didactic session where normal and pathologic findings in the kidneys, bladder, and lungs were reviewed. Then, there was a hands-on session where ultrasonography was performed on standardized patients. Since the training, both nephrology fellows and faculty at our institution have incorporated lung ultrasound into their volume management decisions in the hospital and outpatient settings.

Based on our experience, we believe that lung ultrasonography is a useful clinical tool for the nephrologist that can be easily learned.[1,2] Nephrology fellowship programs should also consider incorporating this training into their curriculum.

1. Noble VE, Murraf AF, Capp R, et al. Ultrasound assessment for extravascular lung water in patients undergoing hemodialysis. *Chest*. 2009;135:1433–1439.
2. Zoccali C, Torino C, Tripepi R, et al. Pulmonary congestion predicts cardiac events and mortality in ESRD. *J Am Soc Nephrol*. 2013;24:639–646.
3. Vitturi N, Dugo M, Soattin M, et al. Lung ultrasound during hemodialysis: the role in the assessment of volume status. *Int Urol Nephrol*. 2014;46:169–174.
4. Pivetta E, Goffi A, Lupia E, et al. Lung ultrasound-implemented diagnosis of acute decompensated heart failure in the ED: a SIMEU multicenter study. *Chest*. 2015;148:202–210.

Daniel W. Ross[1], Richard L. Barnett[1] and Hitesh H. Shah[1]

[1]*Division of Kidney Diseases and Hypertension, Department of Medicine, North Shore University Hospital and Long Island Jewish Medical Center, Hofstra Northwell School of Medicine, Great Neck, New York, USA*

Correspondence: *Daniel W. Ross, Division of Kidney Diseases and Hypertension, Department of Medicine, North Shore University Hospital and Long Island Jewish Medical Center, Hofstra Northwell School of Medicine, 100 Community Drive, 2nd Floor, Great Neck, New York 11021, USA. E-mail: Dross@nshs.edu*

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Absorbable phosphate in medication

To the Editor: Sherman *et al.*, in a Policy Forum recently published in *Kidney International*, analyzed the content of phosphorus in prescription medications.[1] They found that 11.5% of the drugs most commonly prescribed to dialysis patients contained phosphorus. The control of serum phosphorus is one of the main factors associated with better clinical outcomes in patients with chronic kidney disease (CKD). High serum phosphorus levels are correlated with the occurrence of cardiovascular events, as clearly demonstrated by numerous observational studies.[2]

Despite all the available strategies, including the introduction of new phosphate binder agents, minimizing the intake of phosphorus remains an important approach for controlling hyperphosphatemia. Dietary protein is the main source of phosphate intake, and low-protein diets have been shown to delay the start of dialysis,[3] thus highlighting the importance of serum phosphorus reduction in CKD patients. In addition to dietary phosphorus, food additives such as polyphosphates, beverages, and other sources need to be considered for the total amount of phosphate ingested.

Recently, we carried out a population-based study to explore the use of prescription drugs containing absorbable phosphate in a cohort of 1989 patients with CKD from Southern Italy.[4] Drugs were classified as phosphate-containing based on information provided by summaries of product characteristics (SPCs), PubChem, and Micromedex. As the content of phosphate in drugs does not immediately translate to an increase in serum phosphorus since it depends not only on the route of administration but also on other factors, we estimated the amount of absorbable phosphate for each drug. Over a median follow-up of 6 years, 70% of CKD patients received overall 266 medicinal products containing absorbable phosphate.[4] The estimated median value of phosphate intake per defined daily dose was 27.8 mg, interquartile range 4.0 to 40.9. As in the study of Sherman *et al.*,[1] our findings show the potential importance of prescription medicines as an additional phosphate source in patients with CKD. Long-term prescription drugs that are likely to significantly increase serum phosphate levels should contain this information on the label. Clinicians should verify that a drug does not contain a high amount of phosphate when starting a long-term drug therapy in such patients.

1. Sherman RA, Ravella S, Kapoian T. A dearth of data: the problem of phosphorus in prescription medications. *Kidney Int*. 2015;87:1097–1099.
2. Palmer SC, Hayen A, Macaskill P, et al. Serum levels of phosphorus, parathyroid hormone, and calcium and risks of death and cardiovascular disease in individuals with chronic kidney disease: a systematic review and meta-analysis. *JAMA*. 2011;305:1119–1127.
3. Fouque D, Wang P, Laville M, Boissel JP. Low protein diets delay end-stage renal disease in nondiabetic adults with chronic renal failure. *Nephrol Dial Transplant*. 2000;15:1986–1992.
4. Sultana J, Musazzi UM, Ingrasciotta Y, et al. Medication is an additional source of phosphate intake in chronic kidney disease patients. *Nutr Metab Cardiovasc Dis*. 2015;25:959–967.

