SIGNIFICANCE STATEMENT

In the vast majority of cases, autosomal dominant tubulointerstitial kidney disease caused by *MUC1* mutations (ADTKD-*MUC1*) is due to a cytosine duplication leading to creation of a specific frameshift protein (MUC1fs) pathogenic to tubular cells. For technical reasons, clinical genetic testing only identifies the cytosine duplication. This article describes a novel immunohistochemical method that allows identification of MUC1fs in urine. Using this technique, the authors identified 17 families who were negative for the cytosine duplication but had MUC1fs in the urine. The investigators then used an innovative method to identify five novel *MUC1* mutations in six families. This article contributes to growing evidence that MUC1fs is central to the pathogenesis of ADTKD-*MUC1* and provides an assay for MUC1fs independent of mutation.