Fig S1

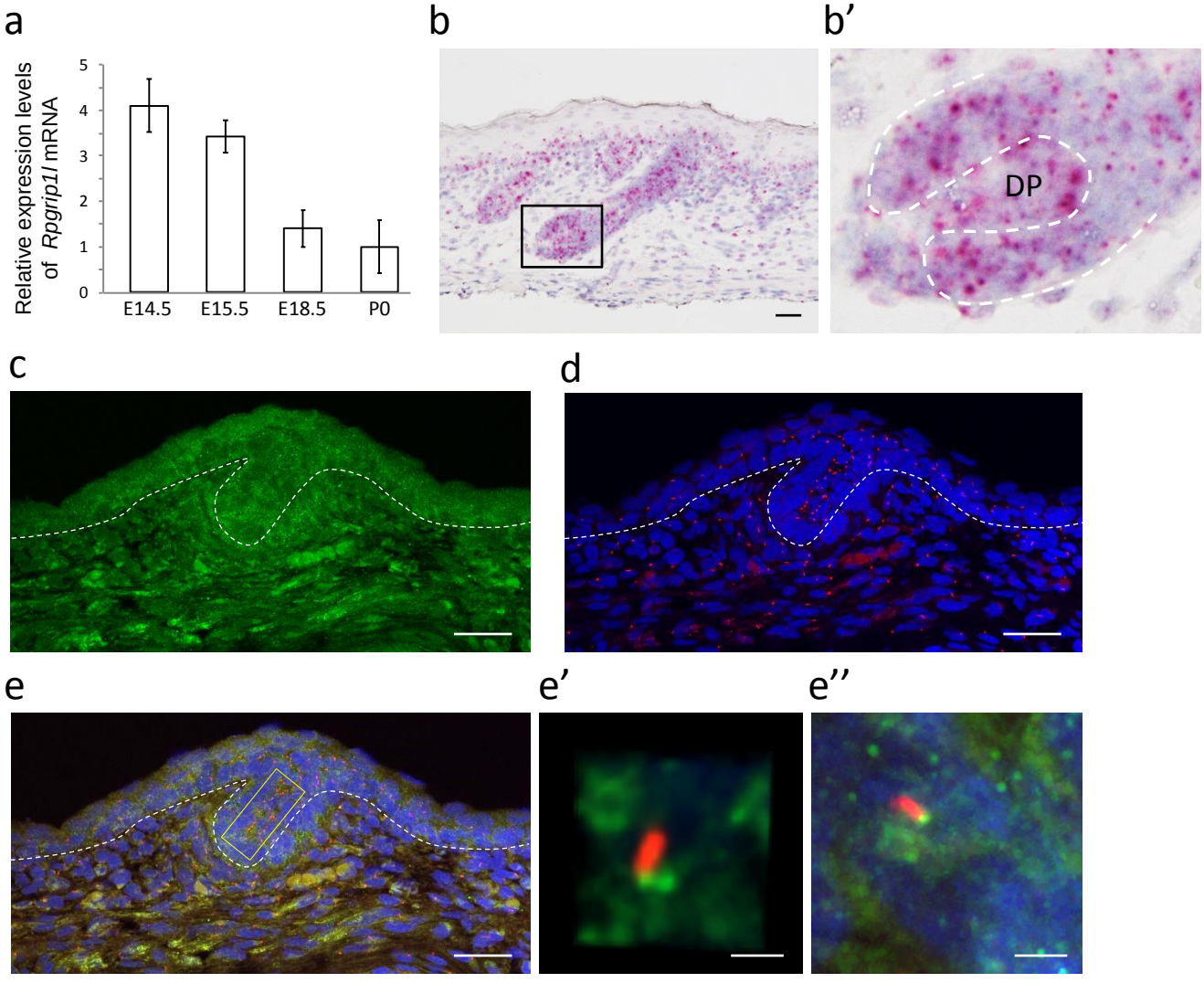

Fig. S1. Expression of *Rpgrip1l* in mouse skin. (a) Relative levels of *Rpgrip1l* by quantitative RT-PCR (normalized to P0). (b) *In situ* hybridization of *Rpgrip1l* in E18.5 mouse embryonic skin. (b’) Magnified image of boxed area in (b). DP, dermal papilla. (c – e) Immunofluorescence of RPGRIP1L (c, green), cilia (d, ARL13B, red), and merge images (e) of E15.5 scalp skin. (e’ and e’’) are representative fields selected from boxed area in (e). Nuclei were stained with DAPI (blue). Note that RPGRIP1L is enriched at the base of cilia. Dotted line highlights the epithelial-mesenchymal boundary. Scale bar = 50 μm in (b); 25 μm in (c–e); 2 μm in (e′ and e′′).

