

Supplementary Material

Table S1. The differentially expressed genes (DEGs)

131 Differentially expressed genes (DEGs) were identified from GSE109248, including 86 upregulated genes and 45 downregulated genes in the patients with psoriasis, compared to healthy control.

DEGs	Gene Name
Upregulated	SPRR2D, TREX2, KLK9, TYMP, DEFB4A, LCE3A, SPRR2A, IL36A, SERPINB4, FCHSD1, FAM110C, OASL, SPRR2C, PKMYT1, ODF3B, HERC6, C10orf99, SPRR2F, PLA2G2F, RAB24, S100A7, HIST2H3C, FAM83A, SHC1, HAS3, SERPINB3, IL36G, SPRR1B, GMPPB, IFI6, RELT, TUBG1, EPHA2, ACP7, MIR941-2, IRF7, IL36RN, DEFB103B, SLX1A, RMI1, LCE3E, AMPD3, NFKBIZ, CCL22, HIST2H3A, S100A7A, SLX1B, LCE3D, CCDC88B, PKP3, KLK8, FUT3, SERPINB3, SRMS, ODF3B, IFIT3, ABCG4, SLC26A9, IL21R, MPZL2, KLK10, CTLA4, S100A8, APOBEC3A, TNIP3, PI3, LYPD5, SNORD83A, RPL8, SNORA71A, S100A9, KRT6C, SPRR2G, RHCG, FAM83A, SPRR3, ACAP3, CDKN1A, LTF, RALGDS, ATP12A, CXCL8, LCE3C, SLC23A2, TCN1, SPRR2B
Downregulated	LRRC17, IL17D, UGT3A2, SMAD5, ALDH1A2, PPARGC1A, C5orf46, ADH1B, PCDH18, RECK, ARGLU1, TBATA, PIK3R1, GALNT16, THRSP, CDH23, TMEM8B, KANK4, PCDHGB2, SSPN, ITGA10, ACOX2, CPE, PDE1A, PLA2G4C, EBF1, MRAP, CLDN23, GSTM5, C3orf33, TMEM56, FBLN2, LVRN, TUBB2B, CGNL1, HAO2, ASIP, NNAT, SCGB1D2, SCGB2A2, TMEM50B, KRT79, KRT72, AWAT1, CIDEC

Table S2. The significant gene ontology terms of DEGs associated with psoriasis.

Category	Term	Count	FDR
BP	GO:0030216~keratinocyte differentiation	13	1.38E-10
BP	GO:0031424~keratinization	11	9.16E-10
BP	GO:0008544~epidermis development	9	1.43E-04
BP	GO:0018149~peptide cross-linking	11	1.42E-09
BP	GO:0006954~inflammatory response	12	4.58E-04
BP	GO:0045087~innate immune response	11	6.04E-04
MF	GO:0005198~structural molecule activity	15	7.49E-07
MF	GO:0050786~RAGE receptor binding	3	0.002147993
MF	GO:0005149~interleukin-1 receptor binding	3	0.003020907
MF	GO:0004867~serine-type endopeptidase inhibitor activity	4	0.024330845
MF	GO:0035662~Toll-like receptor 4 binding	2	0.025348592
MF	GO:0005125~cytokine activity	5	0.026491492

Table S3. The significant gene ontology enrichment terms of up-regulated key DEGs.

