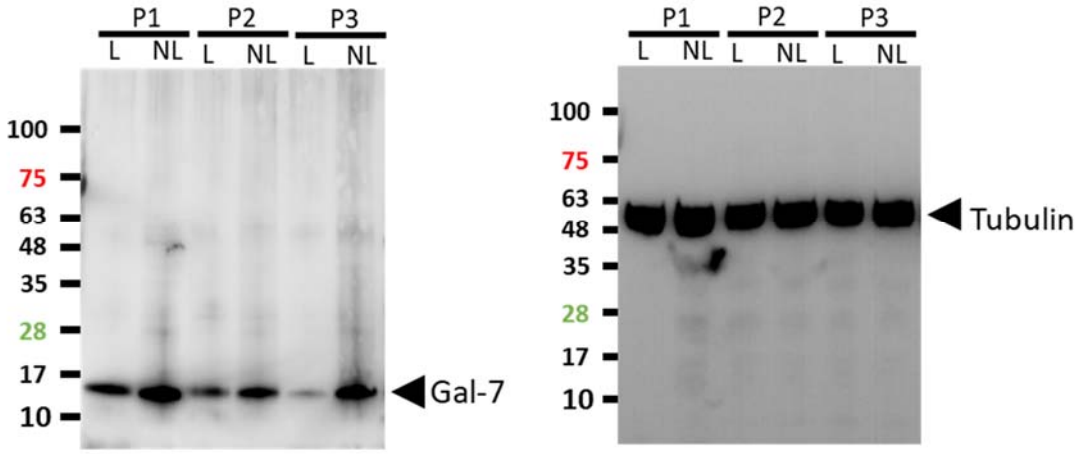
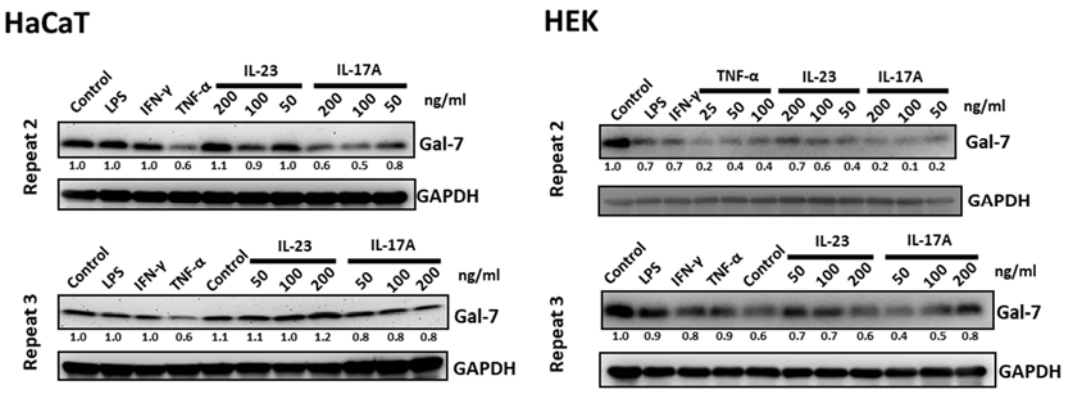
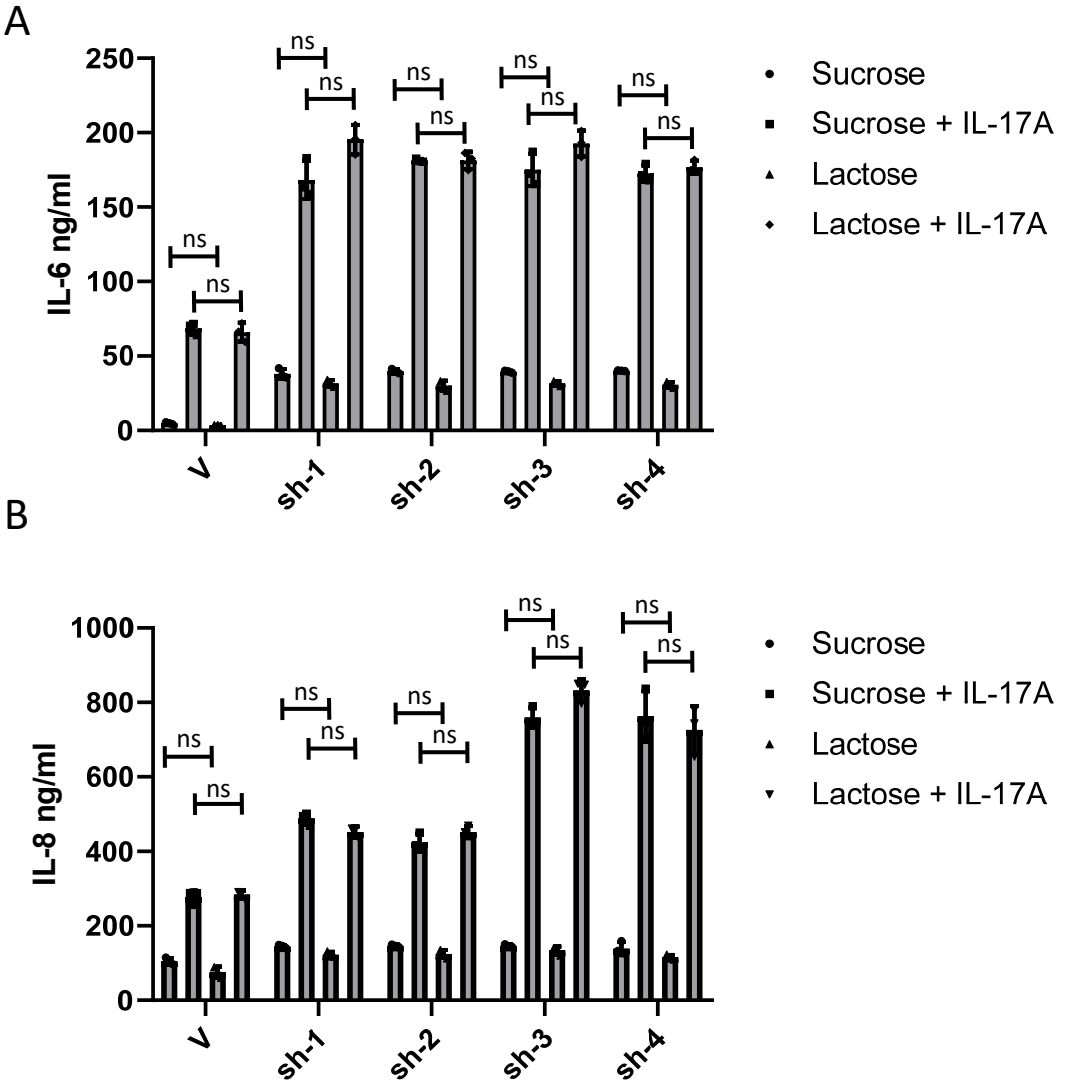


