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Renal Fibrosis: Mechanisms and Therapies

 Springer

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Preface

The high prevalence of chronic kidney disease (CKD) is a tremendous global burden. In developed countries, it is estimated that more than 10% of adults present with various degrees of CKD. Irrespective of the initial cause, renal fibrosis is the hallmark of most progressive CKD, which is characterized by the excessive accumulation of fibroblasts and extracellular matrix (ECM). This is accompanied by glomerulosclerosis, tubular atrophy, tubulointerstitial inflammation, and irreversible loss of parenchymal cells. These pathological changes cause progressive deterioration of kidney function, and ultimately lead to end-stage renal disease (ESRD). Unfortunately, around 1–2% of the CKD patients will eventually succumb to the need of renal replacement therapy. Therefore, strategies for slowing or even preventing CKD to ESRD progression are of utmost importance.

In light of this, mechanistic studies of kidney fibrosis have been the focus of intensive research, and it is generally accepted that the critical steps for renal fibrogenesis are as follows: (1) activation of inflammatory response and inflammatory cell infiltration after renal injury; (2) release of profibrotic factors, including cytokines, growth factors, and chemokines; (3) excessive accumulation of fibroblasts and ECM in the interstitial compartment, due to the imbalance in ECM synthesis and degradation; (4) phenotypic change and irreversible loss of parenchymal cells; and (5) reduction in renal microvasculature. Among the above processes, ECM accumulation is the most critical step, as it causes renal scarring that leads to irreversible renal injury both structurally and functionally.

Recently, there are many elegant studies shedding light on the pathogenesis of renal fibrosis, arranging from the role of intrinsic kidney cells to the infiltrating inflammatory cells. New findings also uncover new molecular mechanisms mediating renal fibrogenesis. The development of reliable non-invasive biomarkers has also provided a new potential for diagnosis of CKD, and recent and ongoing advances in basic science research have also provided the necessary platform for new drugs development and novel therapies for renal fibrosis, which may alter the unfortunate fate of CKD patients down the road.

Currently, there are very limited books that systemically reviewed the research progress of renal fibrosis. In view of this, we have invited a group of experts in this field to compile a book that aims to systemically introduce the state-of-the-art research on renal fibrosis. The possible mechanisms, biomarkers, and strategies for prevention and treatment of renal fibrosis are to be elaborated in detail. It is hoped that this book will help readers to have a comprehensive understanding of the renal fibrosis. Finally, we would like to express our gratitude to the financial support of the Key National R&D Project of China Science and Technology Ministry (2018YFC1314000) and the Key International Cooperation Program of National Natural Science Foundation (81720108007).



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Contents

Part I Renal Fibrosis in Chronic Kidney Disease

- 1 **Prevalence and Disease Burden of Chronic Kidney Disease** 3
Ji-Cheng Lv and Lu-Xia Zhang
- 2 **Morphology and Evaluation of Renal Fibrosis** 17
Ping-Sheng Chen, Yi-Ping Li and Hai-Feng Ni
- 3 **Current Opinion for Hypertension in Renal Fibrosis** 37
Hai-Jian Sun
- 4 **A Glimpse of the Mechanisms Related to Renal Fibrosis
in Diabetic Nephropathy** 49
Ling-Feng Zeng, Ying Xiao and Lin Sun
- 5 **Polycystic Kidney Disease and Renal Fibrosis** 81
Cheng Xue and Chang-Lin Mei
- 6 **Pathogenesis of Chronic Allograft Dysfunction Progress
to Renal Fibrosis** 101
Cheng Yang, Ruo Chen Qi and Bin Yang
- 7 **How Acute Kidney Injury Contributes to Renal Fibrosis** 117
Li Yang