Category	Term	Count	FDR	Genes
BP	GO:0030216~keratinocyte differentiation	13	1.38E-10	LCE3A, S100A7, LCE3C, LCE3D, SPRR2G, SPRR2F, EPHA2, SPRR2D, SPRR2A, SPRR1B, SPRR2B, SPRR3,
		11	9.16E-10	LCE3E
BP	GO:0031424~keratinization			LCE3A, SPRR2D, SPRR1B, SPRR2A, LCE3C, SPRR2B,
		9	1.43E-04	LCE3D, SPRR3, SPRR2G, SPRR2F, LCE3E
BP	GO:0008544~epidermis development			S100A7, SPRR2D, SPRR1B, SPRR2A, SPRR2B, LCE3D, SPRR3, SPRR2G, SPRR2F
		11	1.42E-09	LCE3A, SPRR2D, SPRR1B, SPRR2A, LCE3C, SPRR2B, LCE3D, SPRR3, SPRR2G, SPRR2F
BP	GO:0018149~peptide cross-linking			LCE3A, SPRR2D, SPRR1B, SPRR2A, LCE3C, SPRR2B, LCE3D, SPRR3, SPRR2G, SPRR2F, LCE3E
		15	7.49E-07	KRT6C, LCE3A, LCE3C, LCE3D, SPRR2G, SPRR2F, CLDN23, KRT72, SPRR2D, SPRR1B, SPRR2A, KRT79, SPRR2B, SPRR3, LCE3E
MF	GO:0005198~structural molecule activity			

Table S4. The sequences of primers used in RT-qPCR.

Genes	Primer sequences
<i>LCE3A</i>	F: CTATCACCTTCCCCATCTGGTCC R: TGTAGCACAGCACGAAGAGG
<i>LCE3C</i>	F: TGCCTTGCTGTATCTGGTCC R: AGAGCTTGTAGCACAGCAGG
<i>LCE3D</i>	F: TGACTTGC GGTTATCTGGTCC R: GCACCTTGGGGAGCACTTTG
<i>SPRR2A</i>	F: ATCACCA GCTCACCGACTCC R: GATCATTCTCAGCATCCCCAG
<i>SPRR2D</i>	F: GTCCCCCTCCCTCATGCCAGC R: CTCTGCAGCCCCTTGACACC
<i>SPRR2F</i>	F: CCCCTCCCTCATTCCAGCAG R: GACCCATTCTCTAGAGCCCC
<i>SPRR2G</i>	F: CCTCCTCCTGTATGCCACC R: CCCTTCTCTTCCCCCTTGTTC
<i>Actin</i>	F: CCAGCCTCCTTCTTGGGTAT R: GTTGGCATAGAGGTCTTACGG

