SUPPLEMENTARY FIGURES

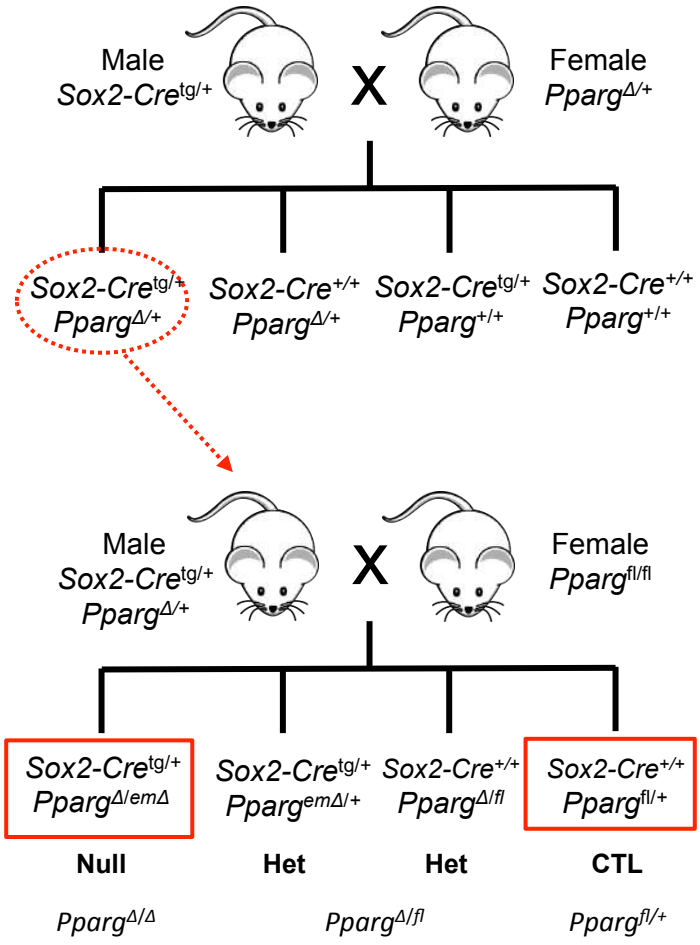

Figure S1. Mating strategy and genotypes of *Pparg*$^{\Delta/\Delta}$ mice and their littermates

The *Sox2-Cre* transgene must be transmitted by a male mouse. *Sox2-Cre*$^{tg/+}$: carrier of one *Sox2-Cre* expressing allele. *Sox2-Cre*$^{+/+}$: no transmission of the *Sox2-Cre* transgene; *Pparg*$^{+}$: wild-type allele; *Pparg*^{fl}: functional *Pparg* allele carrying 2 flox sites flanking exon 1 and 2 of *Pparg*; *Pparg*$^{\Delta}$: *Pparg* allele deleted of the genomic region encompassing exon 1 and exon 2, resulting in a non functional allele; *Pparg*$^{em\Delta}$: *Pparg* allele deleted during development in all the cells forming the embryo (epiblast deletion) but still present in the trophoblastic cells allowing a normal placental development. The last line gives the corresponding simplified names.