Part II Resident and infiltrating cell activation in renal fibrosis

- 8 **Role of Endothelial Cells in Renal Fibrosis** 145
Zhen Yang, Li-Jie He and Shi-Ren Sun
- 9 **Mesangial Cells and Renal Fibrosis** 165
Jing-Hong Zhao
- 10 **Role of Podocyte Injury in Glomerulosclerosis** 195
Chen-Chen Lu, Gui-Hua Wang, Jian Lu, Pei-Pei Chen, Yang Zhang,
Ze-Bo Hu and Kun-Ling Ma

11	How Tubular Epithelial Cell Injury Contributes to Renal Fibrosis	233
	Bi-Cheng Liu, Tao-Tao Tang and Lin-Li Lv	
12	Myofibroblast in Kidney Fibrosis: Origin, Activation, and Regulation	253
	Qian Yuan, Roderick J. Tan and Youhua Liu	
13	Macrophages in Renal Fibrosis	285
	Xiao-Ming Meng, Thomas Shiu-Kwong Mak and Hui-Yao Lan	
14	Targeting Bone Marrow-Derived Fibroblasts for Renal Fibrosis	305
	Changlong An, Li Jia, Jia Wen and Yanlin Wang	
Part III Mediators and Cellular Processes in Renal Fibrosis		
15	Role of Aldosterone in Renal Fibrosis	325
	Aanchal Shrestha, Ruo-Chen Che and Ai-Hua Zhang	
16	TGF-β/Smad and Renal Fibrosis	347
	Tao-Tao Ma and Xiao-Ming Meng	
17	Connective Tissue Growth Factor and Renal Fibrosis	365
	Qing Yin and Hong Liu	
18	Inflammatory Mediators and Renal Fibrosis	381
	Xiao-Ming Meng	
19	Role of Inflammasome in Chronic Kidney Disease	407
	Liang Li, Wei Tang and Fan Yi	
20	Complement Activation in Progression of Chronic Kidney Disease	423
	Su-Fang Chen and Min Chen	
21	Renal Effects of Cytokines in Hypertension	443
	Yi Wen and Steven D. Crowley	
22	Role of Extracellular Vesicles in Renal Inflammation and Fibrosis	455
	Lin-Li Lv	
23	Hypoxia and Renal Tubulointerstitial Fibrosis	467
	Zuo-Lin Li and Bi-Cheng Liu	
24	New Understanding on the Role of Proteinuria in Progression of Chronic Kidney Disease	487
	Dan Liu and Lin-Li Lv	

25 Mitochondria and Renal Fibrosis 501
 Mohammed Mazheruddin Quadri, Syeda-Safoorah Fatima,
 Ruo-Chen Che and Ai-Hua Zhang

26 Lipid Metabolism Disorder and Renal Fibrosis 525
 Xiao-Gang Du and Xiong-Zhong Ruan

27 Renal Interstitial Lymphangiogenesis in Renal Fibrosis 543
 Gang Xu

28 Cell Apoptosis and Autophagy in Renal Fibrosis 557
 Xing-Chen Zhao, Man J. Livingston, Xin-Ling Liang
 and Zheng Dong

**29 Oxidative Stress and Renal Fibrosis: Mechanisms
 and Therapies** 585
 Hua Su, Cheng Wan, Anni Song, Yang Qiu, Wei Xiong
 and Chun Zhang

Part IV Biomarkers and Treatment of Renal Fibrosis

30 Urinary Biomarkers of Renal Fibrosis 607
 Le-Ting Zhou, Lin-Li Lv and Bi-Cheng Liu

31 New Therapies for the Treatment of Renal Fibrosis 625
 Feng Liu and Shougang Zhuang

32 Renal Injury Repair: How About the Role of Stem Cells 661
 Jian-Si Li and Bing Li

33 Antifibrotic Roles of RAAS Blockers: Update 671
 Ying-Ying Zhang, Ying Yu and Chen Yu

**34 Extracellular Vesicles: Opportunities and Challenges
 for the Treatment of Renal Fibrosis** 693
 Tao-Tao Tang and Bi-Cheng Liu

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