Molecular insight into kidney diseases

Forskningsleder Per Svenningsen

Gruppens kerneforskningsområder

Protein i urinen (proteinuri) ses ved flere alvorlige sygdomme som fx diabetes og svangerskabsforgiftning. Proteinuri kan føre til væskeophobning i kroppen (ødemer), men vi mangler stadig at forstå de præcise mekanismer bag.

Tidligere studier har vist, at proteinuri kan aktivere nyrens natriumkanal (ENaC), men denne mekanisme alene forklarer ikke sygdomsudviklingen. Vores forskning søger derfor at afdække, hvordan proteinuri påvirker nyrens salt- og vandhåndtering – med potentiale for at identificere nye behandlingsmål.

Vores projekter bruger eksperimentelle modeller til at undersøge sygdomsmekanismer bag proteinuri. Projekterne inkluderer arbejde med cellemodeller, avancerede fysiologiske målinger og analyse af biologisk materiale fra patienter. Du vil få hands-on erfaring med moderne laboratorieteknikker, dataanalyse og videnskabelig projektplanlægning, og du bliver en del af et aktivt forskningsmiljø med tæt vejledning og mulighed for faglig sparring.

Projektet egner sig til studerende med interesse for fysiologi, nyrefunktion og sygdomsmekanismer, og der vil være gode muligheder for at præge projektets retning ud fra dine faglige interesser.

Metoder: *Proteinurisk musemodel, In vivo gen-modificering, Fluorescence activated cell sorting og RNA sekventering, Immun-fluorescence analyse af humant nyrevæv, Cell-type specifikke extracellulære vesikler.*

Er du interesseret i at skrive projekt i gruppen, så kontakt :

psvenningsen@health.sdu.dk

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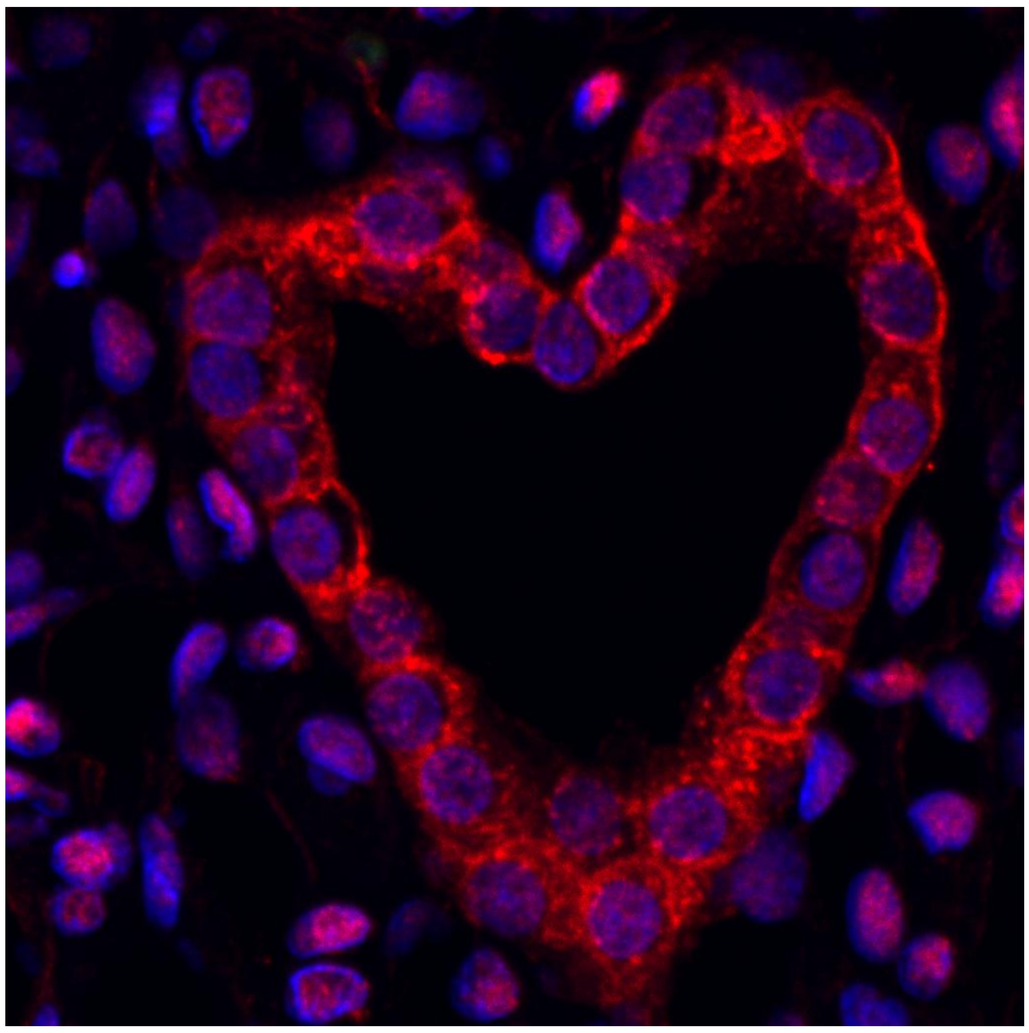

