Rodent Transplant Medicine

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Editor

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To my beloved wife, our son and parents

Preface

With the rapid development of microsurgery and molecular biology, rodent transplant models have become increasingly popular. Transplantation in rodents is the most useful in studying transplant immunobiology, in which more immunological tools can be utilized. However, the highly demanding techniques not only hamper the wide use of rodent transplant models but also affect the production of reliable, comparable, reproducible data. Many surgical modifications can de facto cause a significant variation of allograft survival. Systematic description of commonly used transplant models of solid organs (kidney, heart, liver) in rodents may improve surgical quality and save surgical time as a consequence, which will reduce and refine animal use. Adoption of uniform surgical procedures can produce comparable data efficiently enhancing the research translation from bench to nonhuman primate, even bedside. Furthermore, master of microsurgical techniques will benefit trainees in many surgical specialties and surgical research as well.

Indeed, the innovation of technologies can interplay with the progress of science. The refinement of microsurgical techniques has significantly promoted the development of transplant immunology because it has made the feasibility of rodent transplant models, in which a large amount of monoclonal antibodies, reagents, knockout/knockin animals, and other immunological tools can be utilized, but not for other laboratory species such as rabbits, dogs, swines, and nonhuman primates.

Currently, commercialized knockout rats have become available for research. Compared with the mouse, the rat is much more representative and indicative for human physiology, metabolism, and disease. Rat is advantageous in its larger size and physiological, cognitive, and breeding characteristics. Rat physiology is more suitable for studying human pharmacokinetics, toxicity, and immunology. Furthermore, more surgical procedures can be performed, and blood collection can be done simply and frequently in the larger animal.

As above-described, establishment of mouse and rat transplant models is of great value in application for both scientific research and improvement of microsurgical techniques. *Rodent Transplant Medicine* by Dr. Weihua Gong et al. is directed at shedding light on the successful establishment of rodent transplant models and understanding rodent transplant biology. The chapters written by German, American,

and Chinese experts are accomplished by clear illustrations. It will help the readers better grasp the microsurgical techniques of rodent transplant models.

In addition, the challenge of translational medicine from animal models to human situations exists in practice, which requires study models closely mimicking clinical scenarios. Other influencing factors including donor factors (prolonged warm/cold ischemic time, hypertension, diabetes, and brain death) and recipient factors (coinfections, immunological memory) should be taken into account. These aspects might be further discussed for the future in the forward.

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Abbreviations

AMW	Anterior median wall
AO	Aorta
CA	Common carotid artery
GVHD	Graft-versus-host disease
IHVC	Infrahepatic vena cava
IVC	Inferior vena cava
JV	External jugular vein
MHC	Major histocompatibility class
OLT	Orthotopic liver transplantation
PA	Pulmonary artery
SHVC	Suprahepatic vena cava
SVC	Superior vena cava