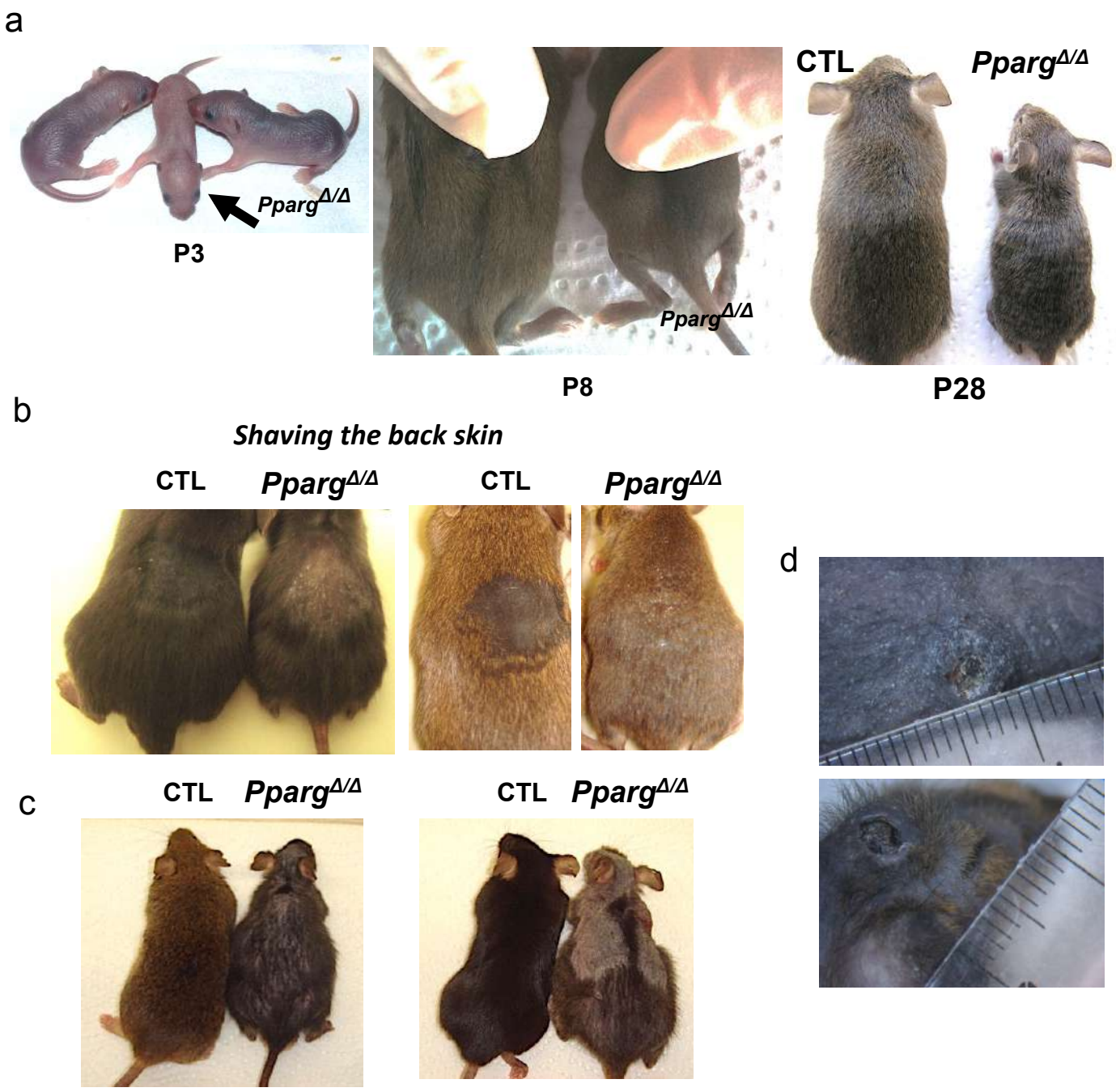

Figure S2: Skin and hair phenotype in *Pparg*$^{\Delta/\Delta}$ mice

(a) Representative pictures of *Sox2-Cre*$^{tg/+}$;*Pparg*$^{\Delta/em\Delta}$ (*Pparg*$^{\Delta/\Delta}$) and littermates taken at P3, P8 and P28. **(b)** Representative pictures of 4-5 weeks old *Pparg*$^{\Delta/\Delta}$ and littermate control mice just shaved on the back. The shaved area is less recognizable in *Pparg*$^{\Delta/\Delta}$, due to their shorter hair, but shows flaking skin. **(c)** Representative pictures of patchy hair loss in 6 months old *Pparg*$^{\Delta/\Delta}$ and control mice (CTL). **(d)** Representative pictures of skin lesions in *Pparg*$^{\Delta/\Delta}$ mice.

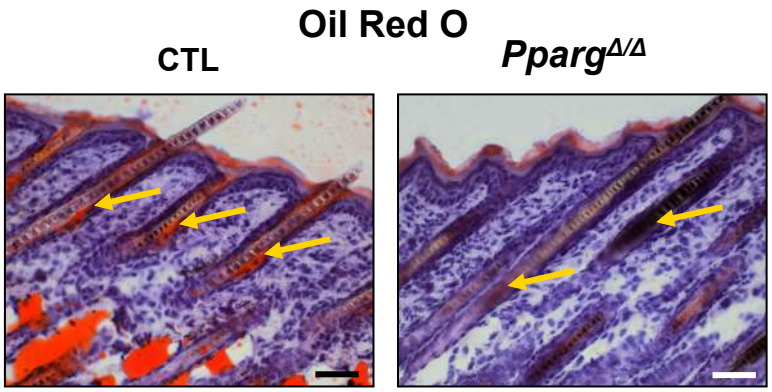

Figure S3: Lack of sebaceous glands in *Pparg*$^{\Delta/\Delta}$ skin
Oil Red O staining of back skin cryosections from *Sox2-Cre*$^{tg/+}$;*Pparg*$^{\Delta/em\Delta}$ (*Pparg*$^{\Delta/\Delta}$) and control (CTL) mice at P28. Yellow arrows indicate the sebaceous glands in control mice and the place where sebaceous glands should be in *Pparg*$^{\Delta/\Delta}$ mice. Scale bar= 50µm.

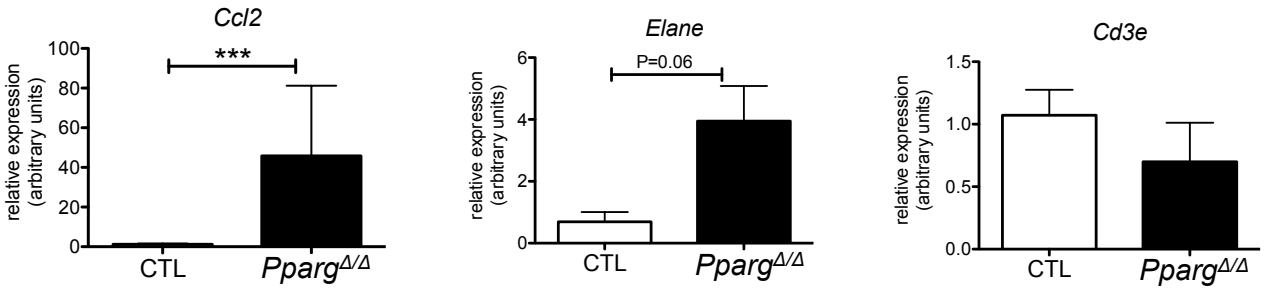

Figure S4: Gene expression analysis of inflammatory markers in *Pparg*$^{\Delta/\Delta}$ skin at P28
Gene expression analysis of markers of immune cells, chemokine (C-C motif) ligand 2 (*Ccl2*) for macrophages, neutrophil elastase (*Elane*) for neutrophils, CD3 (*Cd3e*) for T lymphocytes. RNA was isolated from total skin of *Sox2-Cre*$^{tg/+}$;*Pparg*$^{\Delta/em\Delta}$ *(Pparg*$^{\Delta/\Delta}$*)* and control mice at P28 (n=4). Data are normalized to *Eef1α1* and expressed as mean ± SEM. *** represents p value <0.001.

