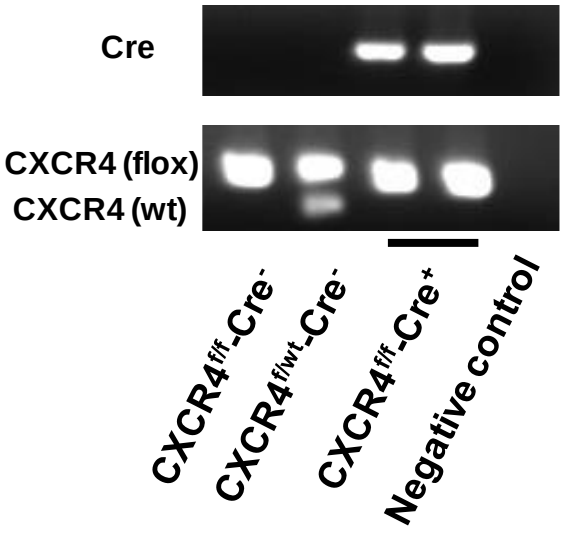
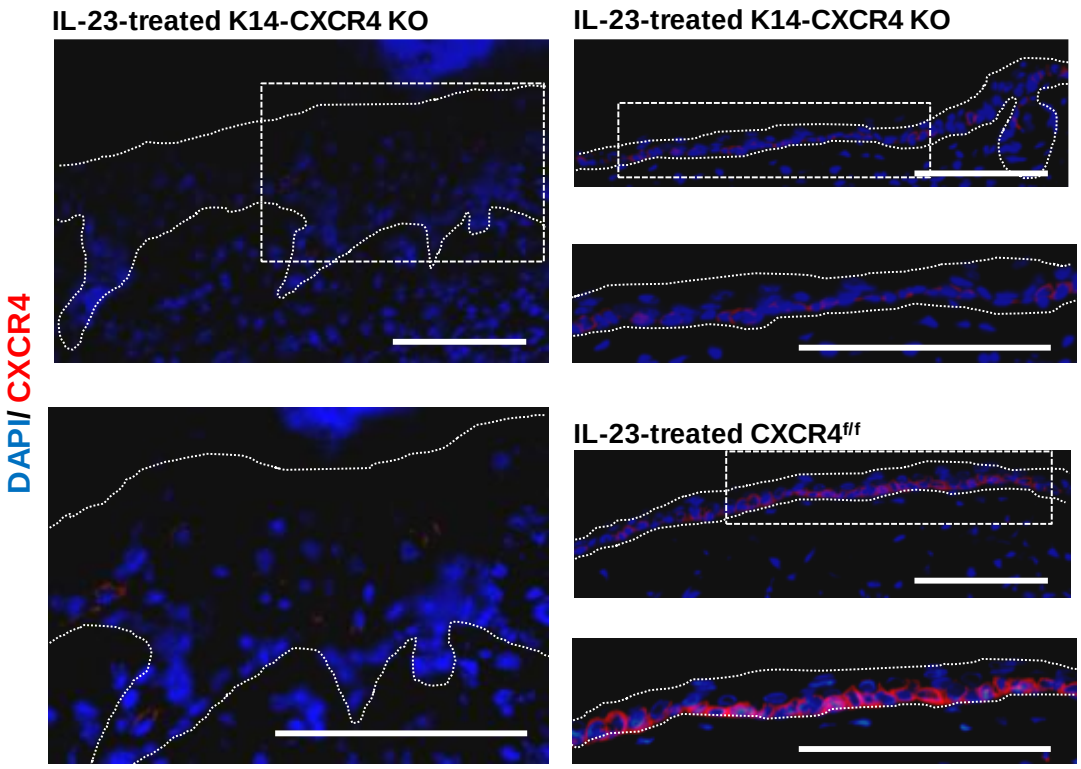
SUPPLEMENTARY MATERIALS



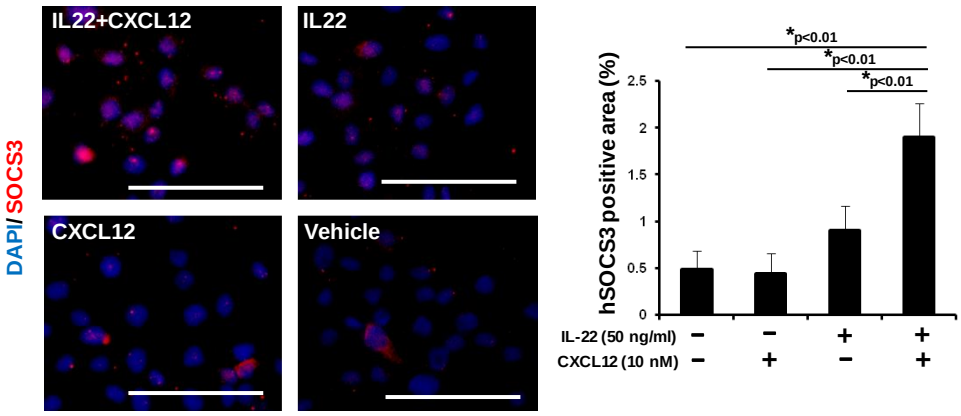
Supplementary Figure S1. Genotyping of K14-CXCR4KO and control mice.