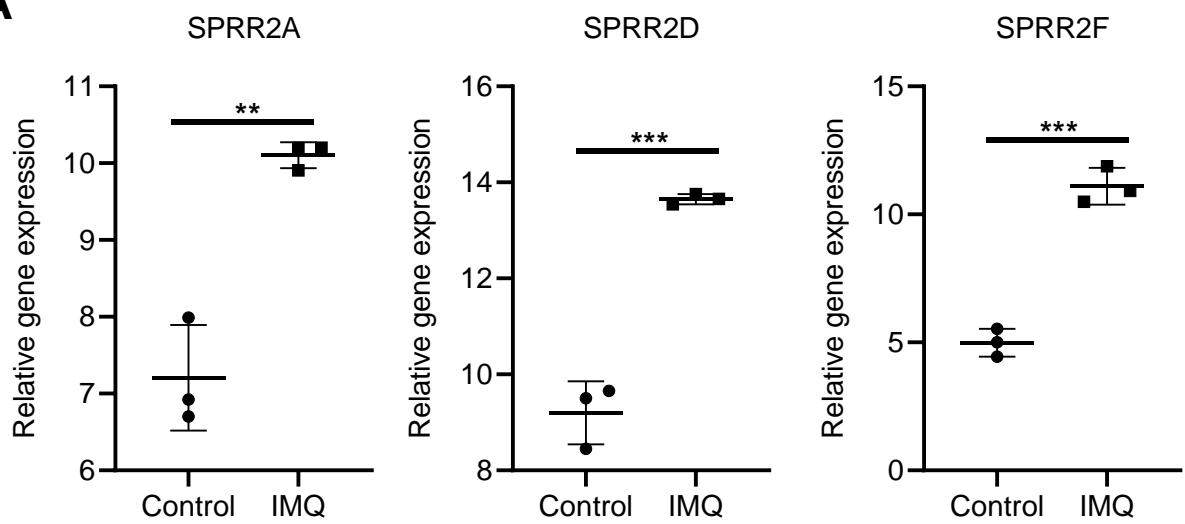
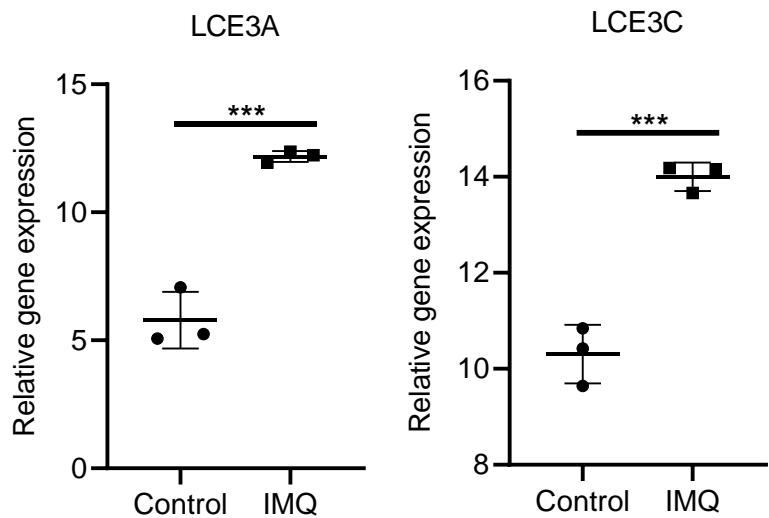
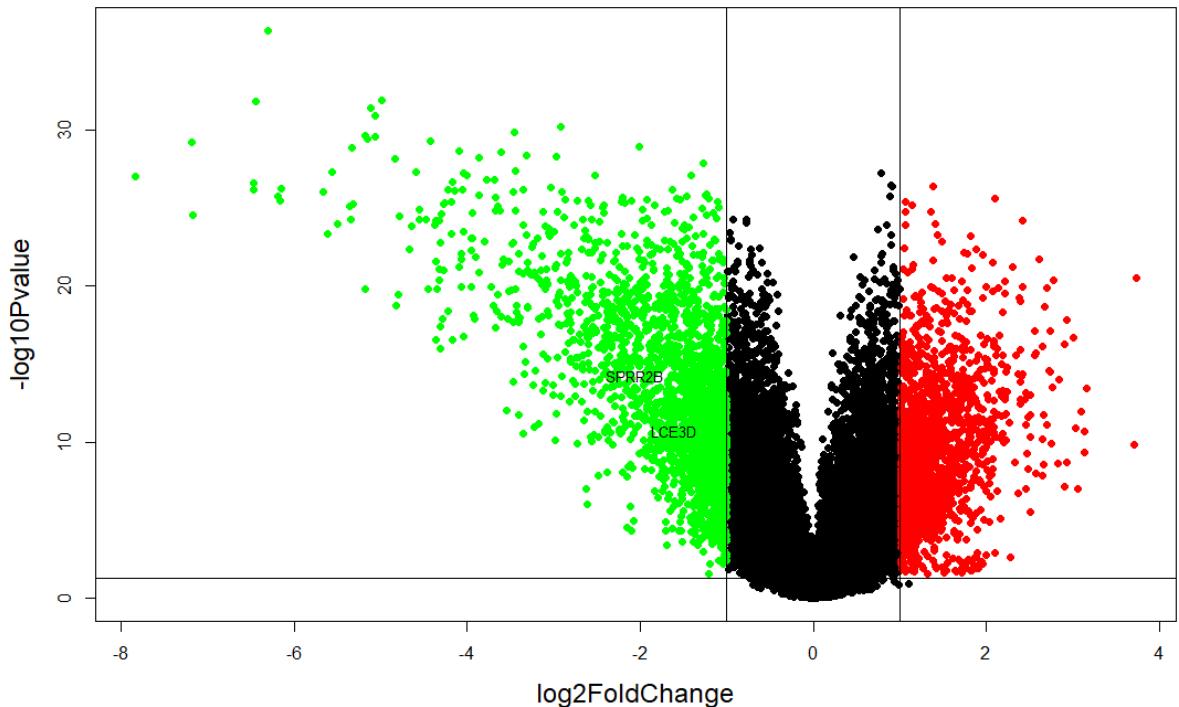
A**B**

