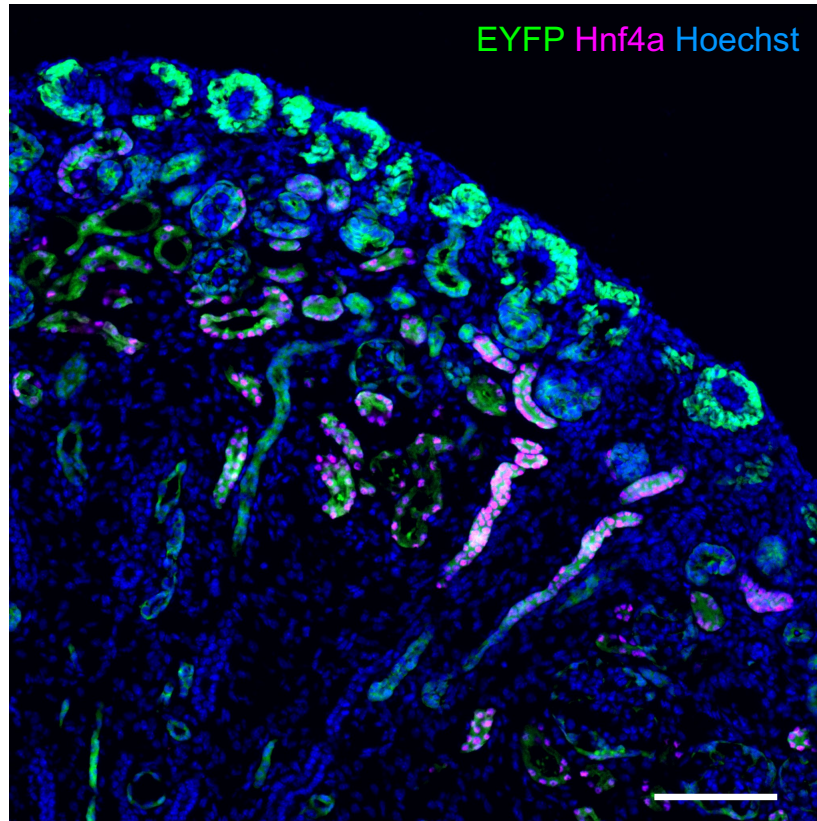
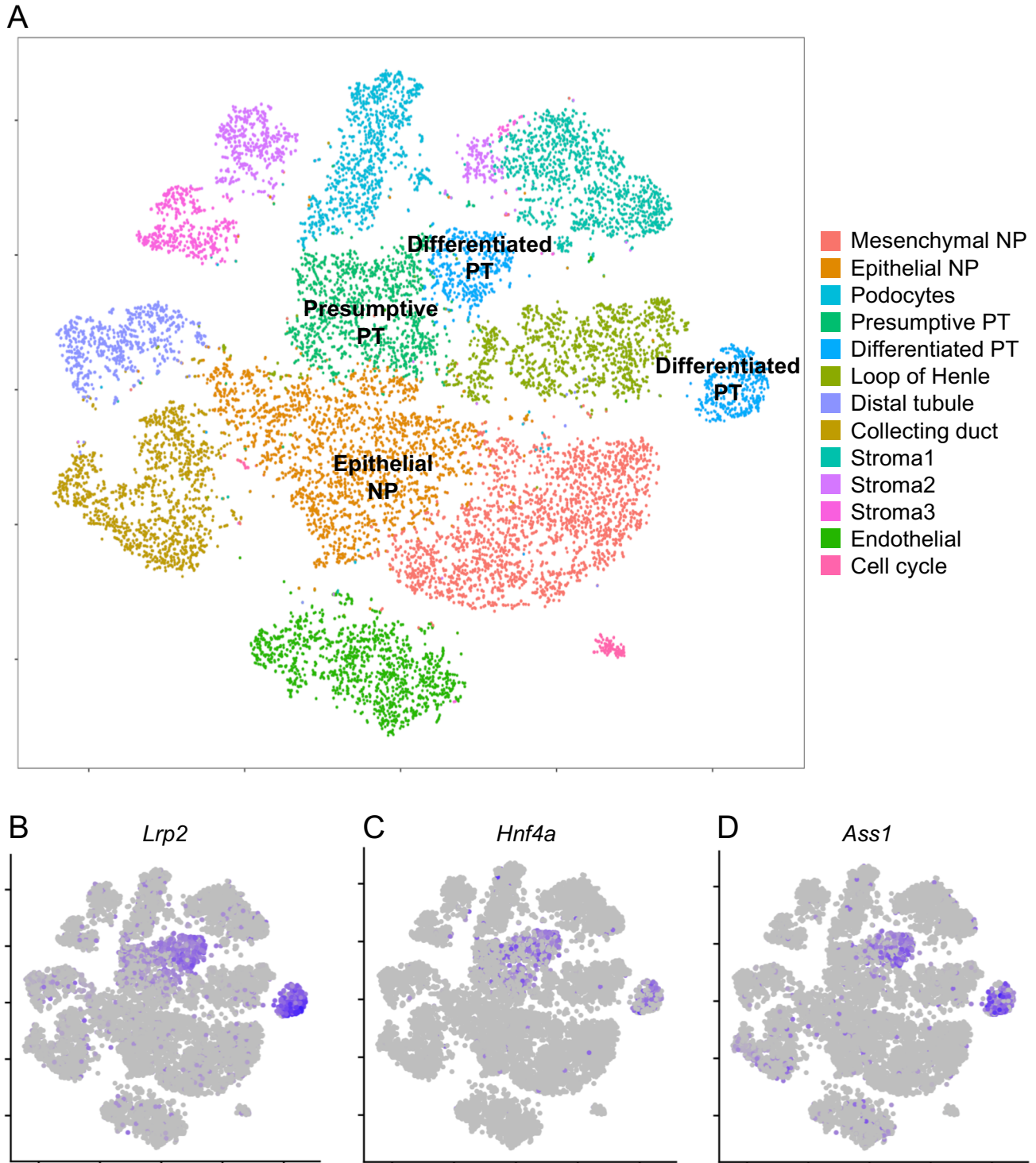