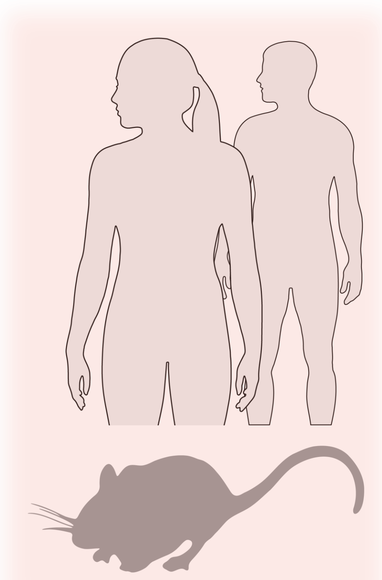

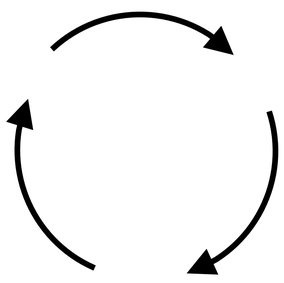

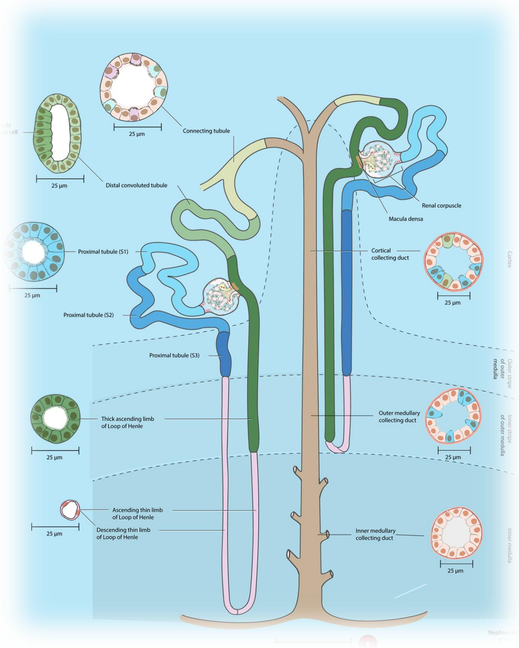

Projekter	Beskrivelse
High-throughput fluorescence assays for urea transporter and ENaC activity	Proteinuria activates the kidneys' Na+ and water reabsorption; yet, strong evidence suggests that this is not mediated by the usual suspects, such as aldosterone and vasopressin. To identify these unknown factors, we will establish activity assays for two important transporters: ENaC and the urea transporter (UT-A). The assays are based on cellular expression of fluorescence-based genetic probes, enabling screening of patient samples via live-cell imaging.
Cell type-specific uptake of aberrantly filtered plasma proteins	In proteinuric kidney diseases, the renal epithelium is continuously exposed to high concentrations of plasma proteins. These aberrantly filtered proteins harm the epithelial cells, but the mechanisms underlying this harm remain unresolved. The aim of this project is to determine which kidney epithelial cell types take up plasma proteins, with the overall goal of identifying mechanisms to mitigate the adverse effects of proteinuria on kidney health. This project involves multi-color immunofluorescence labeling and advanced image analyses.
Bile acids and their role in Na+ and water retention in proteinuric kidney diseases	The loss of plasma proteins into the urine increases the liver’s plasma protein production. This affect liver function, and we have observed that proteinuria is associated with alterations in the liver’s bile acid metabolism. Bile acids, in addition to their role in intestinal lipid absorption, are important signaling molecules. The aim of this project is to understand how bile acids contribute to Na+ and water retention in proteinuric kidney disease