Figure S1 Validation expression of SPRR and LCE genes in psoriasis mice based on GEO dataset GSE27628. Expression levels of (A) SPRR and (B) LCE were significantly upregulated in psoriasis mice.*P<0.05, **P<0.01 and ***P<0.001.

Ustekinumab treatment



Guselkumab treatment

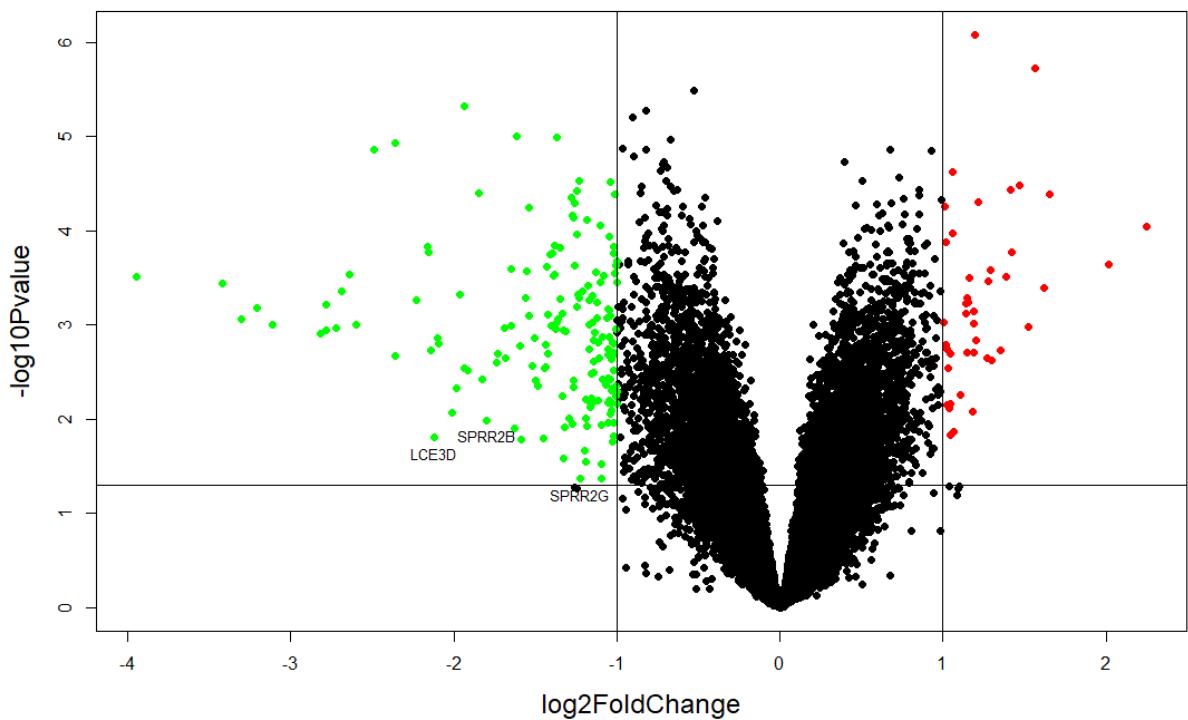
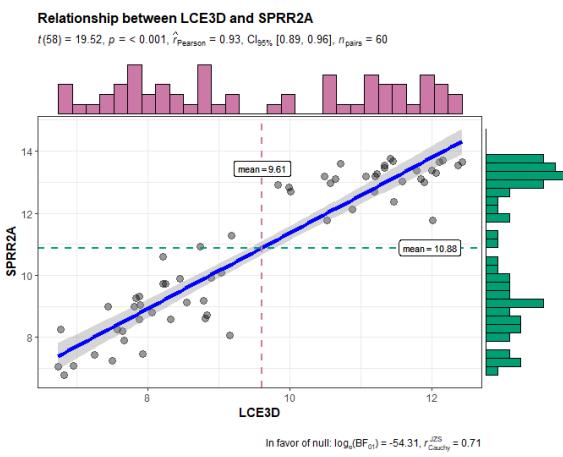
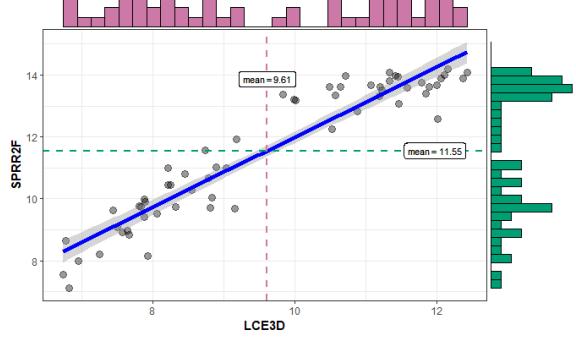
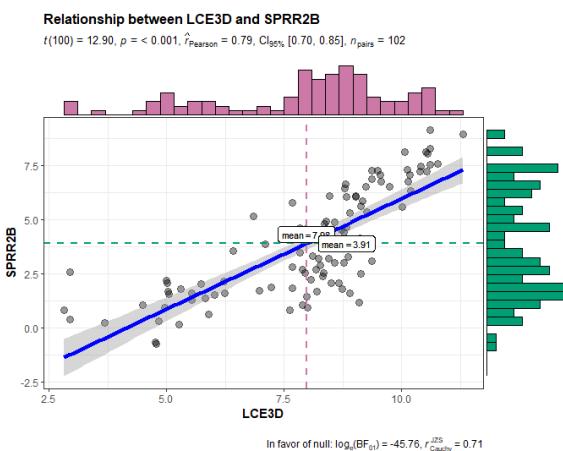
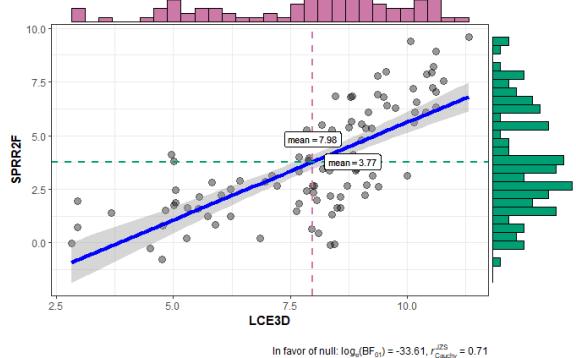