Fig S2

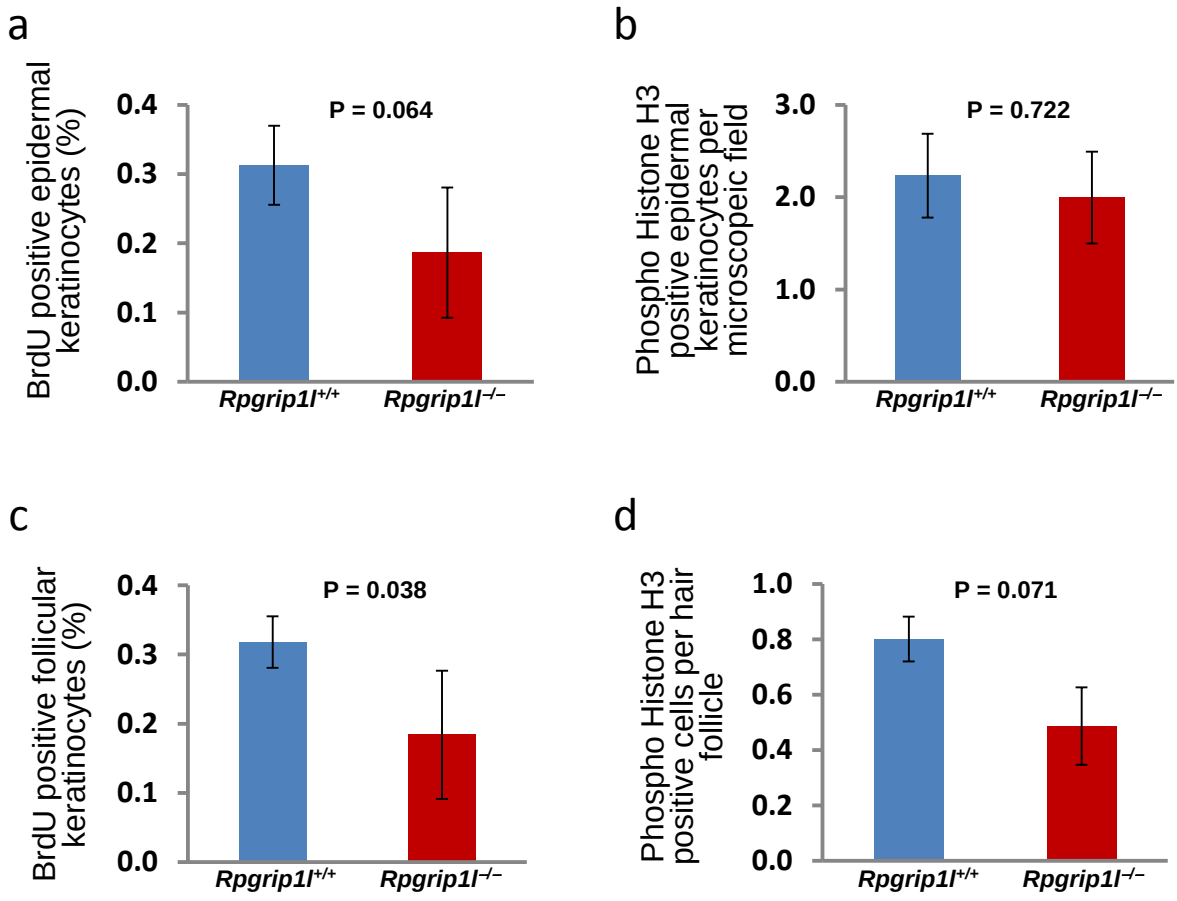

Fig. S2. Proliferation of follicular and interfollicular epidermal keratinocytes in control (*Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (*Rpgrip1l*$^{-/-}$) skins. (a) Percentage of BrdU-positive basal epidermal keratinocytes. (b) Phospho-histone H3-positive basal epidermal keratinocytes per microscopic field (10 × objectives). (c) Percentage of BrdU-positive follicular keratinocytes. (d) Phospho-histone H3-positive cells per hair follicle.

