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Murine models to evaluate immune & inflammatory roles in human kidney disease

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Animal models for kidney disease have been extensively employed to clarify the pathogenesis and underlying mechanisms of acute kidney injury (AKI) and chronic kidney disease (CKD). In particular, it is relatively easy to induce and promote kidney disease in murine models; therefore, it is commonly used to mimic the mechanisms of various human renal diseases.

In this chapter, we will introduce various models for effectively replicating specific kidney diseases using the murine model. AKI could be induced by ischemia-reperfusion injury model or injection of drugs such as cisplatin and Adriamycin. CKD models mainly include 5/6 nephrectomy, lupus nephritis, and diabetic nephropathy. Finally, skin graft and islet transplantation models are widely accepted to investigate kidney transplant immunology and to evaluate new drugs for kidney transplantation.

We will also present experimental methods for identifying the role of immune cells in vivo models of various kidney diseases. By sharing specific methods including purification of T-cell subsets, evaluation of regulatory capacity of sensitized immune cells, modulation of recruitment in innate immune cells such as NKT cell, and adoptive transfer for reconstitution of NKT cell, we hope these methods will help researchers' further e for immunologic studies.

This comprehensive overview of the murine model for renal disease could provide novel insights to design and conduct new approaches on acute and chronic kidney disease with improved immunologic and inflammatory outcomes.