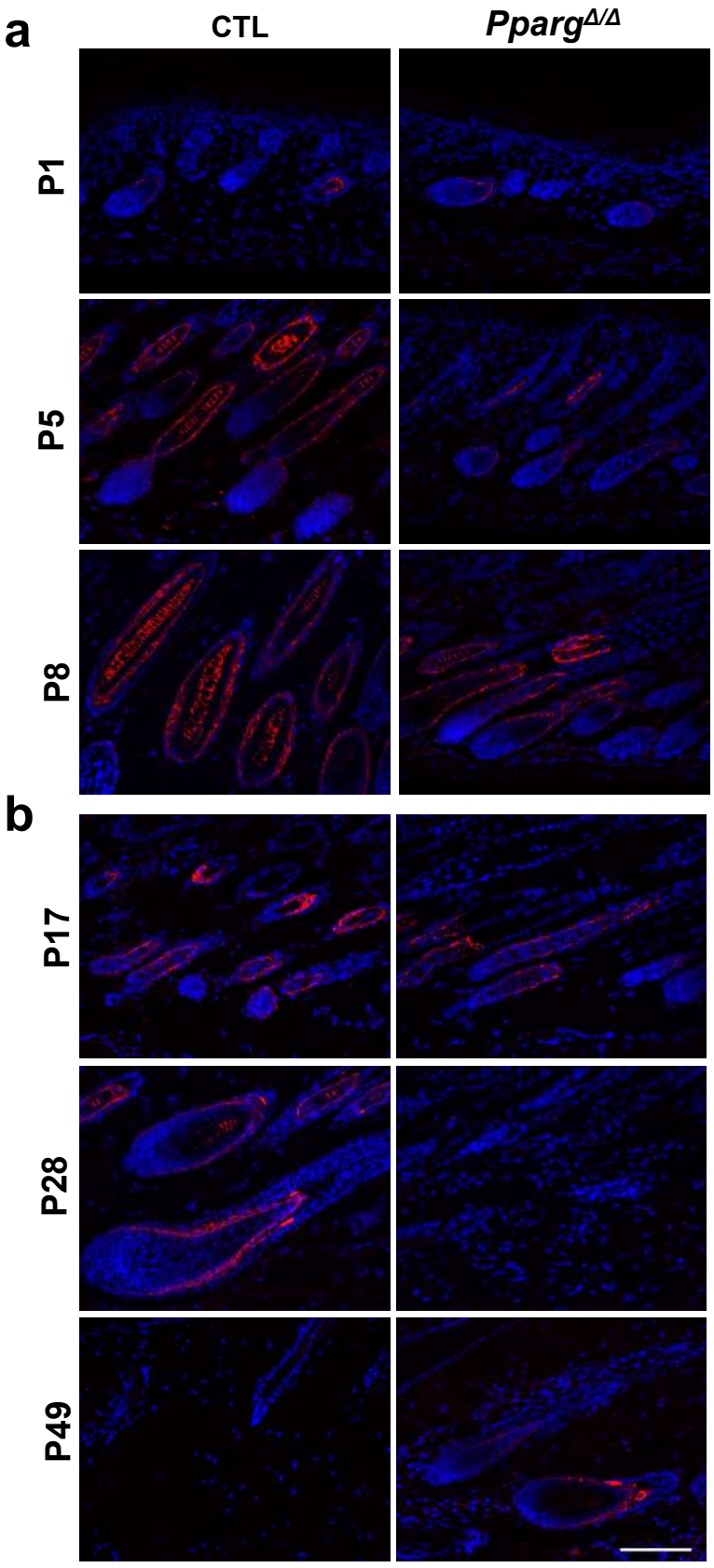

Figure S5: Trichohyalin protein expression is desynchronized in *Pparg*$^{\Delta/\Delta}$ skin
Representative images of IF staining of trichohyalin (red) in skin from *Sox2-Cre*$^{tg/+}$;*Pparg*$^{\Delta/em\Delta}$ *(Pparg*$^{\Delta/\Delta}$*)* and littermate controls (CTL) at different stages of HF morphogenesis **(a)** and of HF cycle **(b)** Nuclei are stained in blue. Scale bar=100µm.

