Early Podocyte Abnormalities in Diabetic Nephropathy
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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.