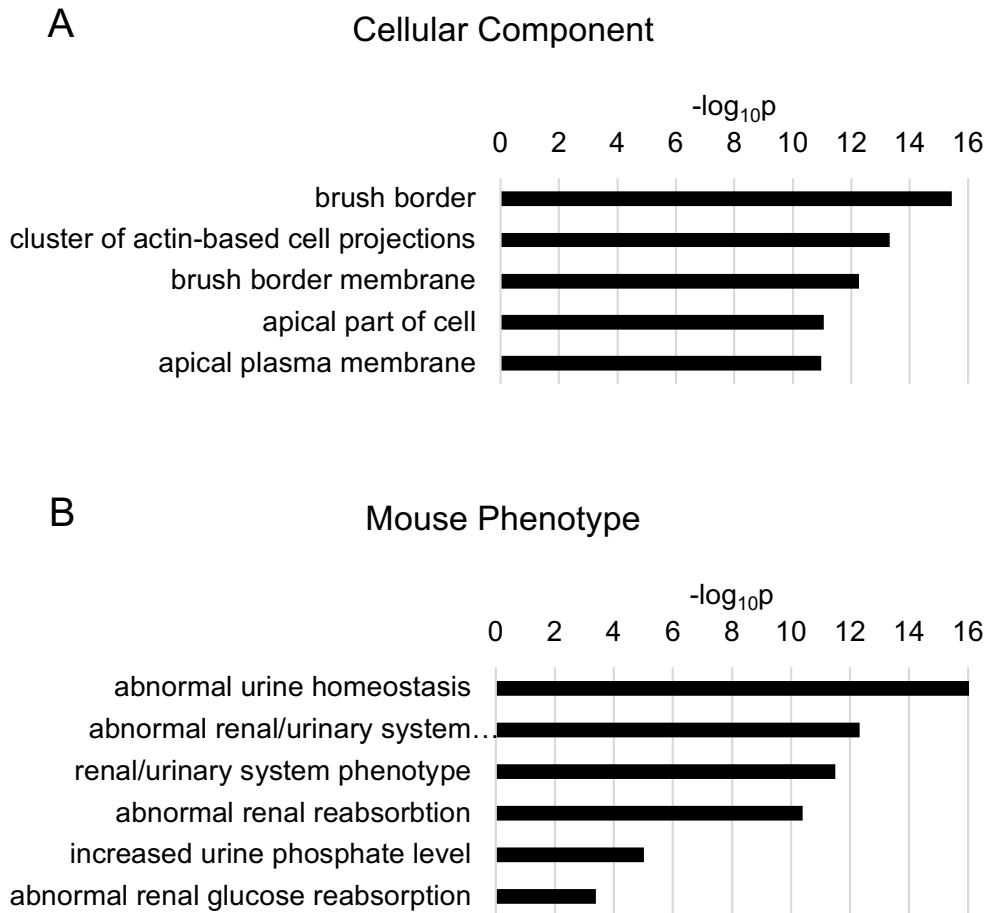
*Rosa26<sup>EYFP/+</sup>;Six2GFPcre*



**Supplemental Figure 1.** In the kidney, *Hnf4a* is expressed in the nephron lineage. Image is representative of ( $n=2$ ) E18.5 kidneys. Scale bar, 100 $\mu$ m.



**Supplemental Figure 2.** (A) Drop-seq (scRNA-seq) analysis of the mouse kidney at P1. Clustering of single cell expression profiles shows 13 kidney cell types. The plot shows a two-dimensional representation (tSNE, t-distributed Stochastic Neighbor Embedding) of global gene expression relationships. NP, nephron progenitors (B) *Lrp2* is expressed in presumptive PT cells and differentiated PT cells. (C) *Hnf4a* is expressed at low levels in presumptive PT cells and expression increases in differentiated PT cells. (D) *Ass1* is expressed in differentiated PT cells with little expression in presumptive PT cells.



**Supplemental Figure 3.** GO analysis with proximal tubule-specific genes that are downregulated in the *Hnf4a* mutant kidney at E18.5. (A) Enrichment of genes associated with the brush border and apical membrane. (B) Enrichment of genes associated with abnormal renal function in mouse models.