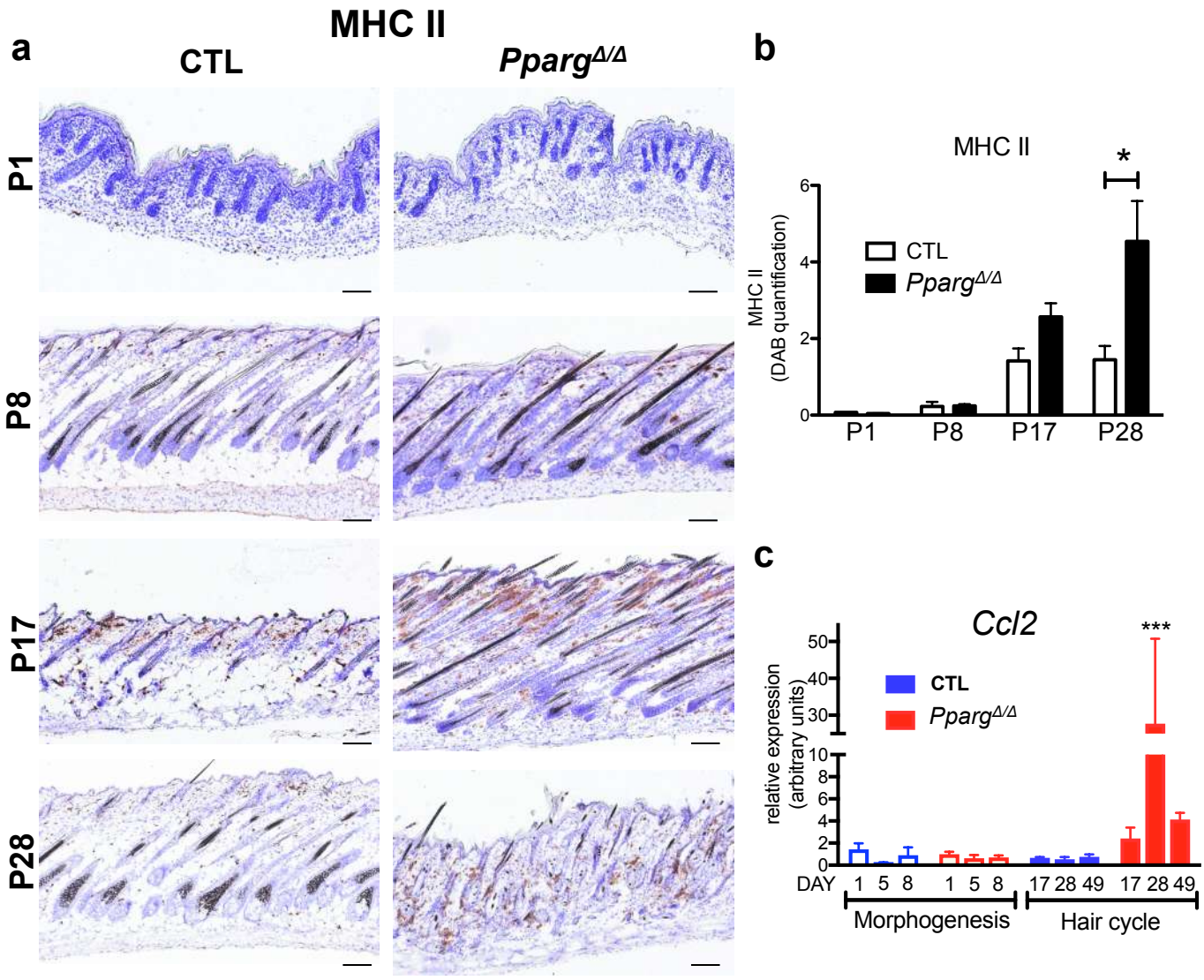

Figure S6: Inflammatory infiltrate appears in *Pparg*$^{\Delta/\Delta}$ skin starting from P17 onwards

(a) Staining with antibody against major histocompatibility complex class II (MHC II) of skin sections from *Sox2-Cre*$^{tg/+}$;*Pparg*$^{\Delta/em\Delta}$ (*Pparg*$^{\Delta/\Delta}$) and control (CTL) mice. Scale bar=100µm **(b)** DAB staining quantification, normalized to the skin area of each section. Data are expressed as mean ± SEM. * represents p<0.05 **(c)** Gene expression analysis of skin from *Pparg*$^{\Delta/\Delta}$ (***γ*$^{\Delta/\Delta}$**; red bars) and control (CTL; blue bars) mice at different stages of hair morphogenesis: P1 (n=5), P5 (n=6) and P8 (n=5); and hair cycle: P17, P28 and P49 (n=4). mRNA levels of Chemokine (C-C motif) ligand 2 (*Ccl2*), as macrophage marker, are shown. Data were normalized to *Eef1α1* and expressed as mean ± SEM. *** represents p<0.001.

