Chapter 8L

Attempts to Regenerate the Mammalian Kidney

Natalia O. Litbarg*,†, Snezana Vujicic*,† and Ashok K. Singh‡

Natalia O. Litbarg

Snezana Vujicic

Ashok K. Singh

Introduction

Although an unrealized goal as of today, regenerating the functional kidney tissue would be an ideal approach to treating end-stage kidney disease. With the advancement in our understanding of molecular events in kidney development and the possibility of utilizing embryonic and adult stem cells, this goal may become more achievable. In this chapter we summarize the research progress in our understanding of kidney embryogenesis and experimental attempts to regenerate the kidney.

Embryonic Nephrogenesis Across the Animal Kingdom is Directed by Similar Molecular and Cellular Pathways

During intrauterine development of the mammalian kidney, the following three distinct excretory systems are formed along the craniocaudal axis, each derived from the intermediate mesoderm of the cervical region: pronephros, mesonephros, and metanephros. Pronephros regresses prior to the development of mesonephros. The mesonephros coexists with the

*Department of Medicine, Sections of Nephrology, Department of Medicine, College of Medicine, University of Illinois at Chicago, 820 South Wood Street, Chicago, Illinois 60612-7315, USA. E-mail: olitbarg@gmail.com
†Jesse Brown VA Medical Center, Chicago, Illinois, USA.
‡John Stroger, Jr. Hospital of Cook County, Chicago, Illinois, USA.
Hektoen Institute for Medicine, Chicago, Illinois, USA.
§Principal Scientist, Hektoen Institute of Medicine and Stroger Hospital of Cook County, Chicago, Illinois, USA.
singhashok@comcast.net