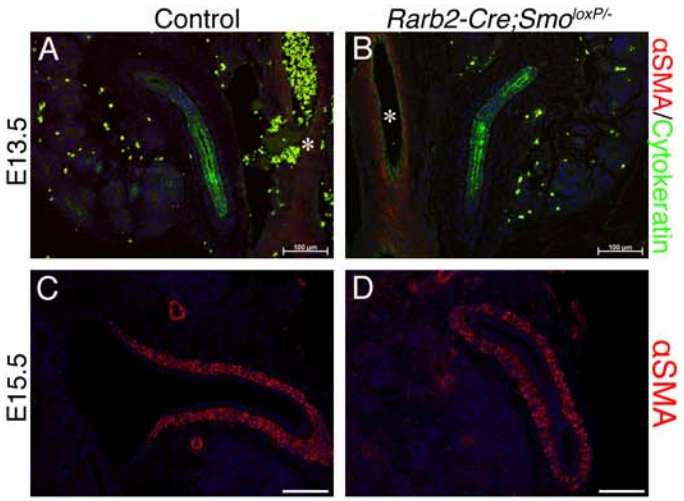
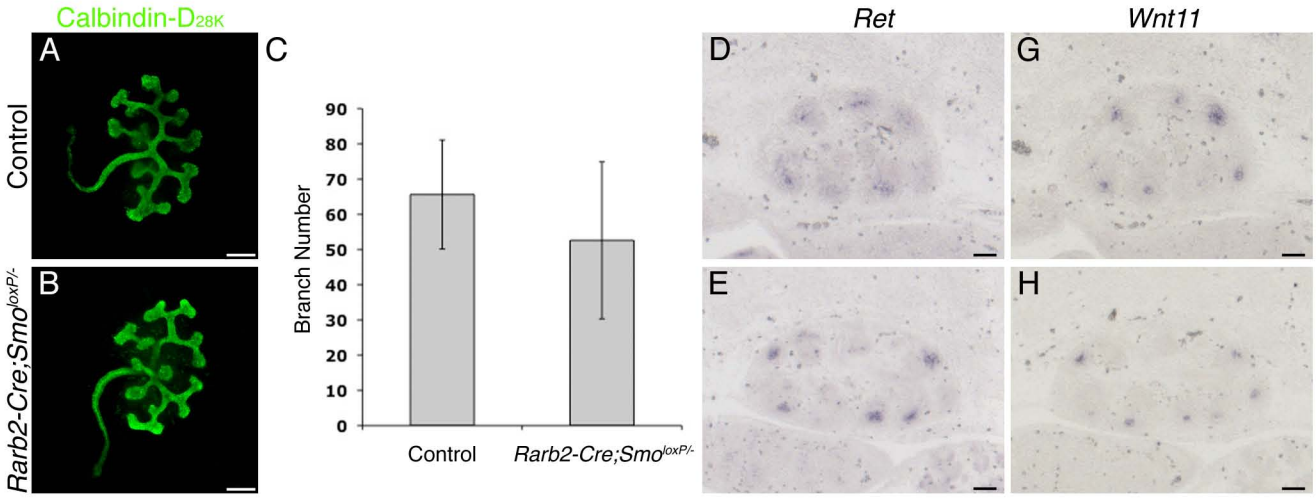
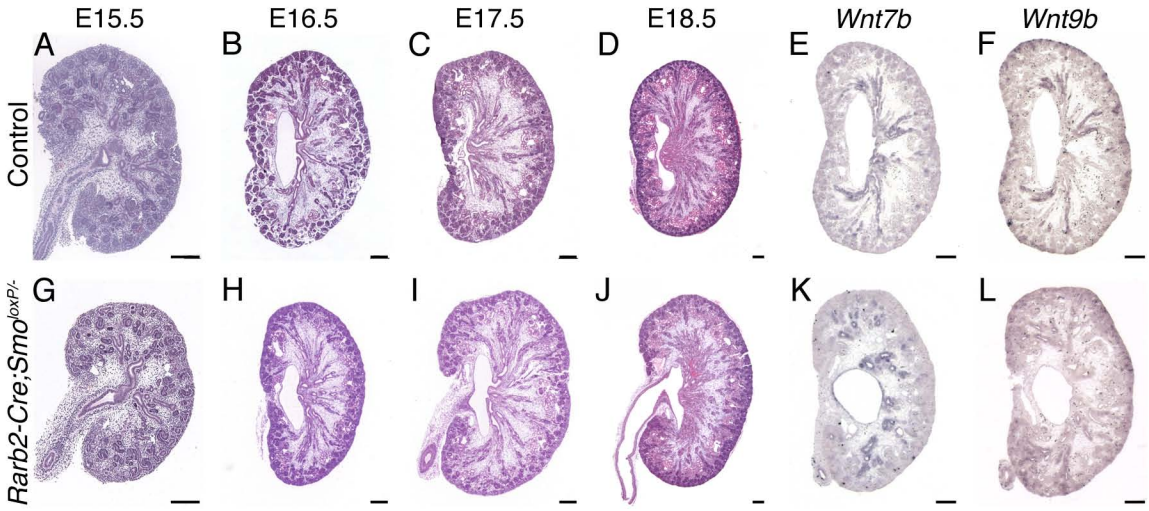


Supp Figure 1

Smo deficient embryos demonstrate normal ureter smooth muscle differentiation. Ureter smooth muscle differentiation is comparable between control and *Rarb2-Cre;Smo*$^{loxP/-}$ mutants at E13.5 (**A,B**) and E15.5 (**C,D**). * = Descending aorta. Scale bars: 100μm.



Supp Figure 2
Normal early ureteric branching morphogenesis in *Smo* deficient embryos. *Rarb2-Cre;Smo*$^{loxP/-}$ kidneys exhibit normal ureteric patterning (**A,B**) and comparable branch number (**C**) to control kidneys at E12.5. Expression of ureteric bud tip markers critical for ureteric branching morphogenesis, *Ret* (**D,E**) and *Wnt11* (**G,H**) in *Rarb2-Cre;Smo*$^{loxP/-}$ kidneys is comparable to control kidneys at E13.5. Scale bars: 200µm.



Supp Figure 3
Renal medulla development and differentiation is normal in *Smo* deficient kidneys. (**A-D,G-J**) Histological analysis of renal medulla patterning and developing from E15.5-E18.5 is comparable between control and *Rarb2-Cre;Smo*$^{loxP/-}$ kidneys. Expression of medullary collecting duct markers *Wnt7b* (**E,K**) and *Wnt9b* (**F,L**) is comparable between genotypes. Scale bars: 200µm.

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Supp Movie 1
Control ureter peristalsis.

Supp Movie 2
Rarb2-Cre;Smo$^{loxP/-}$ ureter peristalsis.

Supp Movie 3
Control ureter peristalsis.

Supp Movie 4
Gli2 homozygous null ureter peristalsis.

Supp Movie 5
Gli3 homozygous null ureter peristalsis.

Supp Movie 6
Gli3$^{-699/\_699}$ ureter peristalsis.

Supp Movie 7
Gli3$^{-699/\_699}$ ureter peristalsis.

Supp Movie 8
Rarb2-Cre;Smo$^{loxP/-}$*;Gli3*$^{XtJ/XtJ}$ ureter peristalsis.