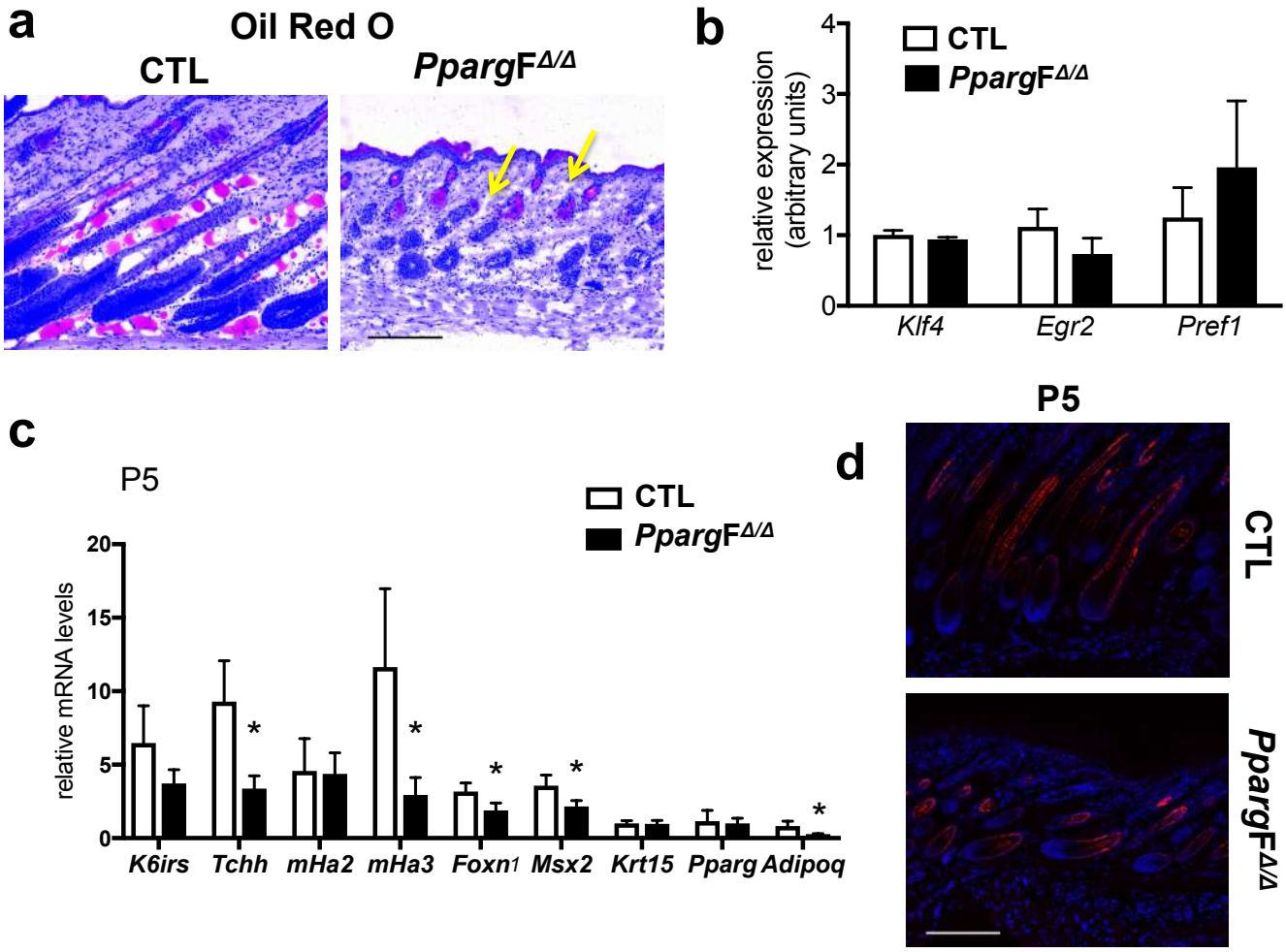

Figure S7: HF morphogenesis phenotype of fat-specific *Pparg* knock-out mice
(a) Oil Red O staining of back skin cryosections from *Adipoq-Cre*$^{tg/+}$;*Pparg*$^{fl/fl}$ (*Pparg*F$^{\Delta/\Delta}$) and control (CTL) mice at P28. Yellow arrows indicate the sebaceous glands in *Pparg*F$^{\Delta/\Delta}$ mice. **(b)** Gene expression analysis in full thickness skin of preadipocyte-markers, kruppel like factor 4 (*Klf4*), early growth response 2 (*Egr2*) and preadipocyte factor 1 (*Pref1*) in *Pparg*F$^{\Delta/\Delta}$ and control (CTL) mice at P1 (n=4 for CTL, n=3 for *Pparg*F$^{\Delta/\Delta}$). Data are normalized to *Eef1α1* and expressed as mean ± SEM. **(c)** Gene expression analysis in full thickness skin of keratin 72 (*K6irs*), trichohyalin (*Tchh*); murine type I hair keratins *mHa2* and *mHa3*; forkhead box N1 (*Foxn1*), homeobox msh-like 2 (*Msx2*), Keratin 15 (*Krt15*), Pparγ (*Pparg*) and adiponectin (*Adipoq*) in *Pparg*F$^{\Delta/\Delta}$ and control (CTL) mice at P5 (n=4 for CTL, n=3 for *Pparg*F$^{\Delta/\Delta}$). Data are normalized to *Eef1α1* and expressed as mean ± SEM. * represents $p<0.05$. **(d)** Representative images of IF staining of trichohyalin (red) in skin from *Pparg*F$^{\Delta/\Delta}$ and control (CTL) mice at P5. Nuclei are stained in blue. Scale bar=200μm.

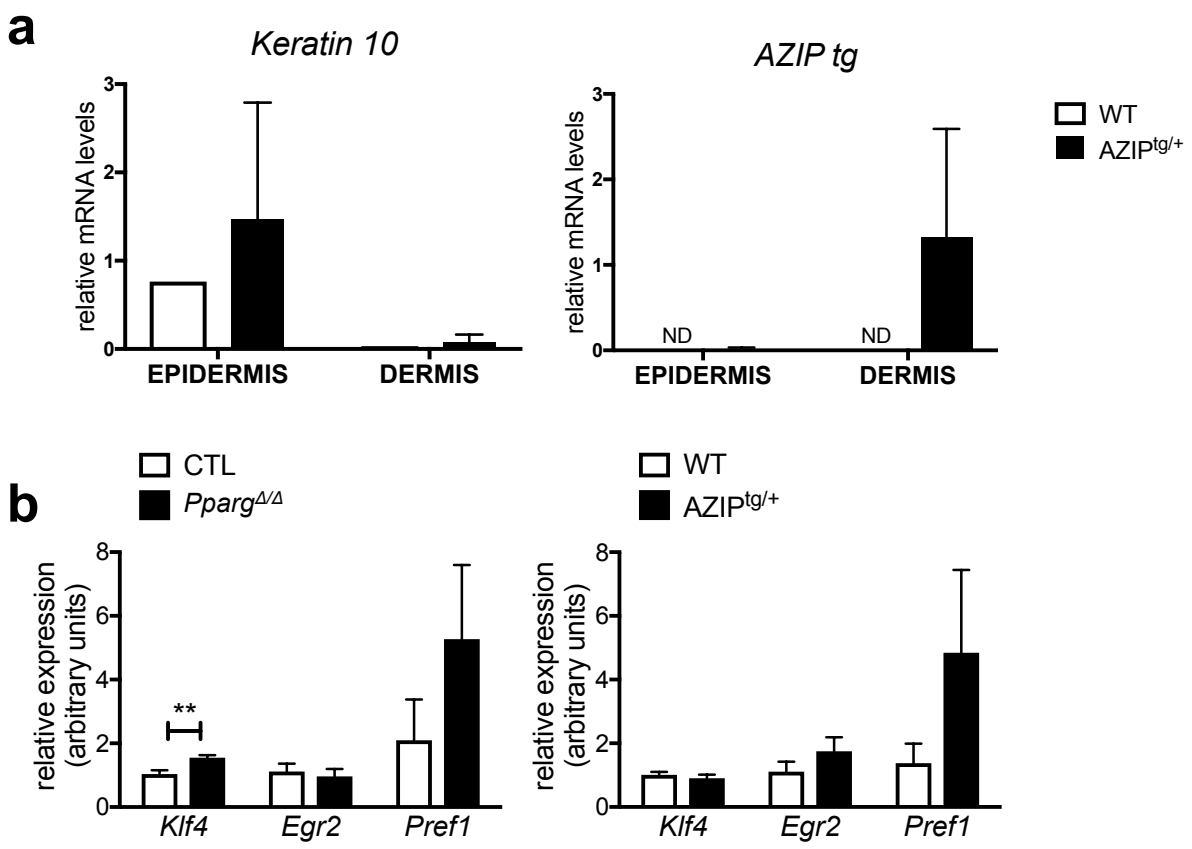

Figure S8: Skin expression of the AZIP transgene and of preadipocyte markers in AZIP$^{tg/+}$ mice

