

Cell Biology (Kidney Research Center)

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The mission of Department of Cell Biology, Kidney Research Center is to unravel the pathogenesis of kidney diseases, and to develop new therapies. In particular, our efforts are focused on elucidating the pathogenic mechanisms of proteinuria. Proteinuria is not only a symptom showing dysfunction of glomerular barrier and is the most important progressive factor leading kidney failure. The number of the patients with chronic renal failure is still annually increasing. Ameliorating proteinuria is a rational strategy to prevent the progression to end-stage kidney disease.



Research interests

1. Molecular structure of the slit diaphragm, a cell-cell junction of glomerular epithelial cell (podocyte), which functions as a final barrier preventing proteinuria.
2. Alteration of the molecular structure of the slit diaphragm and its role in the development of proteinuria.
3. Regulatory mechanisms of expressions of slit diaphragm molecules by the renin-angiotensin system.
4. Development of novel therapy for proteinuria.

Materials and methods for collaborations

1. Nephrotic syndrome model rats, mimics of human minimal change nephrotic syndrome and focal segmental glomerulosclerosis.
2. Tamoxifen inducible podocyte-specific conditional knockout mice.
3. RNA-seq analyses with next-generation sequencer to detect down- or up-regulated molecules in injured kidney.
4. Novel screening system with cultured podocytes to identify novel therapeutic agents.

Links to additional info

1. Takamura S, et al. Partitioning-Defective-6-Ephrin-B1 Interaction Is Regulated by Nephrin-Mediated Signal and Is Crucial in Maintaining Slit Diaphragm of Podocyte. *Am J Pathol.* pii: S0002-9440(19)30852-1. 2019.
<https://www.ncbi.nlm.nih.gov/pubmed/31837290>
2. Fukusumi Y, et al. Nephrin-Binding Ephrin-B1 at the Slit Diaphragm Controls Podocyte Function through the JNK Pathway. *J Am Soc Nephrol.* 29(5):1462-1474. 2018.
<https://www.ncbi.nlm.nih.gov/pubmed/29602834>
3. Wakamatsu A, et al. Role of calcineurin (CN) in kidney glomerular podocyte: CN inhibitor ameliorated proteinuria by inhibiting the redistribution of CN at the slit diaphragm. *Physiol Rep.* pii: e12679. 2016.
<https://www.ncbi.nlm.nih.gov/pubmed/27009276>
4. Lab HP (Japanese). <https://www.med.niigata-u.ac.jp/nim/welcomej.html>