Figure S2 The expression of the LCE and SPRR genes were significantly down-regulated in psoriasis clinical therapy based on GEO dataset GSE51440 and GSE106992.

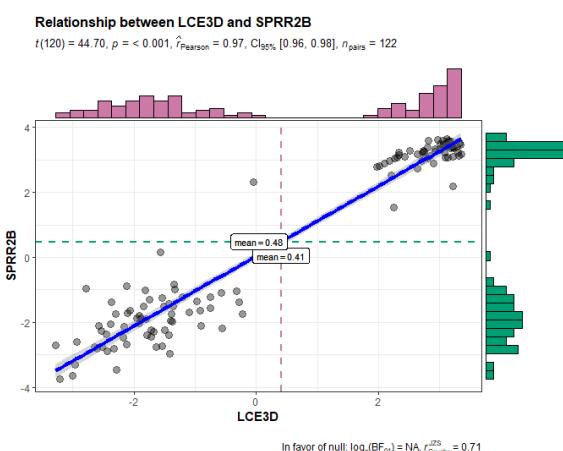
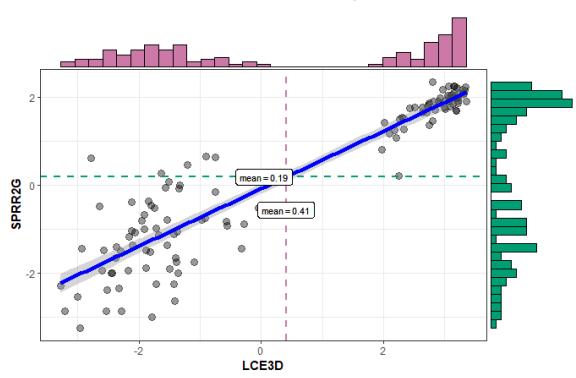
A