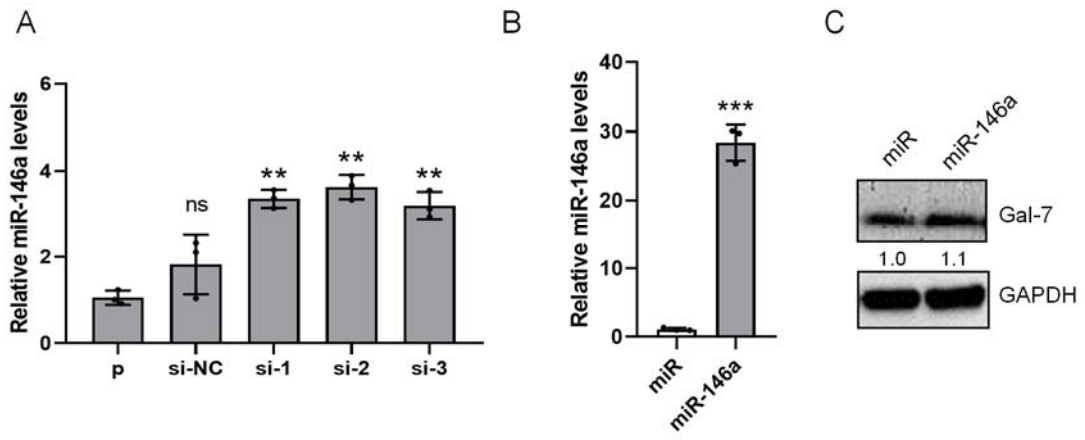
Supplementary Figure 1. Immunoblot analysis of galectin-7 in the lesional (L) and nonlesional (NL) skin from three psoriasis patients (P1, P2 and P3). In three pairs of skin biopsies, the epidermis plus dermis was manually separated from the subcutaneous fat with a forcep. The tissues were lysed in RIPA lysis buffer containing 1% Triton X-100 and a protease inhibitor cocktail (Sigma-Aldrich), and the total protein concentrations were measured with a Bradford Protein Assay Kit (Bio-Rad). Twenty μg of proteins from each sample were separated by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) and analyzed by immunoblotting using anti-galectin-7 and anti-tubulin antibodies. Tubulin served as loading control.



