Y₂
62 receptor, Cx30 and BKbeta4 subunit knockout mice, compromises the normal
63 regulation of blood pressure causing salt-sensitive elevations in arterial pressure
64 resulting from inappropriate sodium retention due to decreases in renal sodium
65 excretion. The importance of this work lies, in part, in the fact that most of these
66 studies were performed in live animals and in native tissue. Dr. Pochynyuk is
67 one of a few scientists to routinely employ the isolated, split-open tubule
68 preparation to investigate renal ion channels and regulatory mechanisms *in situ*.

69 Through strong leadership and doggedness combined with the continued use
70 and pioneering of cutting-edge experimental approaches, Dr. Pochynyuk has
71 consistently asked important questions about renal ion channels and their
72 involvement in health and disease. As an independent investigator, Dr.
73 Pochynyuk has defined the contribution made by TRPV4 channels to mechano-
74 sensitivity in the distal nephron and cystogenesis; the role played by store-
75 operated calcium channels during nephrogenic diabetes insipidus; the role
76 played by bradykinin and AngII receptors to the control of renal sodium excretion
77 and thus, blood pressure as mediated by ENaC; the role of K_{ir}4.1 and 5.1
78 channels in the renopathy of EAST/SeSAME syndromes; the function of SK3 K⁺
79 channels in the renal tubule; and the contribution and regulation of ClC-K
80 chloride channels with respect to urinary acidification in the distal nephron.

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

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