**Relationship between LCE3D and SPRR2F** $t(58) = 21.78, p < 0.001, \hat{r}_{\text{Pearson}} = 0.94, \text{CI}_{95\%} [0.91, 0.97], n_{\text{pairs}} = 60$ 

B

**Relationship between LCE3D and SPRR2F** $t(100) = 10.37, p < 0.001, \hat{r}_{\text{Pearson}} = 0.72, \text{CI}_{95\%} [0.61, 0.80], n_{\text{pairs}} = 102$ 

C

**Relationship between LCE3D and SPRR2G** $t(120) = 26.93, p < 0.001, \hat{r}_{\text{Pearson}} = 0.93, \text{CI}_{95\%} [0.90, 0.95], n_{\text{pairs}} = 122$ 

D

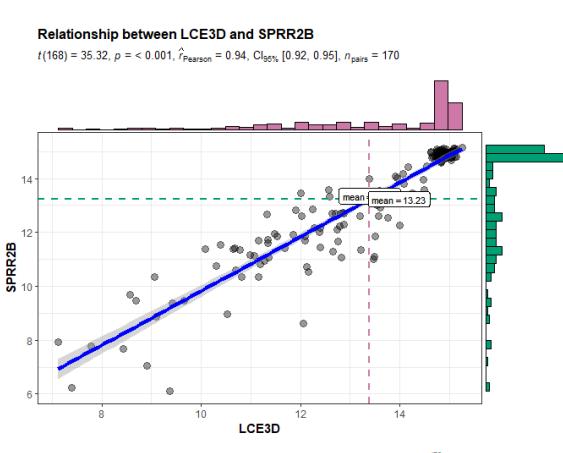
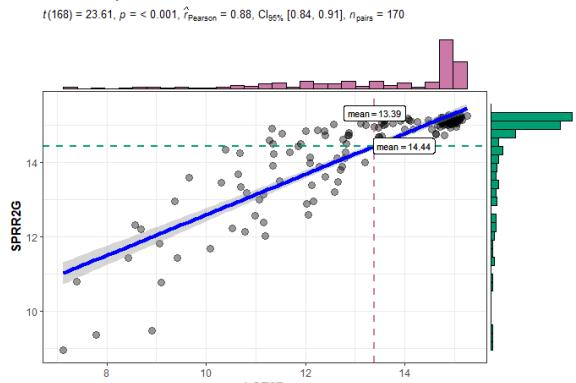
**Relationship between LCE3D and SPRR2G** $t(168) = 23.61, p < 0.001, \hat{r}_{\text{Pearson}} = 0.88, \text{CI}_{95\%} [0.84, 0.91], n_{\text{pairs}} = 170$ 

Figure S3 Validation of Correlation between LCE3D and SPRR2 in the GEO datasets. **(A)** GSE85034 dataset contains non-lesional and lesional skin samples from 30 psoriasis patients. **(B)** GSE83582 dataset contains 20 healthy controls and 82 psoriasis patients. **(C)** GSE13355 dataset contains 64 healthy controls and 58 psoriasis patients. **(D)** GSE30999 dataset contains non-lesional and lesional skin samples from 170 psoriasis patients.