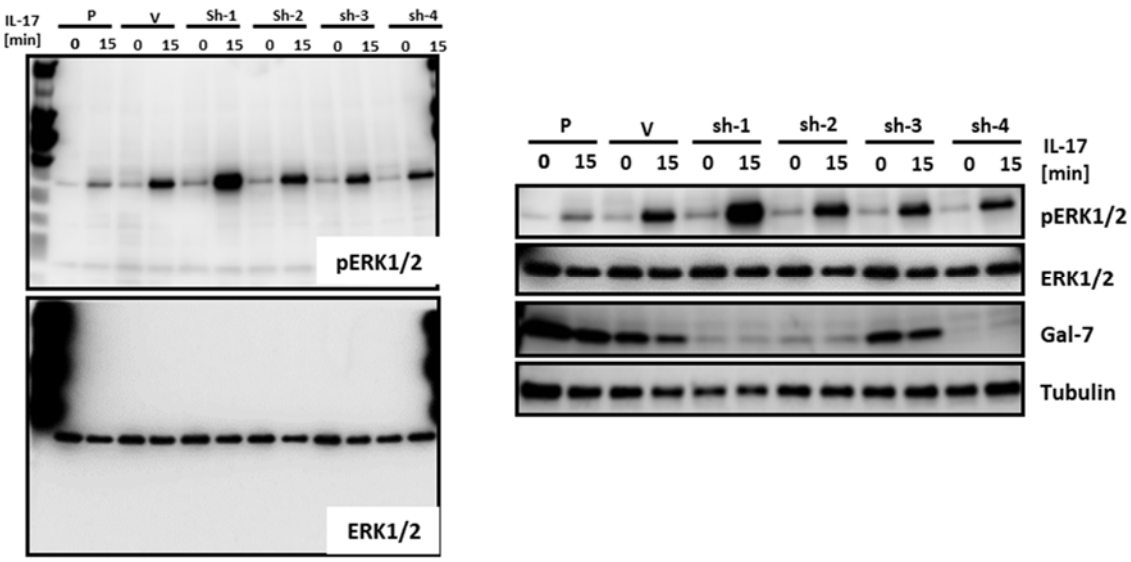
Supplementary Figure 2. Immunoblot analysis of galectin-7 in HaCaT and HEKn cells stimulated with the indicated cytokines (e.g., IFN-γ, LPS, TNF-α, IL-23, or IL-17A). The concentrations of IFN-γ , LPS and TNF-α used were 100 ng/ml, 50 μg/ml and 50ng/ml, respectively. The concentrations of TNF-α, IL-23, and IL-17A used were as indicated in the figure. Cells were treated with the cytokines for 2 days, and cell lysates were prepared for immunoblot analysis. GAPDH served as loading control. The galectin-7 protein amount in each band was quantified and normalized to GAPDH and control samples. The number below each band represents the relative galectin-7 amount.



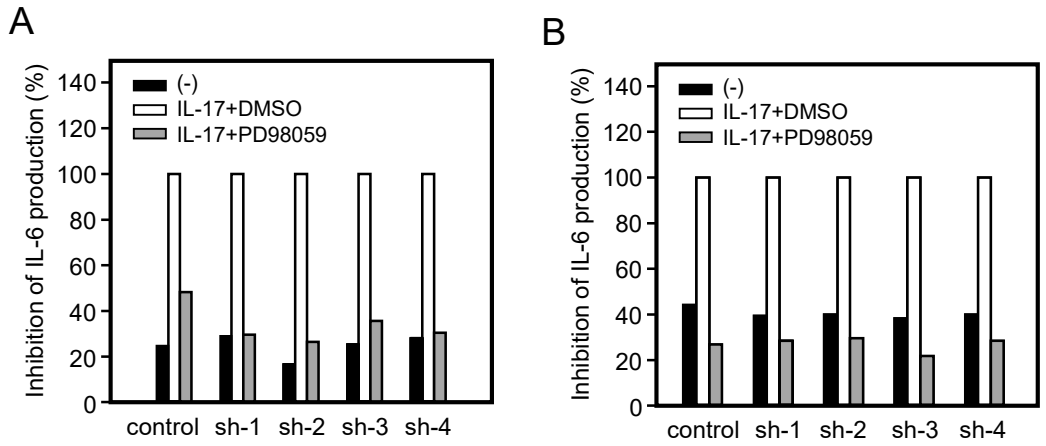
Supplementary Figure 3. Lactose and sucrose have no significant effect on the elevated production of proinflammatory cytokines (IL-6 and IL-8) caused by galectin-7 deficiency in response to IL-17A stimulation. IL-6 (A) and IL-8 (B) levels in galectin-7 knockdown HaCaT cell lines (sh-1, sh-2, sh-3, and sh-4) and controls were incubated with or without IL-17A for 2 days, and with 25 mM of lactose and sucrose, respectively. All the experiments included three biological replicates. Three independent biological replicates were performed for the ELISA analysis. All results were presented as mean ± SD. For statistical analysis, 2-way ANOVA with Tukey's multiple comparisons test were performed. ns: not significant.



