Recent studies have demonstrated that the immune system plays an important pathophysiological role in diseases of the kidney and the vasculature. In particular, the role of T lymphocytes in the development and maintenance of renal (1, 3, 4, 5) and cardiovascular disease (3, 5, 6, 9) has been a topic of intense study in recent years. Pharmacological and genetic methods in experimental animals have been used to manipulate immune cell function to illustrate the deleterious effects of infiltration or activation of T cells in kidney disease. More recently, a focus has been drawn to studies designed to elucidate the effector mechanisms of these infiltrating cells and to describe T-cell subtypes responsible for these effects.

The article by Hyodo et al. (7) in an issue of the American Journal of Physiology-Renal Physiology demonstrates an important role of effector memory T lymphocytes (TEM cells) and macrophages in the development of anti-glomerular basement membrane glomerulonephritis (anti-GBM GN). The expression of the voltage-gated potassium channel Kv1.3 is markedly elevated in TEM cells and macrophages compared with other cell types. Moreover, selective blockade of the Kv1.3 channel has been demonstrated to suppress the proliferation and activation of TEM cells (2). Hyodo et al. demonstrated that many of the T cells in the anti-GBM GN kidneys have the TEM phenotype and express Kv1.3 channels. Subsequent experiments demonstrated that administration of Psora-4, a Kv1.3 channel blocker, reduced the development of proteinuria and crescentic glomeruli in rats treated with rabbit anti-rat GBM antibody (7). These data therefore indicate that TEM cells participate in the development of anti-GBM GN.

This interesting study provides further insight into the effects of different T-cell subsets in renal disease. The deleterious role of TEM cells in anti-GBM GN (7) is consistent with the harmful effects of the total population of T lymphocytes that have been demonstrated in renal (1, 3, 4, 5) and cardiovascular disease (3, 5, 6, 9). In contrast to the pro-disease effects of TEM cells observed in the present study, a recent publication by Kvakan et al. (8) indicated that regulatory T cells can attenuate cardiac damage in a mouse model of angiotension II-mediated hypertension by suppressing immune responses (8). The role of individual T-cell subtypes in the progression of disease is not well understood or appreciated, but the elucidation of the harmful effects of TEM cells in anti-GBM GN is an important step forward to address this important question. As this field of research progresses, a better understanding of the stimuli for T-cell infiltration in different models of renal disease, the role of different subsets of T cells in the development and maintenance of disease, and the effector mechanisms of the infiltrating cells will need to be determined.

Disclosures
No conflicts of interest, financial or otherwise, are declared by the author(s).

References