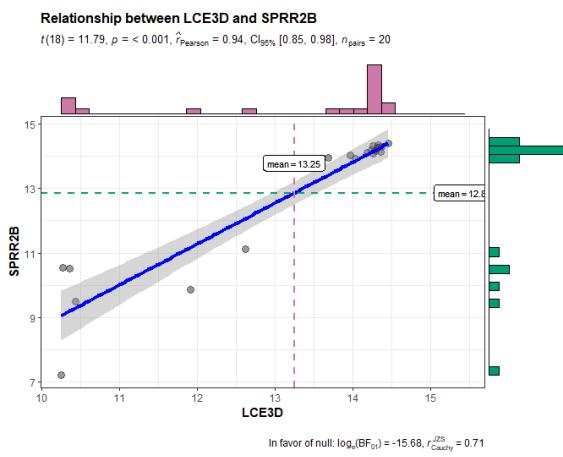
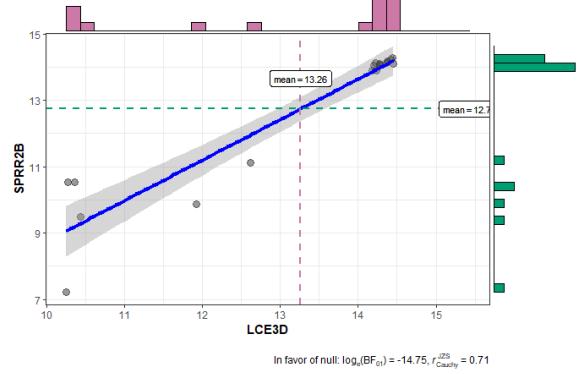
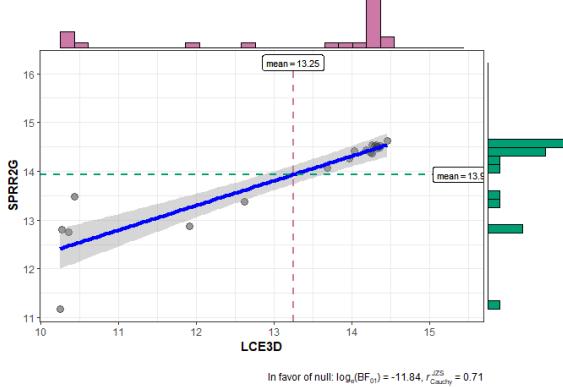
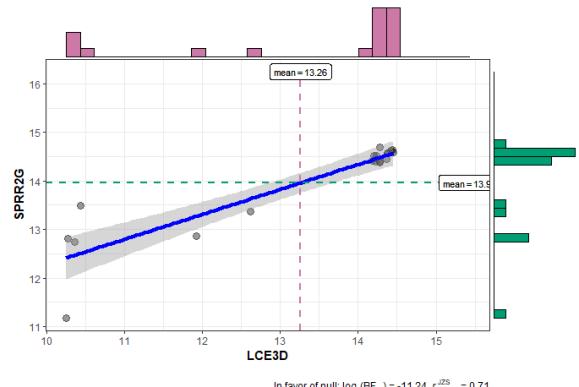
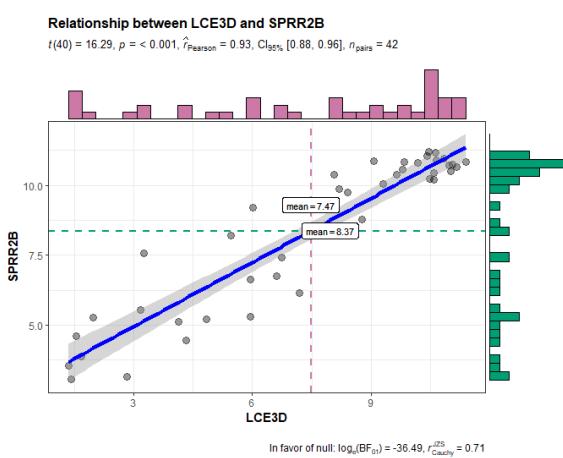
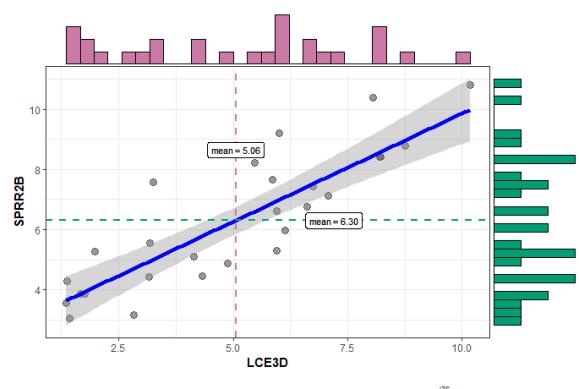
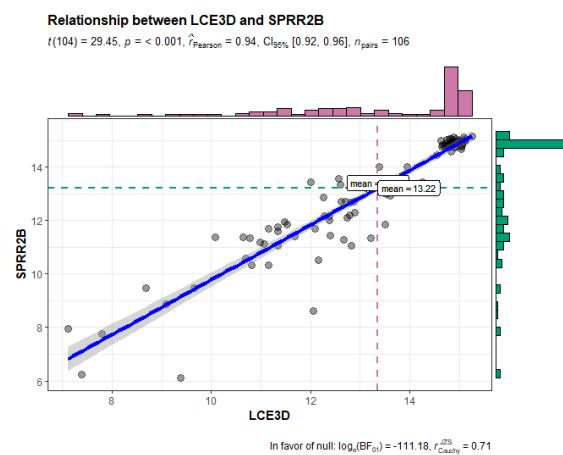
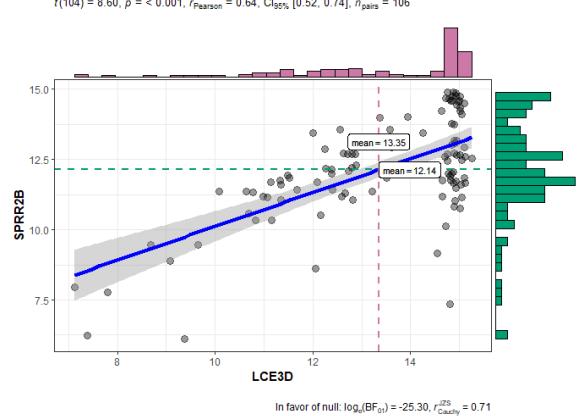
A**Relationship between LCE3D and SPRR2B** $t(17) = 11.55, p = < 0.001, \hat{r}_{\text{Pearson}} = 0.94, \text{CI}_{95\%} [0.85, 0.98], n_{\text{pairs}} = 19$ **Relationship between LCE3D and SPRR2G** $t(18) = 8.78, p = < 0.001, \hat{r}_{\text{Pearson}} = 0.90, \text{CI}_{95\%} [0.76, 0.96], n_{\text{pairs}} = 20$ **Relationship between LCE3D and SPRR2G** $t(17) = 8.67, p = < 0.001, \hat{r}_{\text{Pearson}} = 0.90, \text{CI}_{95\%} [0.76, 0.96], n_{\text{pairs}} = 19$ **B****Relationship between LCE3D and SPRR2B** $t(26) = 8.12, p = < 0.001, \hat{r}_{\text{Pearson}} = 0.85, \text{CI}_{95\%} [0.69, 0.93], n_{\text{pairs}} = 28$ **C****Relationship between LCE3D and SPRR2B** $t(104) = 8.60, p = < 0.001, \hat{r}_{\text{Pearson}} = 0.64, \text{CI}_{95\%} [0.52, 0.74], n_{\text{pairs}} = 106$ 

Figure S4 Correlation analysis between LCE3D and SPRR2 in the GEO datasets. **(A)** GSE78097 dataset (left, mild psoriasis patients; right, severe psoriasis patients). **(B)** GSE51440 dataset. **(C)** GSE106992 dataset.