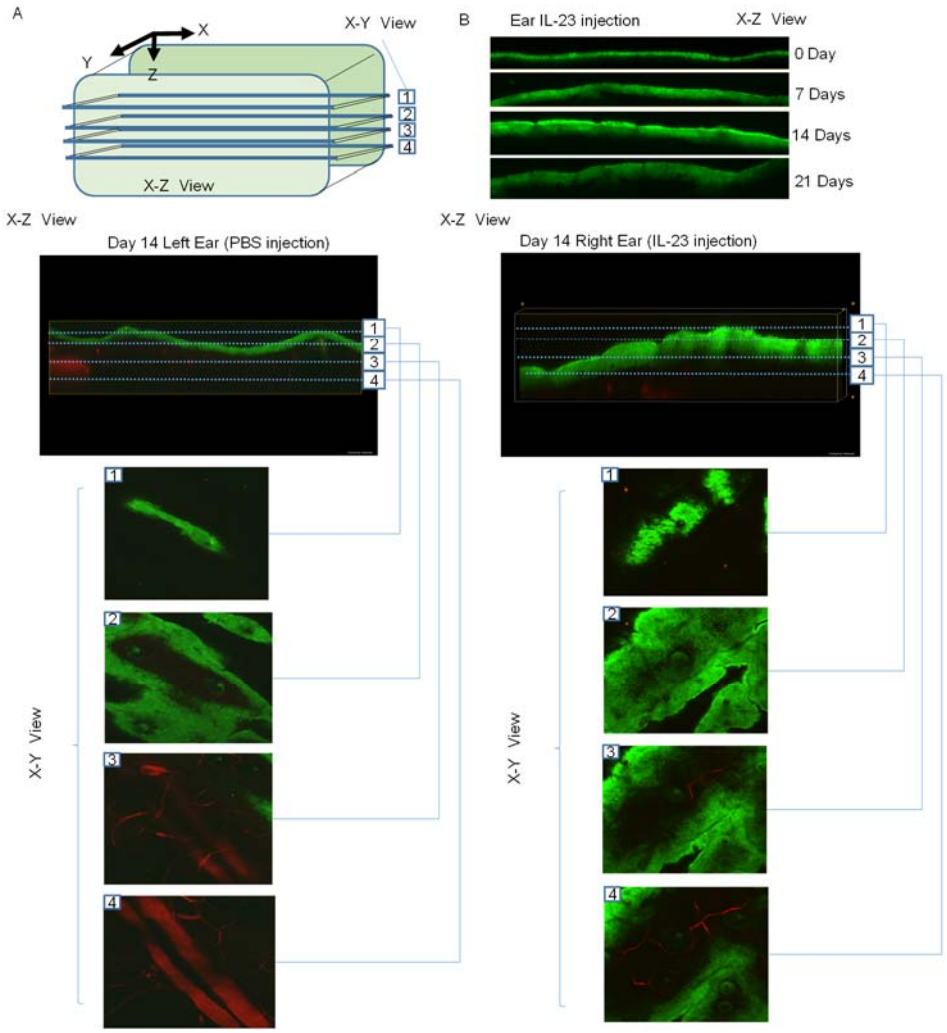
Supplementary Figure 4. Real-time PCR and immunoblot analyses of stably transfected miR-146a–expressing cells. (A, B) Relative fold changes of miR-146a expression were calculated by the ΔΔCt method (normalized to U6 RNA and control cells, ie. P: parental HaCaT cells for A and pmiR control cells for B). The si-NC, si-1, si-2 and si-3 are control and three siRNA treated cells as described in Figure2. **(C)** Immunoblot analysis of galectin-7 expression in pmiR- and pmiR-146a–transfected cells. Three independent biological replicates were performed for the real-time PCR analysis. All results were presented as mean ± SD. For statistical analysis, 1-way ANOVA with Tukey's multiple comparisons test or unpaired Student's t test were performed. ns: not significant, **P < 0.01, ***P < 0.001.