(a) Epidermis and dermis fractions were separated from the skin of AZIP$^{tg/+}$ and littermate wild type control mice. Gene expression analysis of Keratin 10, as a marker of epidermis, and of the AZIP transgene (AZIP tg) were evaluated. **(b)** Gene expression analysis of preadipocyte-markers, kruppel like factor 4 (*Klf4*), early growth response 2 (*Egr2*) and preadipocyte factor 1 (*Pref1*). RNA was isolated from total skin of *Pparg*$^{\Delta/\Delta}$ AZIP$^{tg/+}$ and the respective control mice at P1 (n=7 for CTL, n=5 for *Pparg*$^{\Delta/\Delta}$, n=4 for AZIP$^{tg/+}$ and WT). Data are normalized to *Eef1α1* and expressed as mean ± SEM. ** represents p value <0.01.

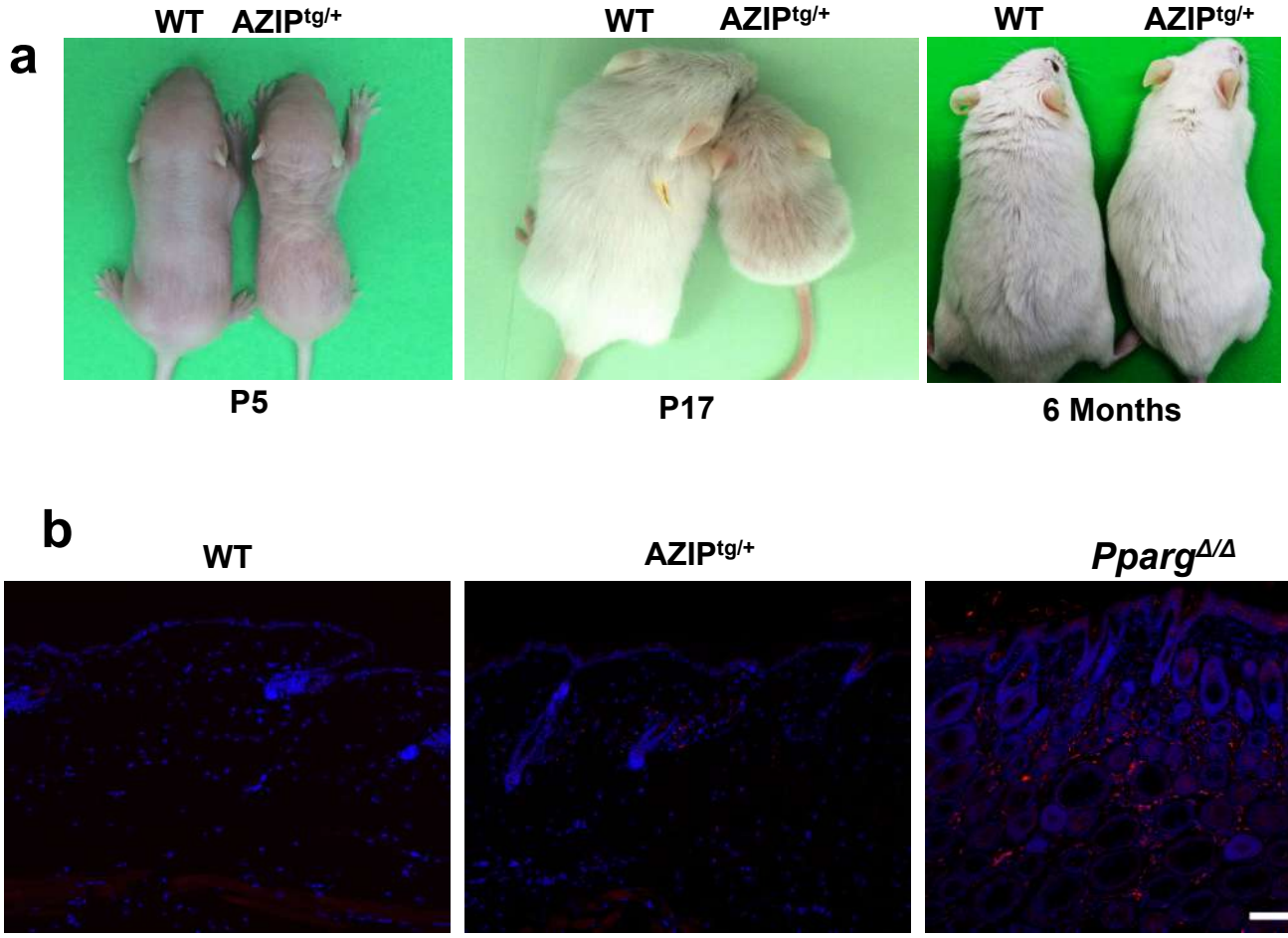

Figure S9: AZIP$^{tg/+}$ mice show delayed hair growth, but no skin inflammation at adult stage

(a) Representative pictures of AZIP$^{tg/+}$ and littermate controls taken at P5, P17 and 6 months. **(b)** IF staining of Iba1^{+} macrophages (red) in the skin of 6 months old AZIP$^{tg/+}$ and littermate controls (nuclei are stained in blue). Skin from *Pparg*$^{\Delta/\Delta}$ (right panel) was used as positive control. Scale bar=200µm.