Homozygous loxP flanked (floxed) CXCR4 mice ($CXCR4^{f/f}$) were crossed with K14-Cre-mice as described in Materials and Methods. DNA was extracted from mouse tails and PCR for *Cre* and *loxP* flanked (floxed) *CXCR4* genes was performed to confirm the presence of *Cre*, floxed *CXCR4*, and wildtype (wt) *CXCR4* sequences. Two examples of genotyping of K14-CXCR4KO mice ($CXCR4^{f/f}$-Cre^{+}) are shown. $CXCR4^{f/f}$-Cre^{-} mice were used as positive controls and purified water was used as negative control.



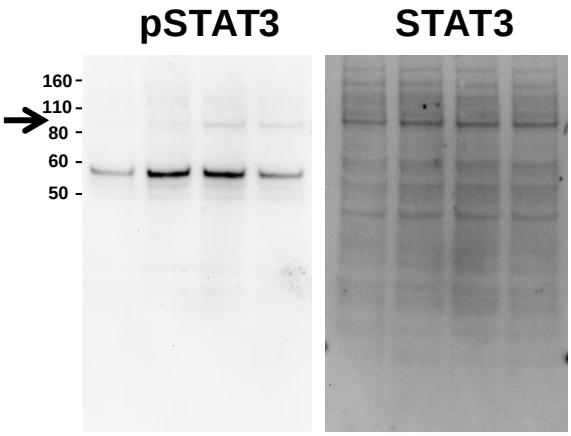
Supplementary Figure S2. Incomplete CXCR4 knockout area of K14-CXCR4 KO treated with IL-23 showed thinner epidermis compared with complete CXCR4 knockout area.

K14-CXCR4 KO ears were injected with IL-23 every other day for 5 days and collected at day 5. CXCR4 staining was performed and incomplete CXCR4 knockout area and complete CXCR4 knockout area are shown. The superior dotted lines represent the approximate level of the cornified layer while the inferior dotted lines represent the approximate level of the epidermal basement membrane. White dotted square areas of left upper panel, right upper panel, and right lower-middle panel are shown at panels shown just blow each panel.



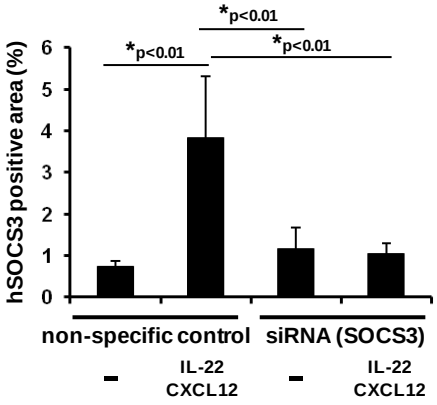
Supplementary Figure S3. Immunostaining for SOCS3 in CXCR4-HaCaT cells cultured with IL-22 and/or CXCL12.

CXCR4-HaCaT cells were cultured with IL-22 and/or CXCL12 for 1 hr and then stained using anti-SOCS3 Ab. A representative image from each treatment group is shown. Scale bars, 100 µm (A). Four HPFs, which contained similar numbers of cells by DAPI staining, were selected for measurement of SOCS3-positive area using ImageJ software (B). *Indicates significance using Scheffé's test for post hoc multiple comparison.