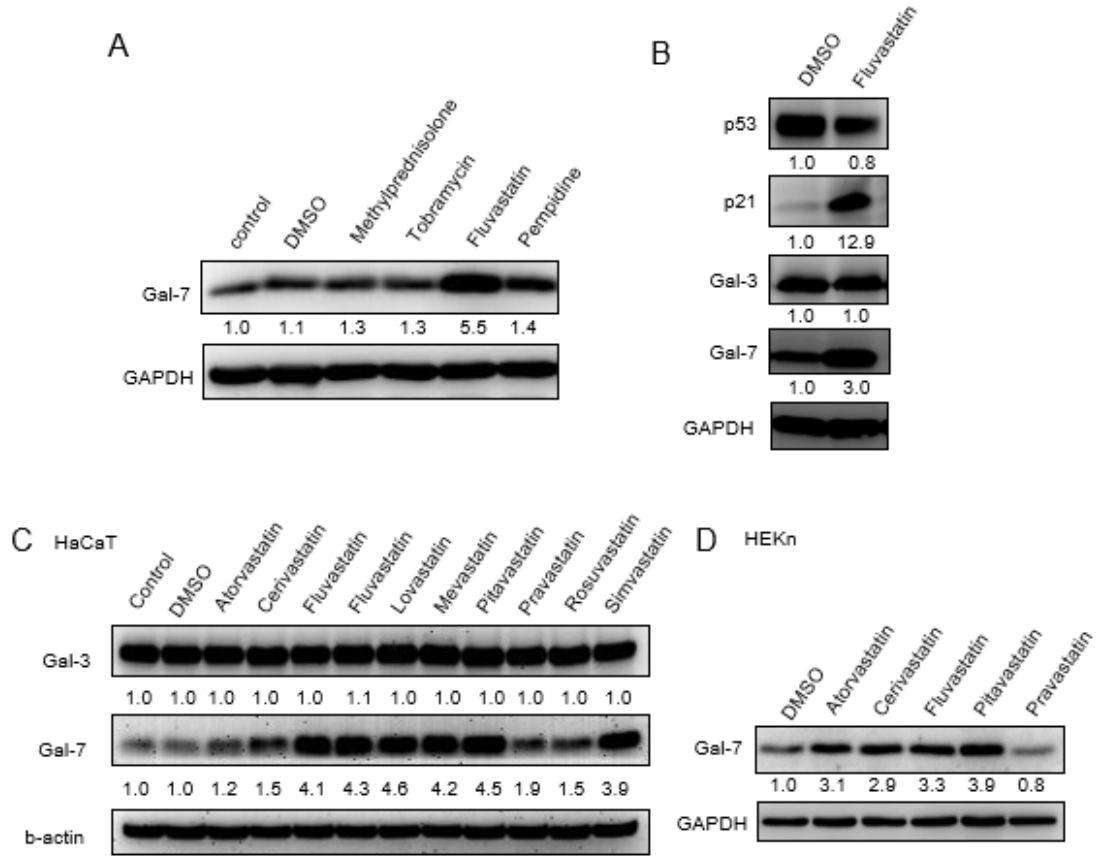
Supplementary Figure 5. Immunoblot analysis of galectin-7, pERK and ERK expression in HaCaT parental (P), vector control (v) and four shRNA knockdown stable cells (sh-1, sh-2, sh-3 and sh-4) treated with IL-17A. Tubulin served as loading control.