Fig S3

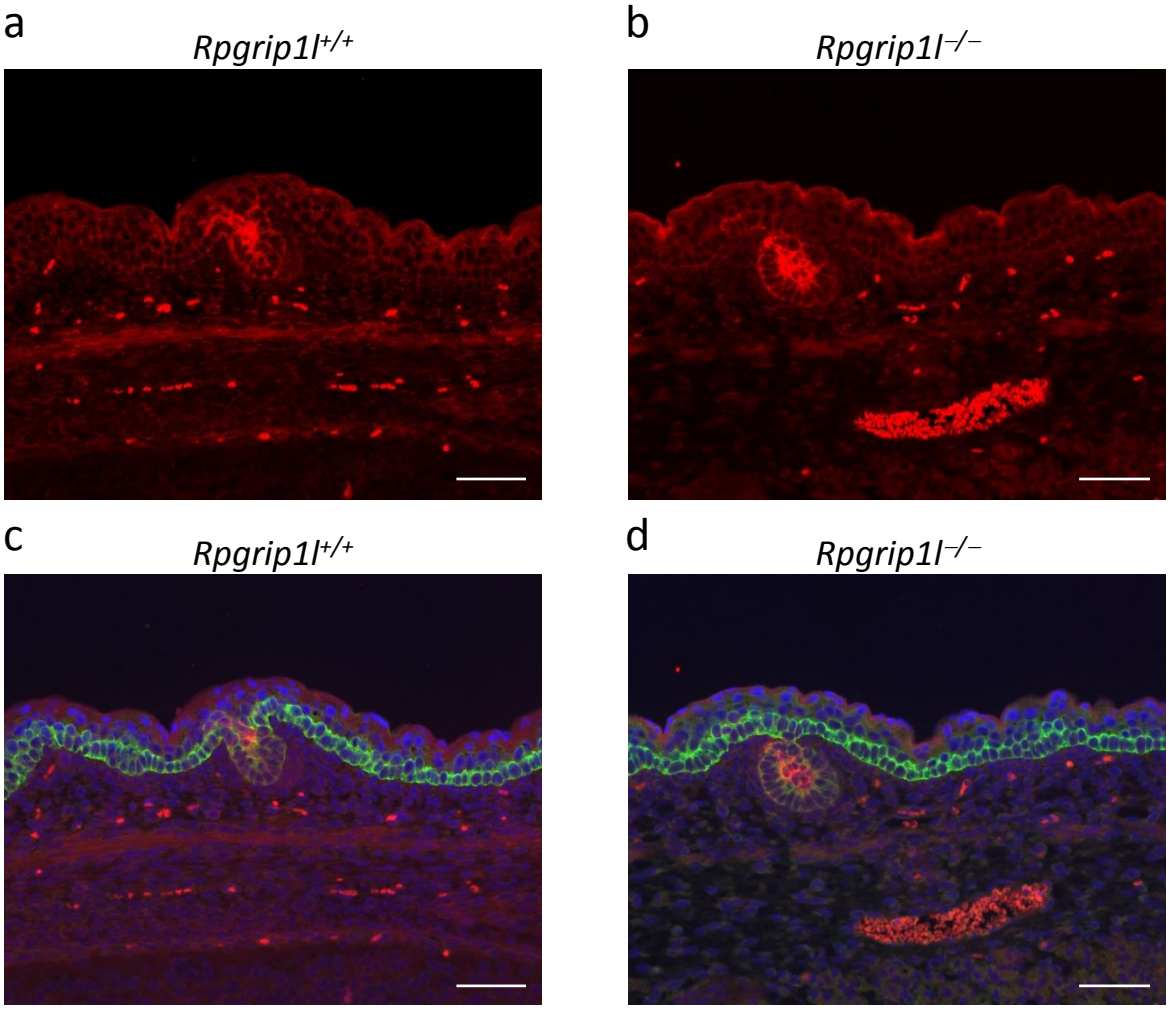

Fig. S3. Hair germ induction in E15.5 embryos marked by KRT17. (a and b) KRT17-positive hair germ in control (a, *Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (b, *Rpgrip1l*$^{-/-}$) skins. (c and d) Double labeling of KRT17 (red) and KRT14 (green). Scale bar = 50 μm.

Fig S4

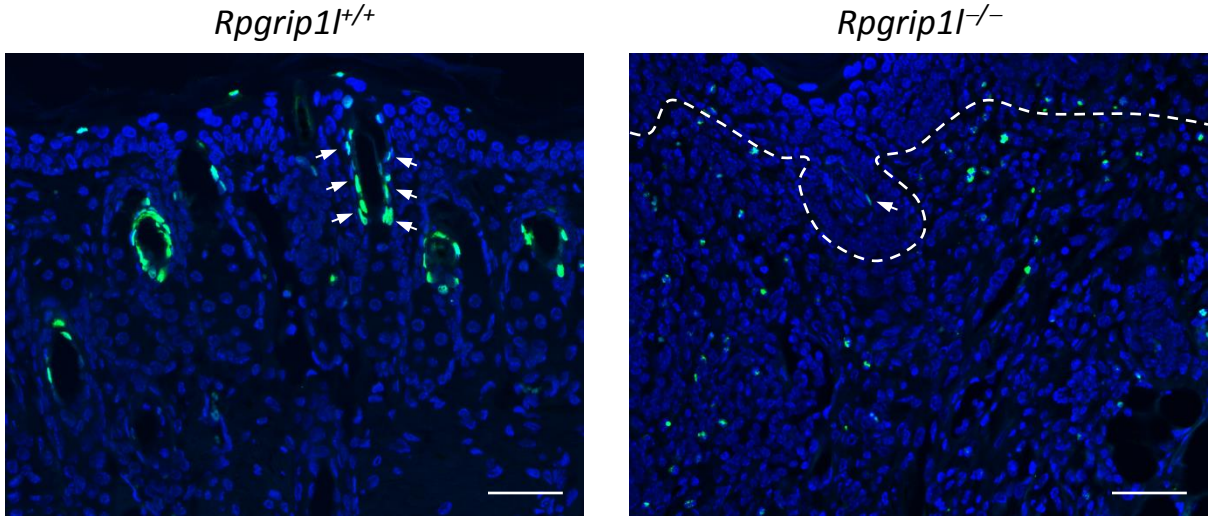

Fig. S4. TUNEL-positive cells in skin transplants of control (*Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (*Rpgrip1l*$^{-/-}$) mutants at 34 days post grafting. Note that distal portion of hair canals of control skin graft contained numerous TUNEL-positive cells; whereas the hair follicle-like structure in the mutant contain few. Arrows point to TUNEL-positive cells. Scale bar = 50 µm.

