Case Study: RESEARCH PATHOLOGY 3

Research Question

Using a back-translational approach in the Zucker diabetic fatty rat model of diabetic kidney (DKD), we wanted to characterise structural and ultrastructural alterations in the podocyte lineage that may underpin the development of albuminuria in DKD, and which may be mitigated by surgical therapy for diabetes using Roux-en-Y gastric bypass surgery.

Our Approach

We sought the support of the Research Pathology Core to develop and optimise immunohistochemical staining protocols in the rat kidney for two markers of podocyte health, namely WT-1 and desmin. This allowed us to assess both podocyte density (WT-1) and evidence of podocyte stress and dedifferentiation (desmin).

Resulting Publication: Canney AL et al. Improvements in diabetic albuminuria and podocyte differentiation following Roux-en-Y gastric bypass surgery. *Diabetes & vascular disease research*. (2020);17(1):1479164119879039.

Martin WP et al. Medications Activating Tubular Fatty Acid Oxidation Enhance the Protective Effects of Roux-en-Y Gastric Bypass Surgery in a Rat Model of Early Diabetic Kidney Disease. *Front Endocrinol* (Lausanne). (2021);12:757228.

Nair M et al. Characterization of the renal cortical transcriptome following Roux-en-Y gastric bypass surgery in experimental diabetic kidney disease. *BMJ Open Diabetes Research & Care*. (2020);8(1).

Expertise:

We offer unique expertise and advice for academic and commercial clients to perform immunohistochemistry studies and digital pathology with services spanning the research pathway from antibody optimisation to image annotation and quantitative/spatial analysis.

Testimonial

"The systematic rigour and attention to detail at the Research Pathology core ensured that our immunohistochemical staining was specific and free from artefact. This permitted quantitative morphometric analysis to be conducted to assess treatment effects. This also allowed us to correlate immunohistochemical and transcriptomic data."

Associate Professor Neil Docherty

Principal investigator

UCD Diabetes Complications Research Centre & UCD School of Medicine

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