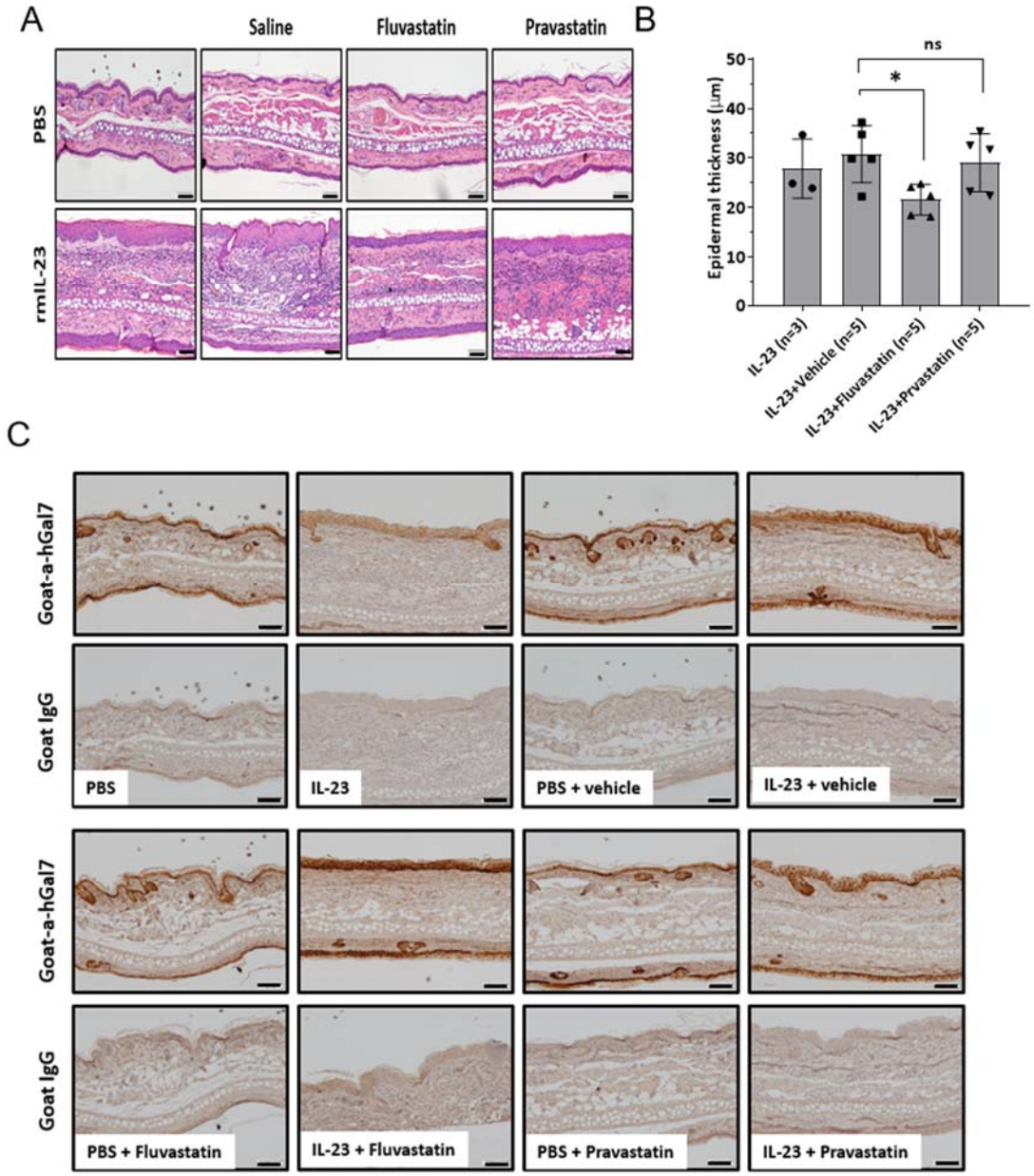
Supplementary Figure 6. Induction of IL-6 and IL-8 by IL-17A is inhibited by an ERK inhibitor (PD98059). (A, B) Galectin-7 shRNA knockdown (sh-1, sh-2, sh-3 and sh-4) and control cells were treated with IL-17 plus the ERK inhibitor as indicated. The percentage increase in IL-6 and IL-8 production was calculated by normalization to the "IL-17 plus DMSO" group (set to 100%).



Supplementary Figure 7. Three-dimensional imaging of live deep-tissue visualization of galectin-7 expression in IL-23 injection ear skin tissue. (A) Three-dimensional two photon image analysis of ear skin after 14-day treatment with PBS (left ear) or IL-23 (right ear). Evan's blue dye (red fluorescence) was used for blood vessel visualization. Four sections (1, 2, 3 and 4) from different points in the Z-axis were taken. (B) The green fluorescence signal in the skin of the ear injected with IL-23 on days 0, 7, 14, and 21.

