

## **Differentiating Pediatric Focal Segmental Glomerular Sclerosis and Minimal Change Disease by Proteomic Analysis of Urine**

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Chronic kidney disease (CKD) has a very high rate of prevalence in the United States and accounts for approximately 24% of Medicare costs. Focal segmental glomerular sclerosis (FSGS) and minimal change disease are two proteinuric kidney diseases that affect adults and children. FSGS progresses to end stage renal disease, while minimal change disease remains stable and is non-progressive. A kidney biopsy is currently the preferred method for differentiating the two diseases, but in pediatric patients a biopsy can be excessively invasive. This study seeks to employ proteomic techniques to identify non-invasive biomarkers in urine that can be used to distinguish between FSGS and minimal change disease without the use of a biopsy. Surface enhanced laser desorption/ionization (SELDI) was used to perform proteomic analyses on urine samples from pediatric FSGS (n=11) and minimal change (n=8) patients. Data from H50, NP20, CM10 and IMAC30 SELDI chips were analyzed using BioRad ProteinChip Datamanager 3.7.0. Peaks that showed a statistically significant difference ( $p < 0.05$ ) in protein concentrations between FSGS and minimal change disease were further analyzed. Peaks that were found to be significant, but had significant outliers were not considered further as possible biomarkers. Protein peaks at 13,800 M/z and 90,000 M/z that were upregulated in FSGS samples were selected for further analysis. Urine from the two samples that produced the highest intensity at ~14,000 M/z by SELDI was run on a SDS-PAGE gel. The protein at 14 kD was removed from the gel by in gel trypsin digestion and c18ZipTip extraction and identified by MALDI-TOF/TOF as  $\alpha$ -1B-glycoprotein, a member of the immunoglobulin superfamily that plays a role in the immune response. The urine containing the 90 kD protein was also run on a SDS-PAGE gel but a band at 90 kD could not be identified. Further study is needed to confirm the identity of the 14 kD and 90 kD proteins. In addition, this study was done on a small scale. A larger scale validation study needs to be conducted to ascertain the role of the 14 kD and 90 kD proteins in FSGS and CKD.