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Physiology & Anatomy
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Area of Expertise

Population of diabetes mellitus continues to rise in the U.S. Diabetic kidney disease is a major complication of diabetes mellitus and is the most common cause of chronic kidney disease.
The research in our laboratory is directed at understanding the molecular mechanisms of the development of diabetic kidney disease. Specifically, we are interested in the role of different calcium signaling pathways in the diabetes-induced kidney injury. Toward this goal, we use both animal models of diabetes mellitus and cultured kidney cells to study how altering calcium signaling changes the function and structure of the kidney/kidney cells under a diabetic environment. We utilize quantitative immunological methods, immunohistochemistry, and RT-PCR to reliably measure both protein and message for various molecules in specific calcium signaling pathways in kidney tissues/kidney cells. We also employ multiple tools to evaluate kidney function under different conditions. It is our goal to better understand the molecular events involved in the kidney response to diabetes, so that we can target rational development of effective therapeutics to prevent/treat the disease.

Qualifications

BS in Medicine, Anhui Medical University

MS in Physiology, Anhui Medical University

PhD in Physiology, University of Nebraska Medical Center

Recent Publications

Neogenin pathway positively regulates fibronectin production by glomerular mesangial cells
Chaudhari, S., Shotorbani, P. Y., Tao, Y., Kasetti, R., Zode, G., Mathis, K. W. & Ma, R., Jul 2022, In: American Journal of Physiology - Cell Physiology. 323, 1, p. C226-C235

Enhanced Orai1-mediated store-operated Ca2+ channel/calpain signaling contributes to high glucose-induced podocyte injury
Tao, Y., Chaudhari, S., Shotorbani, P. Y., Ding, Y., Chen, Z., Kasetti, R., Zode, G. & Ma, R., 1 Jun 2022, In: Journal of Biological Chemistry. 298, 6, 101990.

Store-operated Ca^{2+} channel signaling: Novel mechanism for podocyte injury in kidney disease
Tao, Y., Mallet, R. T., Mathis, K. W. & Ma, R., 2022, (Accepted/In press) In: Experimental Biology and Medicine.

Store-operated calcium entry: Pivotal roles in renal physiology and pathophysiology
Chaudhari, S., Mallet, R. T., Shotorbani, P. Y., Tao, Y. & Ma, R., Feb 2021, In: Experimental Biology and Medicine. 246, 3 , p. 305-316 12 p.

Inhibition of interleukin-6 on matrix protein production by glomerular mesangial cells and the pathway involved
Chaudhari, S., Yazdizadeh Shotorbani, P., Tao, Y., Davis, M. E., Mallet, R. T. & Ma, R., 1 Jun 2020, In: American journal of physiology. Renal physiology. 318, 6, p. F1478-F1488

Inhibitor of myogenic differentiation family isoform a, a new positive regulator of fibronectin production by glomerular mesangial cells
Shotorbani, P. Y., Chaudhari, S., Tao, Y., Tsiokas, L. & Ma, R., Mar 2020, In: American Journal of Physiology - Renal Physiology. 318, 3, p. F673-F682

The Endocrine Kidney: Local and Systemic Actions of Renal Hormones
Mallet, R. T. & Ma, R., 23 Oct 2019, *Hormonal Signaling in Biology and Medicine: Comprehensive Modern Endocrinology*. Elsevier, p. 445-460 16 p.

Glucagon-like peptide-1 receptor pathway inhibits extracellular matrix production by mesangial cells through store-operated Ca^{2+} channel
Huang, L., Ma, R., Lin, T., Chaudhari, S., Shotorbani, P. Y., Yang, L. & Wu, P., 1 Oct 2019, In: Experimental Biology and Medicine. 244, 14, p. 1193-1201 9 p.

Comparison of diabetic nephropathy between male and female $eNOS^{-/-}$ db/db mice
Ma, Y., Li, W., Shotorbani, P. Y., Dubansky, B. H., Huang, L., Chaudhari, S., Wu, P., Wang, L. A., Ryou, M. G., Zhou, Z. & Ma, R., May 2019, In: American Journal of Physiology - Renal Physiology. 316, 5, p. F889-F897

Short-term high-glucose treatment decreased abundance of Orai1 protein through posttranslational mechanisms in rat Mesangial cells
Jiang, H., Zou, S., Chaudhari, S. & Ma, R., 2018, In: American Journal of Physiology - Renal Physiology. 314, 5, p. F855-F863

Sponsored Projects

A Pilot Study on Impact of RTA405 on Glomerular Filtration Rate (GFR) in Type II Diabetic Rats: Phase I
Ma, R.
Reata Pharmaceuticals, Inc.
1/07/11 → 30/09/12

Exaggeration of TRPC6 Function by ROS in Vascular Myocytes, a Mechanism for Enhanced Vessel Contraction in Diabetes
Ma, R.
American Heart Association - Sth Central
1/07/11 → 30/06/13

Grants-in-Aid (For: Sarika Chaudhari)
Ma, R.
Sigma Xi
1/05/15 → 31/05/16

I-mfa, a Potential Target for the Treatment of Diabetic Kidney Disease
Ma, R.
Intramural Research(UNTHSC)
1/05/15 → 31/08/16

Impact of BTE-31 on Glomerular Filtration Rate and Renal Plasma Flow in Rats
Ma, R.
SUNY Stony Brook
1/11/13 → 31/12/14

Inhibitor of myogenic family a, store-operated Ca2+ channel, and diabetic nephropathy
Ma, R.
11/07/16 → 30/06/18

Inhibitor of Myogenic Family a, Store-operated Ca2+ Channel, and Diabetic Nephropathy
Ma, R.
NIDDK: Diabetes & Digestive & Kidney
11/07/16 → 30/06/18

I-mfa, a Potential Therapeutic Target of Diabetic Nephropathy
Ma, R.
American Heart Association - SouthWest
1/01/16 → 31/12/17

NADPH oxidases-derived ROS downregulate TRPC6 in mesangial cells in diabetes
Ma, R.
National Institute of Diabetes and Digestive and Kidney Diseases
15/05/09 → 30/04/15

NADPH Oxidases-Derived ROS Downregulate TRPC6 in Mesangial Cells in Diabetes
Ma, R.
NIDDK: Diabetes & Digestive & Kidney
1/12/12 → 30/04/13

Protection of Renal Function with RTA405 in Rats with Diabetic Chronic Kidney Disease
Ma, R.
Reata Pharmaceuticals, Inc.
1/04/12 → 31/03/13

Store-operated Ca2+ Channel and Diabetic Kidney Disease (For: Elizabeth Chen)
Ma, R.
Intramural Research(UNTHSC)
1/06/16 → 31/05/17

Store-operated Ca2+ Entry and Renal Protection in Diabetic Nephropathy (For: Sarika Chaudhari)
Ma, R.
Intramural Research(UNTHSC)
1/01/15 → 31/08/16

Store-operated Ca2+ signaling and renal inflammation in diabetic kidney disease (For: Suna Burghul)
Ma, R.
Intramural Research(UNTHSC)
5/06/17 → 31/05/18

Store-operated Ca2+ signaling in kidney glomerular mesangial cells
Ma, R.
National Institute of Diabetes and Digestive and Kidney Diseases
1/12/17 → 30/11/21

Store-Operated Ca2+ Signaling in Kidney Glomerular Mesangial Cells
Ma, R.
NIDDK: Diabetes & Digestive & Kidney
1/12/17 → 30/11/21

Sympathetic Threshold in Obstructive Sleep Apnea: The Role of Oxidative Stress
Ma, R.
Intramural Research(UNTHSC)
18/05/15 → 31/08/16