

SUPPLEMENTAL FIGURE LEGENDS

Figure S1: (Related to Figure 1)

- A) Basal cell marker expression (K5, green) and proliferation marker expression (Ki67, red) in *Co* and *Fra-2^{Ep-tetOFF}* embryos at E17.5; n=5/genotype; 20x magnification.
- B) Quantification of Figure S1A, K5+/Ki67+ cells/20x field; n=10 fields/genotype; bars represent mean $\pm$ SD.
- C) Quantification of Figure 1F; mean Lor and Flg fluorescence intensity/40x field; n=10 fields/genotype; * p<0.05, bars represent mean $\pm$ SD.
- D) Quantification of Figure 1I; mean Lor and Flg fluorescence intensity/20x field; n=10 fields/genotype; * p<0.05; bars represent mean $\pm$ SD.
- E) Differential EDC gene expression and *Fra-2* expression in *Co*, *Fra-2^{Ep-tetOFF}*, *SOS+* and *Fra-2^{Ep-tetOFF}* *SOS+* mice at 5 weeks of age; n=4/genotype; * p<0.05; bars represent mean $\pm$ SD.
- F) Proliferation marker expression (Ki67, brown) in *SOS+* and *Fra-2^{Ep-tetOFF}* *SOS+* mice at 5 weeks of age; n=5/genotype.
- G) Quantification of Figure S1E, Ki67+ cells/field; n=5 fields/genotype; bars represent mean $\pm$ SD.

Figure S2: (Related to Figure 2)

- A) Protein expression analyses of Flg, Lor and *Fra-2* in *Co* and *Fra-2^{Δep}* embryos at E17.5; n=4/genotype;
- B) Basal cell marker expression (K5, green) and proliferation marker expression (Ki67, red) in *Co*, *Fra-2^{Δsb}* and *Fra-2^{Δep}* embryos at E17.5; n=5/genotype; 20x magnification.
- C) Quantification of Figure S2A, K5+/Ki67+ cells/20x field; n=10 fields/genotype; bars represent mean $\pm$ SD.
- D) EDC mRNA expression analyses during wild-type mKC differentiation (0-72h Ca2+); n=5; * p<0.05; bars represent mean $\pm$ SD.

Figure S3: (Related to Figure 3)

A) Ezh2 and Suz12 protein expression during *in vitro* mKC differentiation (0-72h Ca²⁺); n=4.

B+C) ChIP analyses of H3K4me3 (B) and H3K27me3S28p (C) during mKC differentiation (0-72h Ca²⁺); n=3; * p<0.05, bars represent mean ±SD.

D+E) ChIP of Fra-2 in basal mKCs followed by D) DNA binding analysis at EDC gene promoters and E) WB analysis of Fra-2, Ezh2 and methylated lysine (methyl K); n=2

F) mRNA expression analyses of EDC genes upon Ezh2 inhibition (GSK126) for 24h with or without Ca²⁺; n=3; * p<0.05, bars represent mean ±SD.

Figure S4: (Related to Figure 4)

A) Exogenous Fra-2-Flag mRNA expression of primary mKCs infected with Lentiviruses expressing wild-type Fra-2 (Fra-2 WT) or mutant Fra-2 mimicking lysine methylation (Fra-2 K104F) compared to empty vector infected cells (pLVX); n=3.

B) Fra-2Δ-GFP mRNA expression of primary mKCs carrying Fra-2 loxed alleles (*Fra-2^{f/f}*) infected with Adeno-GFP (AdGFP) or Adeno-Cre (AdCre), expressing Fra-2 WT or Fra-2 K104F mutant compared to empty vector infected cells; n=3.

C) Exogenous Fra-2-Flag mRNA expression of primary *Fra-2^{f/f}* mKCs infected with AdGFP or AdCre, expressing Fra-2 WT or Fra-2 K104F mutant compared to empty vector infected cells; n=3.

D) Differential Fra-2 and EDC gene expression of primary *Fra-2^{f/f}* mKCs infected with AdGFP or AdCre, expressing Fra-2 WT and Fra-2 K104F compared to empty vector infected cells; n=3.

Figure S5: (Related to Figure 5)

- A) Exogenous Fra-2-Flag mRNA expression of primary mKCs infected with Lentiviruses expressing Fra-2 WT or mutant Fra-2 deficient for C-terminal phospho-acceptor sites (Fra-2 S320A/T322A) compared to empty vector infected cells; n=3.
- B) Fra-2Δ-GFP mRNA expression of primary *Fra-2^{f/f}* mKCs infected with AdGFP or AdCre, expressing Fra-2 WT or Fra-2 S320A/T322A mutant compared to empty vector infected cells; n=3.
- C) Exogenous Fra-2-Flag mRNA expression of primary *Fra-2^{f/f}* mKCs infected with AdGFP or AdCre, expressing Fra-2 WT or Fra-2 S320A/T322A mutant compared to empty vector infected cells; n=3.
- D) Differential Fra-2 and EDC gene expression of primary *Fra-2^{f/f}* mKCs infected with AdGFP or AdCre, expressing Fra-2 WT or Fra-2 S320A/T322A compared to empty vector infected cells; n=3.
- E) IP of Fra-2 and WB of Fra-2, methyl K and p-Fra1/2 upon Ezh2 inhibition with GSK126 in basal mKCs; n=2.
- F) Protein expression of Ezh2, Fra-2, p-ERK1/2 and ERK1/2 upon Ezh2 inhibition with GSK126 in basal mKCs; n=3.