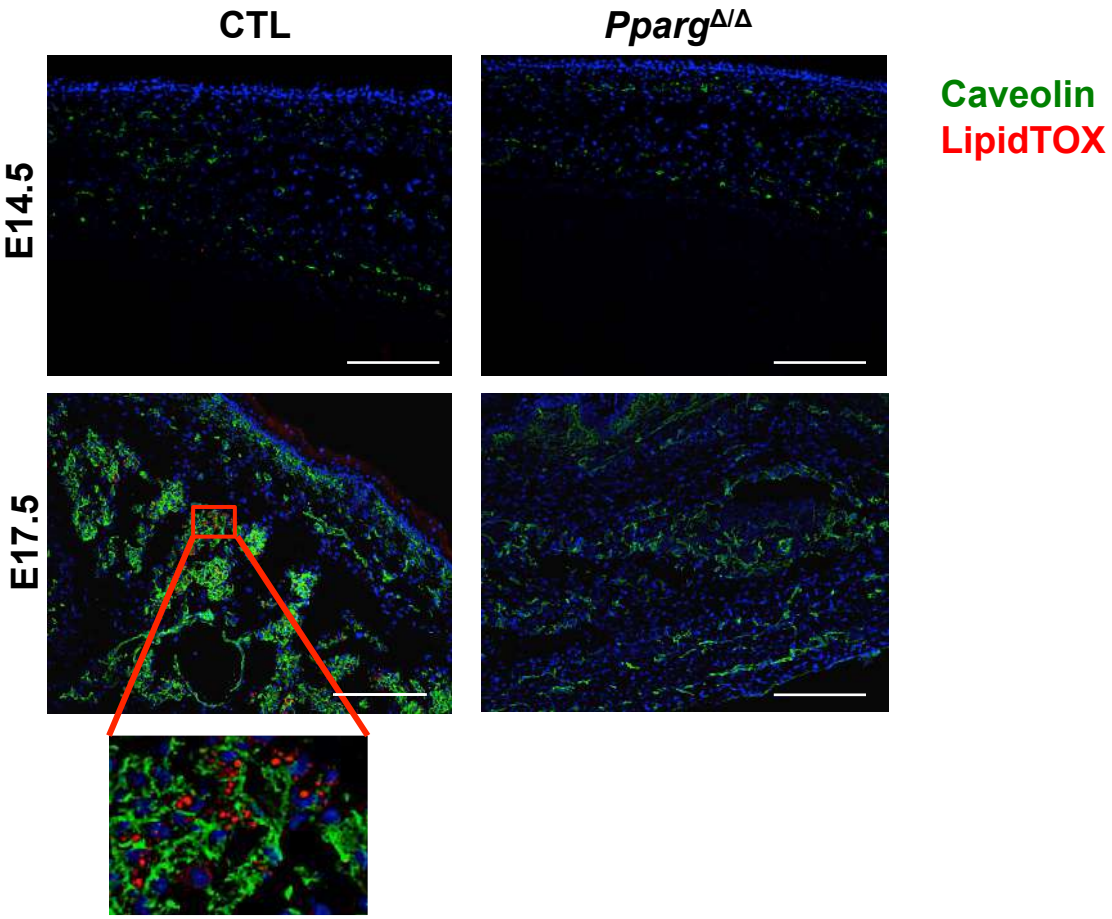

Figure S10: Mature adipocytes appear at E17.5 during embryogenesis
Frozen sections of embryos at E14.5 and E17.5 from *Sox2-Cre*$^{tg/+}$;*Pparg*$^{\Delta/em\Delta}$ (*Pparg*$^{\Delta/\Delta}$) and control (CTL) mice were stained in double immunofluorescence with rabbit anti-caveolin 1 (green) and HCS LipidTOX (red) to mark mature adipocytes, as described in Le Lay et al. 2010. Scale bar=200µm.