Domenico Santoro[1], Vincenzo Savica[1] and Gianluca Trifirò[1]

[1]*Department of Clinical and Experimental Medicine, University of Messina, Messina, Italy*

Correspondence: *Domenico Santoro, Department of Clinical and Experimental Medicine, University of Messina, Via Consolare Valeria, Messina 98125, Italy. E-mail: santisi@hotmail.com*

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Adriamycin susceptibility among C57BL/6 substrains

To the Editor: The C57BL/6 mouse inbred strain is the preferred strain for generating various knockout, knock-in, and genetic glomerular disease models. A review of

published literature in nephrology journals reveals that C57BL/6 and C57BL/6J have been used interchangeably, largely ignoring the fact that there are significant substrain differences within the C57BL/6 strain.[1,2] Thus, it is critical that the nephrology community is well aware of the genetic variations among C57BL/6 substrains[3] that result in varying susceptibility toward various injury-inducing agents and may have important implications for results and their interpretation. When the C57BL/6J substrain was shown to resist adriamycin-induced glomerulopathy,[4,5] it led to a widespread notion that the C57BL/6 strain is resistant to adriamycin.[4] In the present investigation, we demonstrate that unlike C57BL/6J, the C57BL/6N substrain is susceptible to adriamycin-induced glomerulopathy. Adriamycin or saline was retro-orbitally administered in 10-week-old C57BL/6J and C57BL/6N mice. Pre- and post-injection urine samples were collected and analyzed by sodium dodecylsulfate–polyacrylamide gel electrophoresis and enzyme-linked immunosorbent assay for albuminuria estimation. While C57BL/6J mice showed complete absence of albuminuria as reported previously (data not shown),[2,4] the C57BL/6N mice displayed significant albuminuria at 4 weeks (Figure 1a and b). Further analysis by scanning and transmission electron microscopy showed significant loss of podocyte morphology and foot process effacement that is consistent with adriamycin-induced glomerulopathy (Figure 1c and d). These results are consistent with