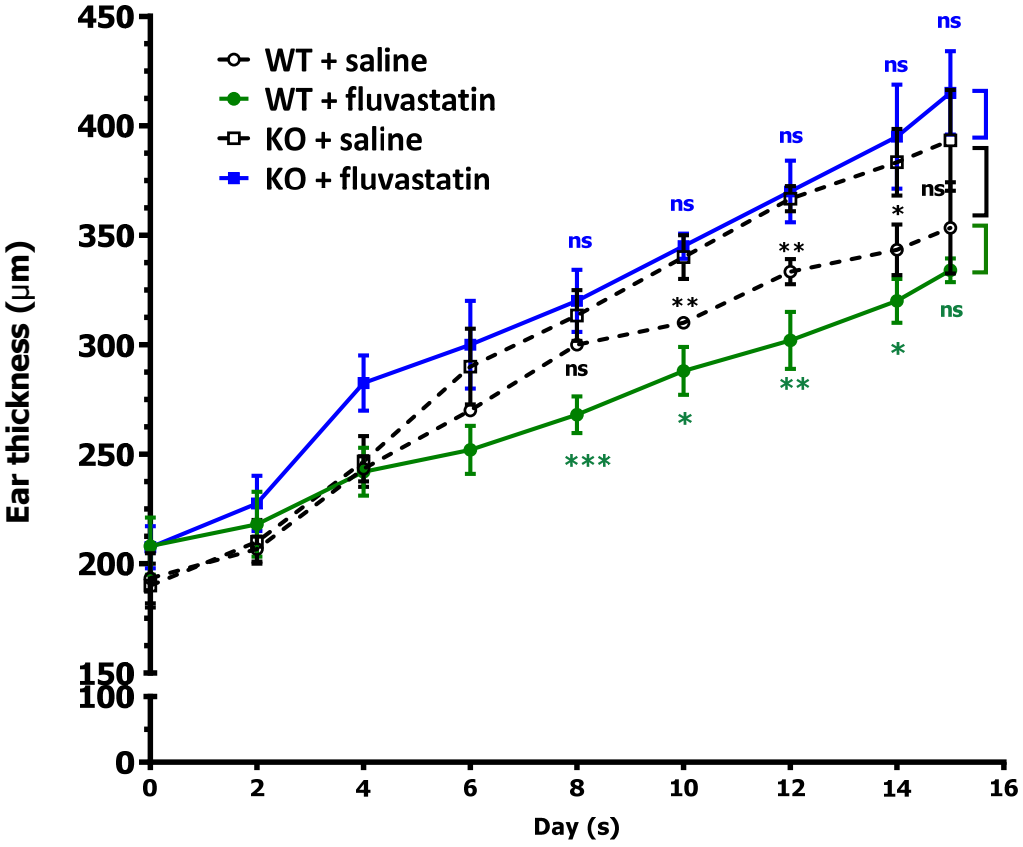


Supplementary Figure 8. Statin treatments induce galectin-7 expression in keratinocytes. (A) Immunoblot analysis of the galectin-7 protein levels in HaCaT cells treated with methylprednisolone (10.6 μM), tobramycin (8.6 μM), fluvastatin (9.2 μM), pempidine (13 μM), or vehicle control (DMSO) for 24 hr. **(B)** Immunoblot analysis of p53, p21, galectin-3, and galectin-7 protein levels in HaCaT cells treated with DMSO or fluvastatin (10 μM). **(C)** Immunoblot analysis of HaCaT cells treated with the indicated statin drugs (10 μM), including atorvastatin, cerivastatin, fluvastatin (duplicated), lovastatin, mevastatin, pravastatin, and simvastatin for 24 hr. The DMSO (vehicle)-treated and controls are also presented. GAPDH or β-actin served as loading controls. The galectin-3 or galectin-7 protein amounts in each band was quantified and normalized to their house-keeping controls and control samples (C) or DMSO (D). The number below each band represents the relative protein abundance. (D) Immunoblot analysis of HEKn cells treated with atorvastatin, cerivastatin, fluvastatin, Pitavastatin and pravastatin for 24 hr.



Supplementary Figure 9. H&E and galectin-7 IHC staining of the sections from the ear of mice injected intradermally with IL-23 or PBS and fed with statin (fluvastatin or pravastatin). 30 mg/kg/day fluvastatin or pravastatin were administrated to mice by oral gavage once daily for 14 days. The saline was used as control. **(A)** Hematoxylin and eosin staining (H&E) of ear sections on day 15 in experimental groups, including PBS (n=2), IL-23 (n=3), PBS + saline (n=5), IL-23 + saline (n=5), PBS + fluvastatin (n=3), IL-23 + fluvastatin (n=5), PBS + pravastatin (n=4), IL-23 + pravastatin (n=5). **(B)** Epidermal thicknesses of mice from H&E-stained sections as described in (A) obtained on day 15 from the same mice. For each tissue section, three measurements were taken from three different sites. The results represent the mean value of three measurement from an individual section. **(C)** Immunohistochemical staining of galectin-7 in skin sections

from intradermally IL-23–injected and PBS-injected mice arranged into groups as described in **(A)**. Scale bar: 100 μm. All results were presented as mean ± SD. For statistical analysis, 1-way ANOVA with Tukey's multiple comparisons test. ns: not significant, *P < 0.05.



Supplementary Figure 10. Galectin-7-deficient mice are less responsive to the suppressive effect of fluvastatin on ear thickness induced by IL-23 injections. Ear thickness of galectin-7 wild type and knockout mice in different groups (saline or fluvastatin treated) were measured every other day after intradermal IL-23 injection as described in Figure 5. For statistical analysis, we used two-way ANOVA multiple comparison tests to compare each group of mice at all time points. Ear thickness of saline or fluvastatin treated group in galectin-7 wild-type or knockout group at each time point was compared using Tukey's multiple comparisons test, and the results (adjusted p value) of three group pairs are annotated on the graph (blue symbols: G7KO+saline (*n*=3) vs. G7KO+fluvastatin (30 mg/Kg, *n*=4) ; black symbols: G7WT+saline (*n*=3) vs. G7KO+saline (*n*=3) ; green symbols: G7WT+saline (*n*=3) vs. G7WT+fluvastatin (30 mg/Kg, *n*=5)). There is no statistical significance before day 8. ns: not significant, *P < 0.05, **P < 0.01, ***P < 0.001.

Supplementary Table 1. Meta-analysis of microarray and RNAseq data of expression of galectin-7 (Lgals7) and other galectins in epidermis of psoriasis patients.