Fig S5

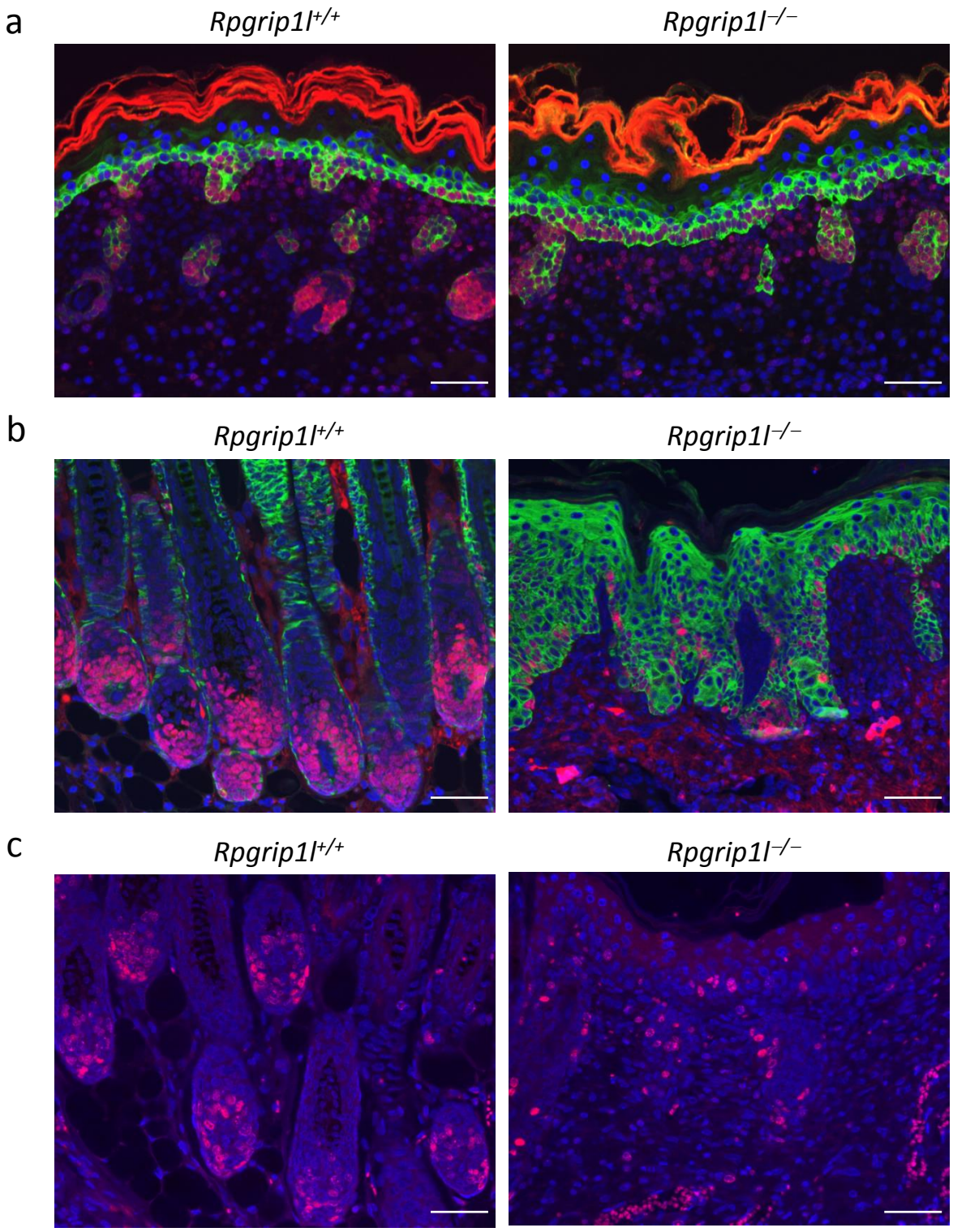

Fig. S5. Proliferating cells in skin explants and transplants of control (*Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (*Rpgrip1l*$^{-/-}$) mutants. (a) Immunofluorescence labeling of Ki67-positive cells in 2-day skin explants. KRT14 was labeled green. (b – c) Immunofluorescence labeling of Ki67-positive cells (b) and BrdU-positive cells (c) in 34-day skin transplants. Ki67 and BrdU were labeling red; KRT14 was labeled green; and nuclei were stained blue. Scale bar = 50 µm.

