Advocacy for Basic Research in Nephrology

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Practicing nephrologists and physician scientists have borne witness to the lack of new therapies for the majority of patients suffering from kidney disease. For example, compared with progress made in treating other types of acute organ injury (e.g., acute coronary syndrome and acute respiratory distress syndrome), new therapeutics for acute kidney injury have been absent for the past several decades (1). Moreover, the last Food and Drug Administration (FDA)-approved therapy for diabetic nephropathy, the most common cause of ESRD, was announced 14 years ago (2, 3), and despite several advances in the materials used for hemodialysis, the prescription for dialysis management today remains similar to that of the 1980s.

While our patients await new therapies, we too face a crisis that threatens our field. The American Society of Nephrology (ASN) recently issued the results of a multifaceted report on the numbers of nephrologists and nephrology trainees (4), showing that interest in nephrology as a medical subspecialty has fallen. This report underlines what nephrology faculty at academic institutions observe each year during fellowship interviews. Specifically, the number of internal medicine residents seeking careers in nephrology has been declining in recent years, despite the increasing prevalence of chronic kidney disease. Although there was a slight increase in the number of fellowship applicants preferring nephrology in the 2016 match, the numbers of unfilled positions and unfilled nephrology programs in the match have steadily risen over the last 8 years (5). Compared with other medical subspecialties, nephrology is losing the recruitment battle (6).

In parallel with the pursuit of clinical nephrology, publication of nephrology-related research has waned (7). Al-Awqati (7) recently tabulated the number of articles related to nephrology in major scientific journals, such as the Journal of Clinical Investigation, Nature, Nature Genetics, and the New England Journal of Medicine. The results are clear: the number of nephrology-related research publications peaked in the 1970s and 1980s and has subsequently declined annually, whereas manuscripts from other subspecialties (e.g., cardiology and gastroenterology) have increased.

To generate interest in nephrology and to develop new therapies, ASN recognizes that we must encourage cutting-edge research in nephrology not only among medical students and postdoctoral fellows. Clearly, nephrology-related research has an image problem among basic scientists. Incoming graduate students choose research fields like human genetics, cancer biology, stem cells, and neurobiology, and few of them have the kidney on their radar. Perhaps basic scientists are similar to the average American, “kidney clueless,” as recently documented by a survey from the National Kidney Foundation (8). Basic scientists oriented toward research in other fields may not be cognizant of the dimensions of kidney disease, the lack of novel mechanism-based therapies, and the existence of huge knowledge gaps that are consequential both for patients desperate for novel treatments and for establishing excellent scientific niches toward building an independent research career in translational medicine. Furthermore, even if PhD students consider a career in kidney research, they will certainly be aware of the higher rates of National Institutes of Health (NIH) funding for studies of other chronic illnesses. In 2013, the NIH supported HIV/AIDS research with $2.9 billion and cancer research with $7.5 billion, whereas research on kidney disease received only $591 million dollars. This represents only $29 of research funding for a patient with kidney disease compared with other devastating diseases, such as AIDS or cancer ($2978 or $568 per patient, respectively) (9). Who can blame today’s graduate students for choosing a research field with the highest levels of NIH support to build a scientific career? If general awareness as well as funding for kidney research increases, then so would the numbers of basic scientists choosing the field of nephrology, research output, and most important, the likelihood of identifying novel drug targets. Until then, kidney research will continue to play in the academic minor league.

However, there is reason for optimism. Nephrology has seen several major breakthroughs in the past several years. Identification of phospholipase A2 as the elusive autoantigen for idiopathic membranous nephropathy (10) has sparked several new studies and a clinical test for this common cause of nephrotic syndrome. Geneticists focused on the kidney have shaped our understanding of the pathogenesis of hypertension (11, 12), nephrotic syndrome (13), and chronic kidney disease (14). Just last year, scientists announced a rapid method for deriving proximal tubular cells from human-induced pluripotent stem cells for drug screening (15) and a method for the growth of three-dimensional kidney organoids in the laboratory (16). Additionally, the promise of new artificial kidneys and the commitment of the FDA to support research in this area may be transformative for the field (17). Change is on the way because of advances made through basic science research in nephrology and the bridging of this research to other disciplines. These advances provide hope for novel therapies for our patients.

As shown by the breakthroughs listed above, scientists working in biology, chemistry, physics, and engineering have the potential to influence/transform nephrology care, and the ASN must recruit and retain minds—young and old—in these disciplines. As part of this larger effort, ASN has made a commitment to fund nephrology research through the Foundation for Kidney Research (www asn-online.org/foundation/) (18). In part due to advocacy by the ASN, Congress has also increased the 2016 budget for NIDDK by $68 million. To advocate for basic research and ensure that PhD researchers feel welcome and integrated within ASN, the society held a PhD Summit in 2013 that led to positive changes in ASN’s efforts to meet the special needs of PhDs in a mostly clinical society. One outcome was the inclusion of PhD students in the Kidney STARS Program on par with medical students, and basic scientists have stepped up to serve as mentors for these young investigators during Kidney Week. ASN has also made an effort to reach out to more basic science-oriented societies (e.g., the American Society for Cell Biology and the American Physiological Society) to attract basic scientists to nephrology research.

As scientists and concerned ASN members, we encourage everyone, particularly those involved in basic nephrology research, to engage with basic scientists both within the ASN community and in the greater scientific community to attract the best and brightest to nephrology research. We believe that the future is bright for nephrology research, with forthcoming major advances in our understanding of basic physiologic processes and development of novel therapeutics to ameliorate and, it is hoped, cure a range of kidney diseases. However, this will only happen if we devote the attention, manpower, and financial resources that this field requires and deserves.

References