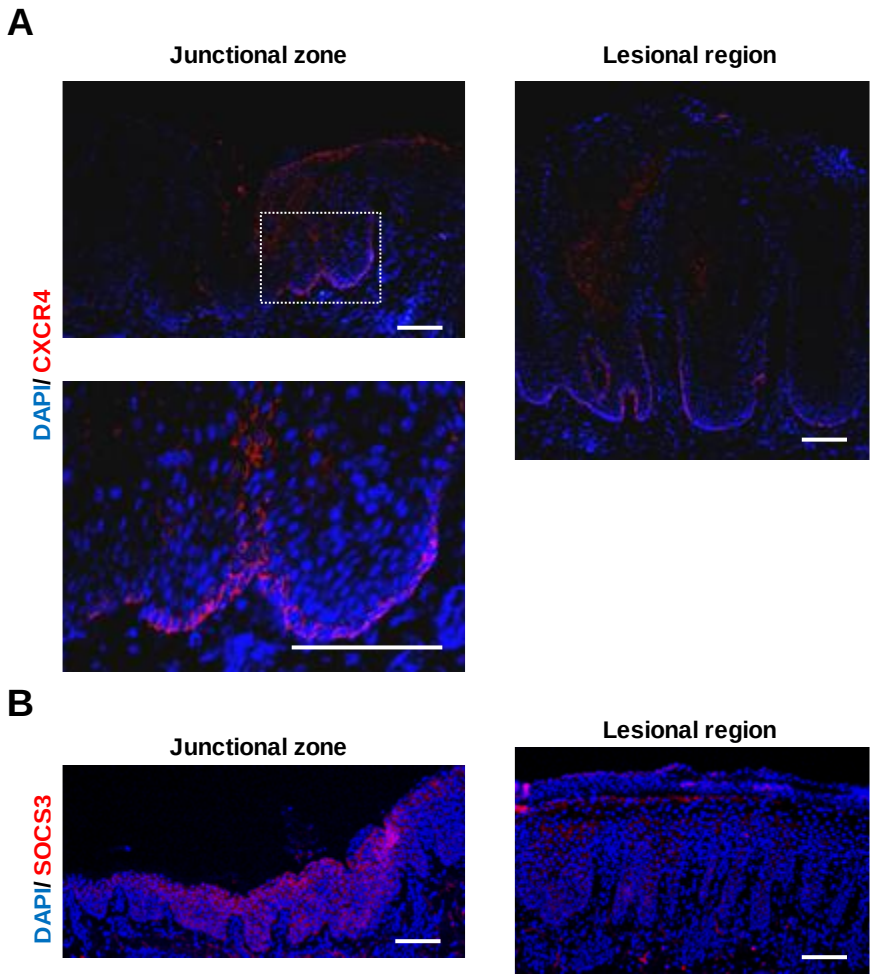
Supplementary Figure S4. STAT3 and pSTAT3 protein expression in CXCR4-HaCaT cells cultured with IL-22 and/ or CXCL12.

STAT3 protein levels and pSTAT3 protein levels in CXCR4-HaCaT cells cultured with IL-22 and/or CXCL12 were evaluated by Western blot [full-length blot shown, and cropped blot is shown in Fig 5D]. The same membrane was used for second antibody staining after stripping the first antibody prior to restaining.



Supplementary Figure S5. RNA interference for SOCS3 in CXCR4-HaCaT cells.

siRNA for SOCS3 was transduced to CXCR4-HaCaT cells. Cells were cultured in slide chamber with CXCL12 and IL-23 for 1 hr and then stained using anti-SOCS3 antibody. Four HPFs, which contained SOCS3 expressing cells, were selected and SOCS3-positive area was measured using ImageJ software. *Indicates significance using Scheffé's test for post hoc multiple comparison.



Supplementary Figure S6. CXCR4 and SOCS3 expression in human psoriatic skin.

Three human psoriasis skin samples containing the junctional zone between lesional and peri-lesional regions were stained using anti-CXCR4 and anti-SOCS3 antibodies (Patients' information is shown in Supplementary Table S1.). CXCR4 staining of patient 1's sample is shown. White dotted square area of left-upper panel is shown at left-lower panel (A). SOCS3 staining of patient 3's sample is shown (B). Scale bars, 100 μm.

Supplementary Table S1: Patients' information of Figure 6

	Sex	Age	Diagnosis	History	Region
Patient 1	F	36	Psoriasis Vulgaris	5 month	Abdomen
Patient 2	M	61	Psoriasis Vulgaris	20 years	Back
Patient 3	M	62	Psoriasis Vulgaris	>20 years	Back

Supplementary Table S2: Primer sequences

mouse loxP-attached CXCR4	5’-CCA CCC AGG ACA GTG TGA CTC TAA-3’
	5’-GAT GGG ATT TCT GTA TGA GGA TTA GC-3’
Cre recombinase	5’-CCG GGC TGC CAC GAC CAA-3’
	5’-GGC GCG GCA ACA CCA TTT TT-3’
mouse CXCR4	5’-AGG TAC ATC TGT GAC CGC CTT T-3’
	5’-AGA CCC ACC ATT ATA TGC TGG AA-3’
human SOCS3	5’-CAC TCT TCA GCA TCT CTG TCG GAA G-3’
	5’-CAT AGG AGT CCA GGT GGC CGT TGA C-3’
human PIAS3	5’-TTT ACC TTT GCC CTC ACA CC-3’
	5’-GCA CAG TTT CCC ATT GAC CT-3’
mouse GAPDH	5’-CGT GTT CCT ACC CCC AAT GT-3’
	5’-TGT CAT CAT ACT TGG CAG GTT TCT-3’
human GAPDH	5’-ACC CAC TCC TCC ACC TTT GA-3’
	5’-CAT ACC AGG AAA TGA GCT TGA CAA-3’