Fig S6

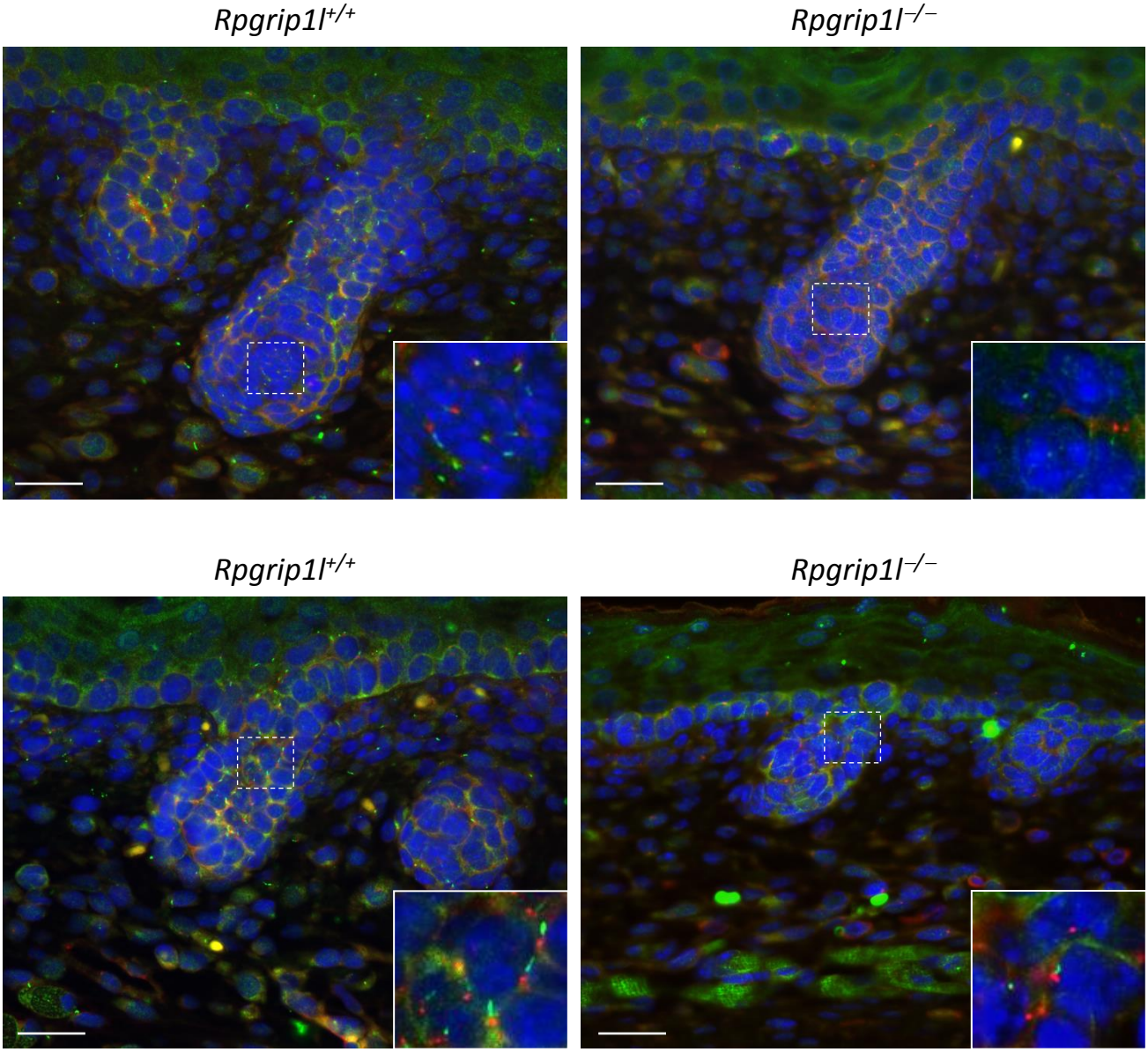

Fig. S6. Primary cilia in E18.5 control (*Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (*Rpgrip1l*$^{-/-}$) skins. Primary cilia were labeled with ARLI13B (green); basal bodies were labeled with γ-tubulin (red). Nuclei were stained with DAPI (blue). Inlets represent boxed areas of dermal papillae (upper panels) or follicular keratinocytes (lower panels). *Rpgrip1l* mutants contained few ciliated cells, in which the ciliary axoneme appeared shortened. Scale bar = 25 μm.