Gene-level experiment of microarray analysis on laser-microdissected epidermis from healthy volunteers and psoriatic patients to identify genes dysregulated in lesional psoriatic epidermis (GSE68937)

Gene	FC ([Lesional epidermis] vs [Healthy Epidermis])	GeneSymbol	Description
P254917|3960	-3.04	LGALS4	lectin, galactoside-binding, soluble, 4
P164664|148003	-3.71	LGALS16	lectin, galactoside-binding, soluble, 16
P120902|3957	1.35	LGALS2	lectin, galactoside-binding, soluble, 2
P238250|3963	-2.66	LGALS7	lectin, galactoside-binding, soluble, 7
P452655|654346	1.71	LGALS9C	lectin, galactoside-binding, soluble, 9C
P166459|3956	-1.10	LGALS1	lectin, galactoside-binding, soluble, 1
P139198|85329	-3.72	LGALS12	lectin, galactoside-binding, soluble, 12
P5031|29124	-3.22	LGALS13	lectin, galactoside-binding, soluble, 13
P153662|56891	-3.49	LGALS14	lectin, galactoside-binding, soluble, 14

Data were acquired from JCI Insight. 2017;2(11):e92979

Supplementary Table 2. Meta-analysis of RNAseq data of expression of galectin-7 (Lgals7) and other galectins in keratinocytes of psoriasis patients.

RNA-Seq Raw data from RNA-seq gene signature in primary monolayer keratinocytes grown from lesional and uninvolved psoriatic skin (PRJNA421744)

Name	Chromosome	Region	Max group	Log_2 fold change	Fold change	P-value	FDR p-value	Bonferroni
LGALS8	1	236681300..236716281	4.88	-0.44	-1.36	0.09	1	1
LGALSL	2	64681103..64688515	45.09	-1.87	-3.66	1.21E-05	4.69E-03	0.7
LGALS12	11	63273556..63284246	0.02	-3.52	-11.47	0.12	1	1
LGALS3	14	55590828..55612126	52.78	-0.38	-1.3	0.09	1	1
LGALS9C	17	18380051..18398259	1.17	1.25	2.38	0.01	0.82	1
LGALS9B	17	complement(20352708..20370852)	1.62	1.07	2.1	0.08	1	1
LGALS9	17	25956824..25976586	0.05	0.66	1.58	0.42	1	1
LGALS3BP	17	complement(76967320..76976191)	22.36	0.95	1.93	6.08E-03	0.52	1
LGALS7	19	complement(39261611..39264132)	63.39	-0.65	-1.57	0.33	1	1
LGALS7B	19	39279851..39282389	950.52	-2.39	-5.23	1.67E-06	1.40E-03	0.1
LGALS4	19	complement(39292311..39304004)	0.02	-0.78	-1.72	0.49	1	1
LGALS2	22	complement(37966255..37978623)	0.04	-0.04	-1.03	0.97	1	1
LGALS1	22	38071615..38075813	232.03	0.05	1.04	0.89	1	1

Data were acquired from Sci Rep, 7 (2017) 18045.

Supplementary Table 3. Microarray data of WT mice with IL-23 injection

PBS, WT	PBS, KO	IL-23, WT	IL-23, KO	Gene Name
1.00	-1.12	2.89	3.01	keratin 6B
1.00	-1.80	1.33	2.54	interleukin 17A
1.00	2.47	1.06	3.38	chemokine (C-X-C motif) ligand 5
1.00	1.60	8.83	9.50	S100 calcium binding protein A8
1.00	1.35	5.05	5.31	S100 calcium binding protein A9
1.00	1.52	5.92	14.61	interleukin 19

RNAs from each of the following groups PBS_WT (*n*=1), PBS_KO (*n*=1), mIL-23_WT(*n*=3) and mIL-23_KO (*n*=3) were analyzed by SurePrint G3 Mouse Gene Expression v2 8x60K Microarray, and data were imported to Genespring software to get the fold changes and gene annotation.

Table 4. Antibody list used in this study.

Antibody	Manufacturer	Clone no. or Reference	Cat. No.
phospho-Erk1 (pT202)/Erk2 (pT185)	Epitomics	E337	1481-1
Erk1	Epitomics	EP4967	3739-1
Erk2	Epitomics	E460	1586-1
NF-κB p65	Abcam	E379	ab32536
phospho-NFκB p65(pS536)	Abcam	EP2294Y	ab76302
IκBα	Abcam	E130	ab32518
phospho-IκBα(pS32)	Abcam	EPR3148	ab92700
β-actin	Sigma	AC-15	5441
GAPDH	Epitomics	EPR1977Y	2251-1
Goat anti-galectin-7	Homemade	J Biol Chem. 2002;277:3487-97.	NA
Rabbit anti-galectin-3	Homemade	Am J Pathol 147:1016-1028, 1995.	NA
p21 Waf1/Cip1	Cell Signaling	12D1	2947
p53	Cell Signaling	7F5	2527

NA: not applicable.