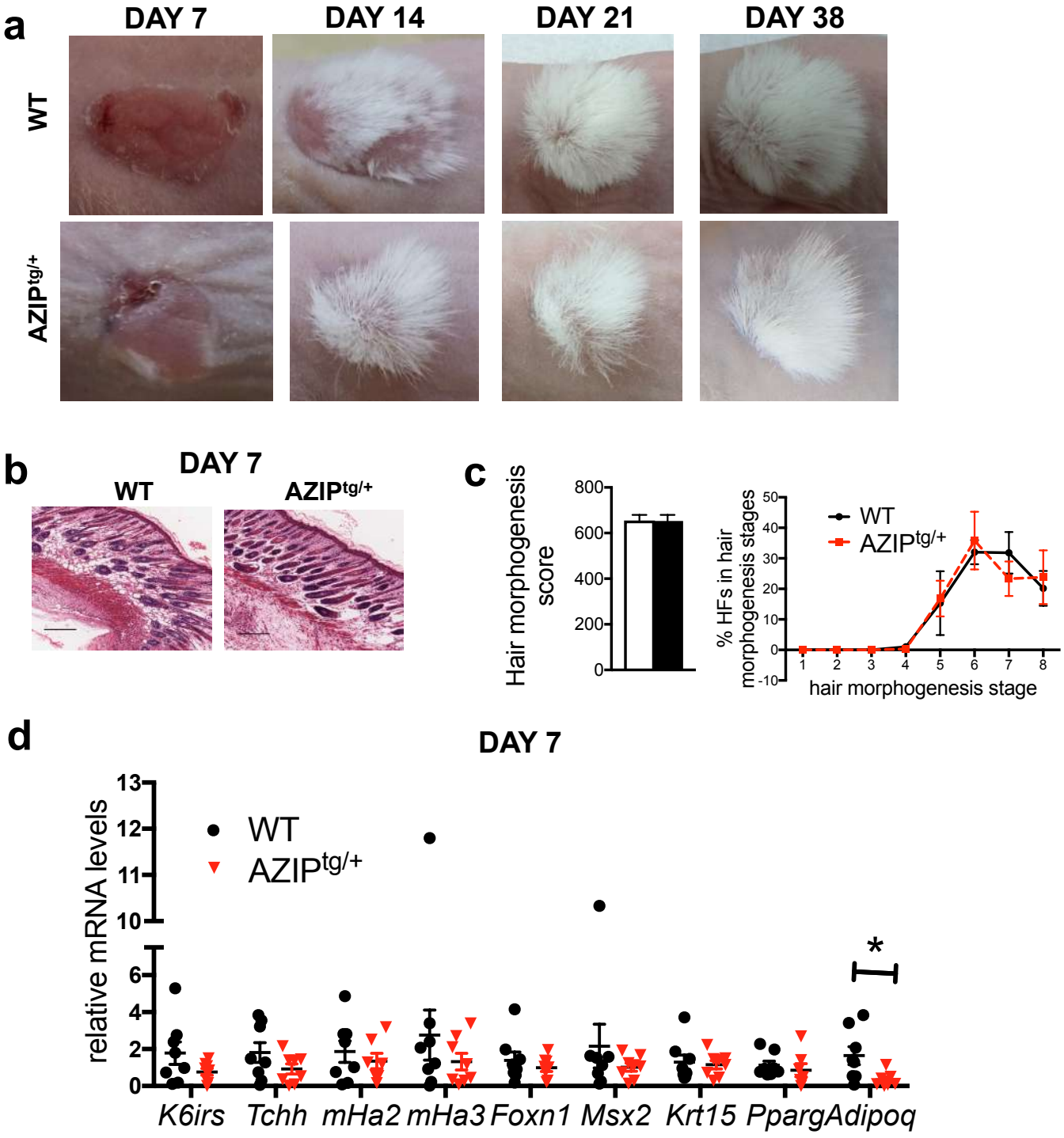

Figure S11: Role of adipose tissue for hair follicle postnatal differentiation
(a) Representative images of skin grafts from AZIP$^{tg/+}$ and wild-type (WT) embryos on *Foxn1*$^{nu/nu}$ mice, 7, 14, 21 and 38 days after engraftment. Scale bar=200µm **(b)** Representative picture 7 days after engraftment and **(c)** Quantitative histomorphometry analysis of hair morphogenesis. Hair morphogenesis score (left panel); % of HFs found in the different hair morphogenesis stages (right panel; n=6). **(d)** Gene expression of keratin 72 (*K6irs*), trichohyalin (*Tchh*); murine type I hair keratins *mHa2* and *mHa3*; forkhead box N1 (*Foxn1*), homeobox msh-like 2 (*Msx2*); Keratin 15 (*Krt15*), *Pparg* and adiponectin *(Adipoq).* Data are normalized to *Eef1α1* and expressed as mean ± SEM (n=8). * represents p<0.05.

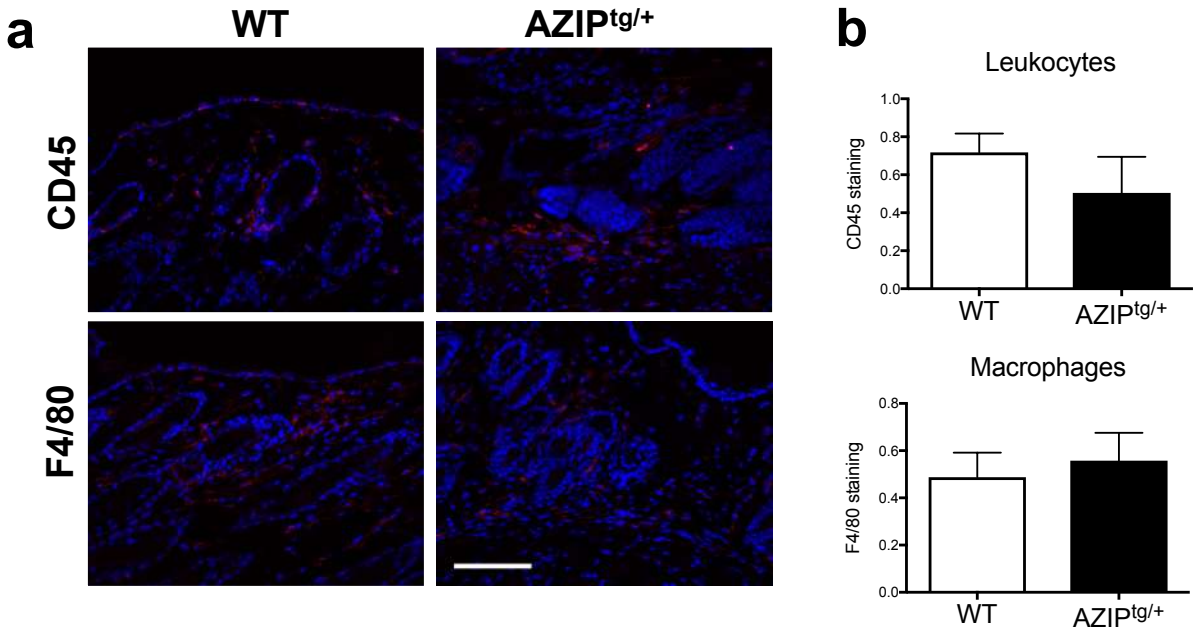

Figure S12: **No inflammation in AZIP$^{tg/+}$ grafts**
38 days after engraftment: **(a)** CD45 (leucocytes) and F4/80 (macrophages) immunostaining (red) and **(b)** their quantification. Scale bar=100µm.