Fig S7

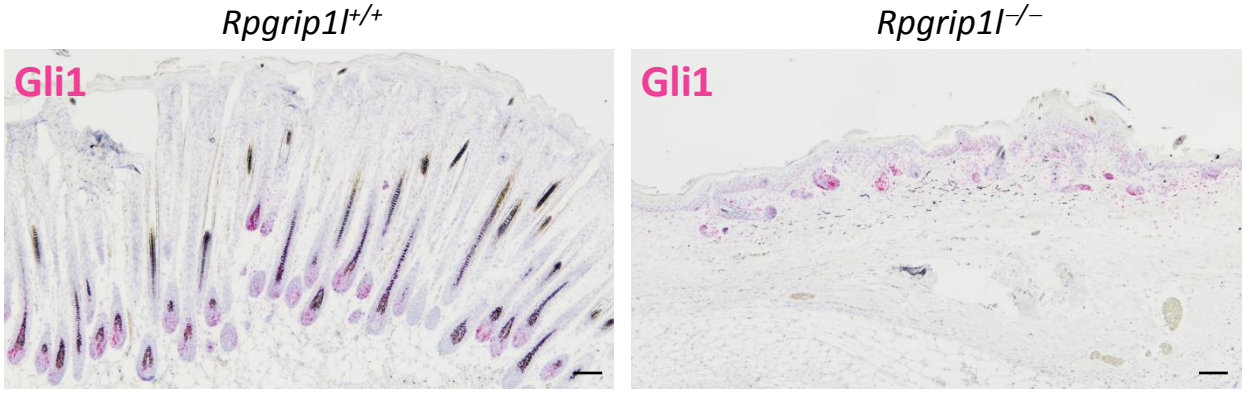

Fig. S7. Expression of *Gli1* in skin transplants of control (*Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (*Rpgrip1l*$^{-/-}$) mutants at 34 days post grafting. Scale bar = 100 µm.

Fig S8

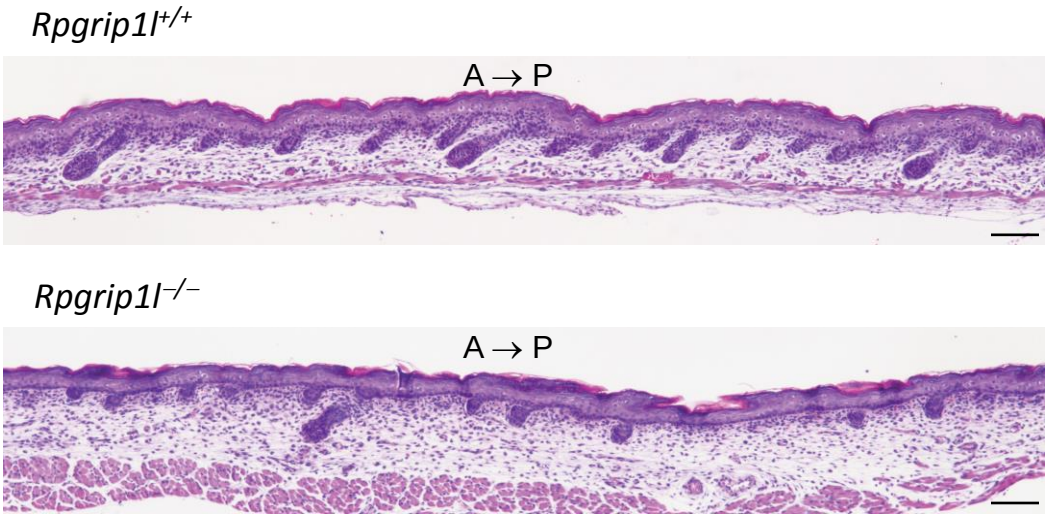

Fig. S8. H&E staining of sagittal sections of dorsal skins of in E18.5 control (*Rpgrip1l*$^{+/+}$) and *Rpgrip1l* mutant (*Rpgrip1l*$^{-/-}$) skins. Note that the hair follicles are polarized along the anterior (A) - posterior (P) direction. Scale bar = 100 µm.