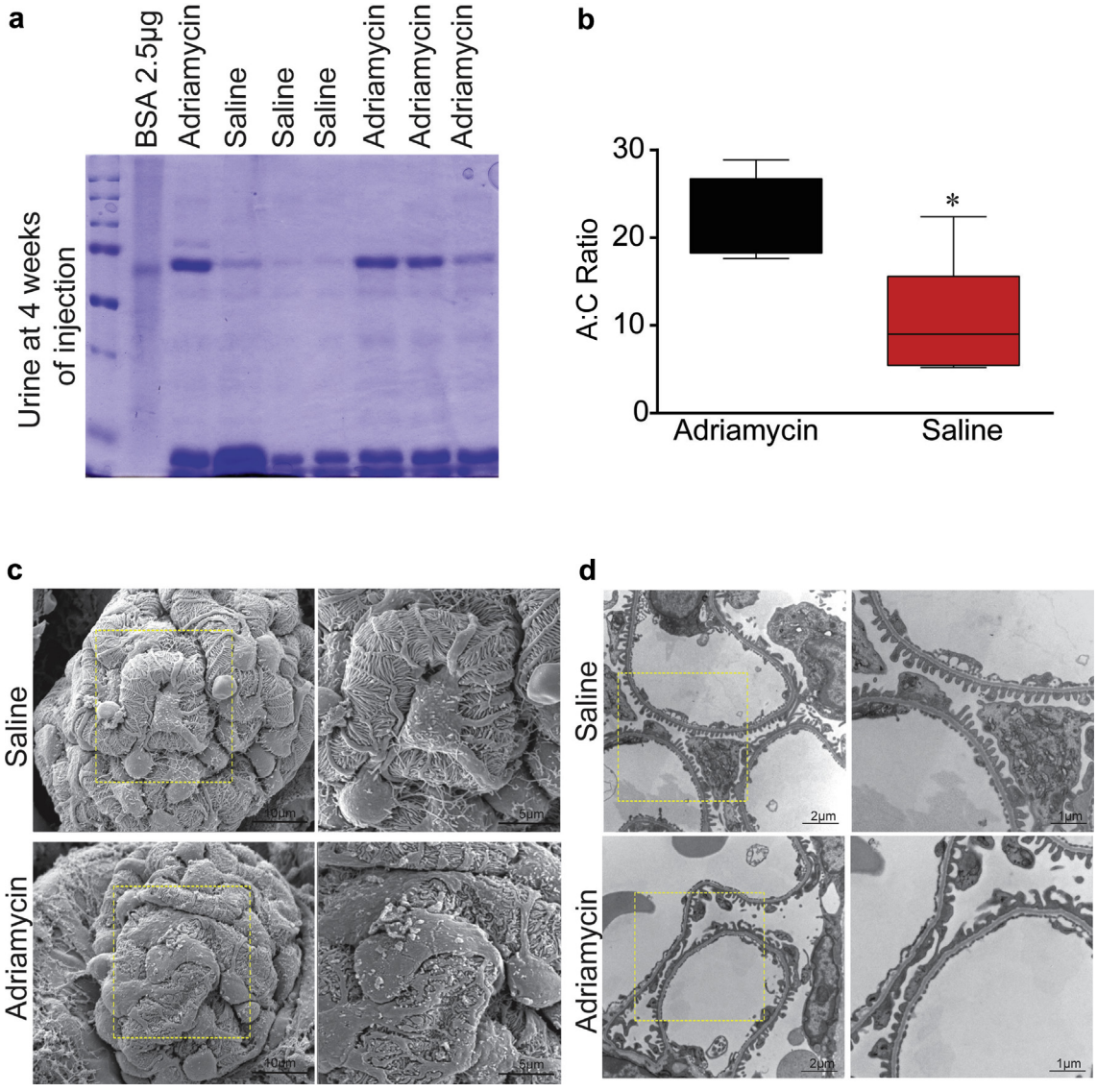

Figure 1 | C57BL/6N mice are susceptible to adriamycin-induced injury. Adriamycin or saline was retro-orbitally injected in anesthetized C57BL/6N mice ($n = 6$–8) (15 mg/kg of body weight). Urine from each mouse was collected at 1-week intervals, and the 4-week urine samples were analyzed by sodium dodecylsulfate–polyacrylamide gel electrophoresis followed by Coomassie blue staining and enzyme-linked immunosorbent assay to calculate albumin-creatinine ratios. Albuminuria was noted only in adriamycin-injected mice (**a** and **b**; $^*P < 0.05$). Scanning and transmission electron microscopy analysis of kidney tissues from these mice further confirms podocyte damage in adriamycin-injected mice only (**c** and **d**). BSA, bovine serum albumin.

recent genetic analysis that suggests these 2 substrains are genetically distinct and vary in their susceptibility to a number of factors.[3] We believe that these results should persuade investigators and reviewers to consider the substrain differences when reporting their results and during the review of manuscripts where such a difference could have significant implications.

1. Hakroush S, Cebulla A, Schaldecker T, et al. Extensive podocyte loss triggers a rapid parietal epithelial cell response. *J Am Soc Nephrol*. 2014;25:927–938.
2. Johnstone DB, Zhang J, George B, et al. Podocyte-specific deletion of Myh9 encoding nonmuscle myosin heavy chain 2A predisposes mice to glomerulopathy. *Mol Cell Bi006FI*. 2011;31:2162–2170.
3. Simon MM, Greenaway S, White JK, et al. A comparative phenotypic and genomic analysis of C57BL/6J and C57BL/6N mouse strains. *Genome Biol*. 2013;14:R82.
4. Jeansson M, Bjorck K, Tenstad O, Haraldsson B. Adriamycin alters glomerular endothelium to induce proteinuria. *J Am Soc Nephrol*. 2009;20:114–122.
5. Simons M, Hartleben B, Huber TB. Podocyte polarity signalling. *Curr Opin Nephrol Hypertens*. 2009;18:324–330.

Ehtesham Arif[1], Ashish K. Solanki[1] and Deepak Nihalani[1]

[1]*Nephrology Division, Medical University of South Carolina, Charleston, South Carolina, USA*

Correspondence: *Deepak Nihalani, Department of Medicine, Medical University of South Carolina, Drug Discovery Building DD514, 70 President Street, Charleston, South Carolina 29425, USA. E-mail: nihalani@musc.edu*

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