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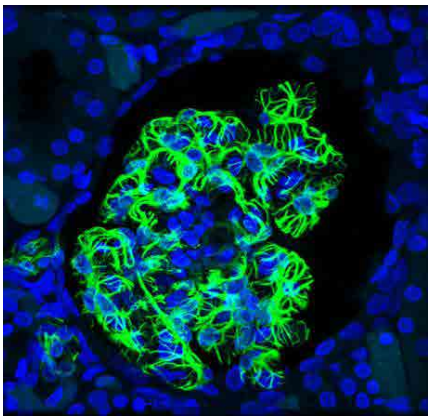
An adverse feto-maternal environment can lead to a permanent reduction in the number of nephrons in kidneys. Low glomerular number has been described in the offspring of rodents fed a low protein diet (LPD), which provides an increased risk of developing renal disease in postnatal life. Podocytes play a number of critical roles in glomerular function, but are unable to replicate in adults. Multiple studies have shown that a reduction in podocyte number during the postnatal period is a direct cause of glomerular scarring. This means that the regulation of podocyte number is essential for normal glomerular function. But what about the number of podocytes we are born with (podocyte endowment)? Would a reduction in podocyte endowment at birth increase our susceptibility to disease in later life? We hypothesize that an adverse feto-maternal environment (such as LPD) will not only lead to a reduction in the number of glomeruli, but also in podocyte endowment, which will limit the capacity of a glomerulus to tolerate further stress, leading to pathology.

Research Projects

1. **Low glomerular number, adult body weight gain and podocyte depletion**
2. **Mild podocyte depletion and its effect on the development of glomerular hypertrophy**
3. **Defining the effects of diabetes during pregnancy on development of the human fetal kidney and infant renal function**



3D reconstruction of podocytes (green) in a human kidney glomerulus obtained using confocal microscopy. Cell nuclei are labelled with DAPI (blue).

Selected significant publications:

1. Puelles VG, Cullen-McEwen LA, Taylor GE, Li J, Hughson MD, Kerr PG, Hoy WE, **Bertram JF**. 2016. Human podocyte depletion in association with older age and hypertension. *Am J Physiol Renal Physiol* 310: F656-F668
2. Luyckx VA, **JF Bertram**, BM Brenner, C Fall, WE Hoy, SE Ozanne and BE Vikse. 2013. Effect of fetal and child health on kidney development and long-term risk of hypertension and kidney disease. *Lancet*. 382:273-83.
3. Hoy WE, T Samuel, SA Mott, PS Kincaid-Smith, AB Fogo, JP Dowling, MD Hughson, R Sinniah, DJ Pugsley, RN Douglas-Denton and **JF Bertram**. 2012. Renal biopsy findings among Indigenous Australians: a nationwide review. *Kidney Int*. 82: 1321-1331.
4. **Bertram JF**, RN Douglas-Denton, B Diouf, MD Hughson and WE Hoy. 2011. Human nephron number: implications for health and disease. *Ped. Nephrol.* 26:1529-1533.
5. Cullen-McEwen LA, MM Kett, WP Anderson and **JF Bertram**. 2003. Nephron number, renal function and arterial pressure in aged GDNF heterozygous mice. *Hypertension* 41:335-340.