1. **Mechanisms to podocyte injury.**

It has long been established that podocyte injury involves mechanical signaling components such as integrins and the actin cytoskeleton. Our ongoing work used proteomics, phosphoproteomics, ubiquitylomic and degradomic approaches to investigate the machineries that are orchestrating the podocyte's response to injury. The studies discovered novel drug targets and podocyte molecules that showed first relevant insights and are currently tested in further systems.

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2. **Development of functional omics technologies in order to understand chronic human kidney diseases.**

It has been known that mass spectrometry-based proteomics technologies are powerful in order to understand pathophysiological mechanisms. We adjusted and developed technology to investigate patient-relevant disease mechanisms from human biopsies, kidney cell populations, subproteomes and interactomes by integrating large datasets guided by phenotypes and function.

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3. Metabolome-dependent protein homeostasis in kidney diseases.

Our studies showed that metabolic reprogramming is a viable option to interfere with kidney disease. In an “activity metabolomics approach”, we focus on metabolic control of protein expression and proteostasis in kidney disease using a wide array of tools, with the central hypothesis that kidney disease is a metabolic disease.

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c. **Rinschen MM*,** Schroeter CB, Koehler S, Ising C, Schermer B, Kann M, Benzing T, Brinkkoetter PT. Quantitative deep mapping of the cultured podocyte proteome uncovers shifts in proteostatic mechanisms during differentiation. *Corresponding author. Am J Physiol Cell Physiol. 2016 Sep 1;311(3):C404-17
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