

Early Podocyte Abnormalities in Diabetic Nephropathy

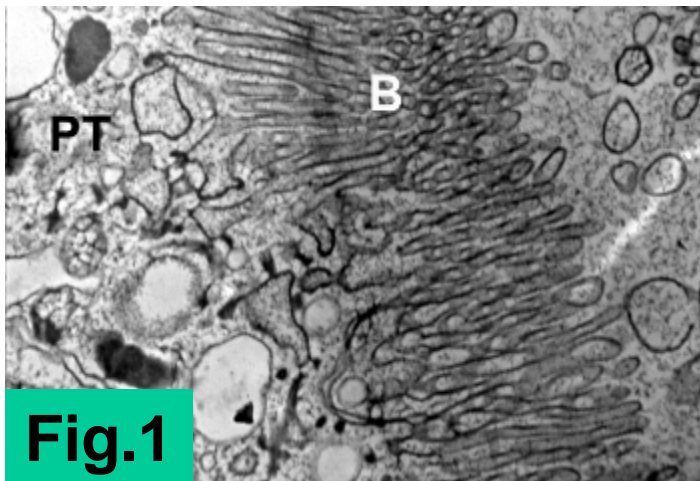
M Mauer, B Najafian, W Zhang, A Palmer, J Basgen, T Groppoli

Pediatrics, Lab Medicine & Pathology, Dentistry, University of Minnesota

NNIN Facility utilized: Characterization Facility

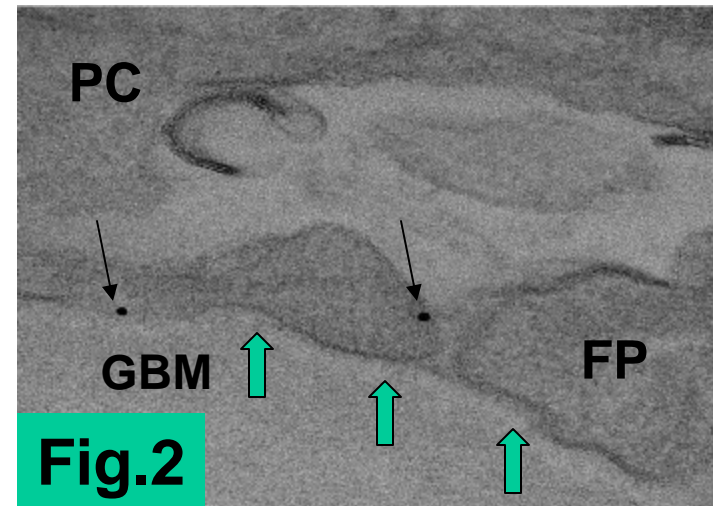
DESCRIPTION OF WORK

- ◆ Podocytes play pivotal role in preserving glomerular structure and function
- ◆ Podocytes are lost in established diabetic nephropathy
- ◆ We have shown podocyte detachment in diabetic nephropathy by conventional TEM
- ◆ We hypothesize that there are abnormalities at the base of podocyte foot processes (early detachment) which can be detected in early diabetic nephropathy using electron tomography
- ◆ We are also implementing high pressure freezing-freeze substitution (HPF-FS) technique on human biopsies to observe more details of podocyte ultrastructure
- ◆ We will study podocyte basal surface adhesion molecules using immunogold electron microscopy



MAJOR OBSERVATIONS

- ◆ We have applied HPF-FS to human kidney biopsies with some success (Figure 1)
- ◆ We have prepared settings for electron tomography of podocytes (Figure 2)



- **Figure 1.** HPF-FS of a human kidney biopsy. A proximal tubule (PT) with very well preserved brush borders (B)
- **Figure 2.** overlaid 10 nm gold particles (black arrows) for alignment during electron tomography. PC= podocyte; FP= foot process; GBM= glomerular basement membrane; Green arrows show the base of foot processes where 3-D reconstruction will be performed.