Supplementary Online Content

Deng J, Liao V, Parthasarathy V, et al. Modulation of neuroimmune and epithelial dysregulation in patients with moderate-to-severe prurigo nodularis treated with nemolizumab. *JAMA Dermatol*. Published online August 9, 2023. doi:10.1001/jamadermatol.2023.2609

This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1. Study Schematic

eFigure 2. Heat Map of Mean-Centered and Scaled Protein Abundances for the Upregulated and Downregulated Differentially Expressed Proteins
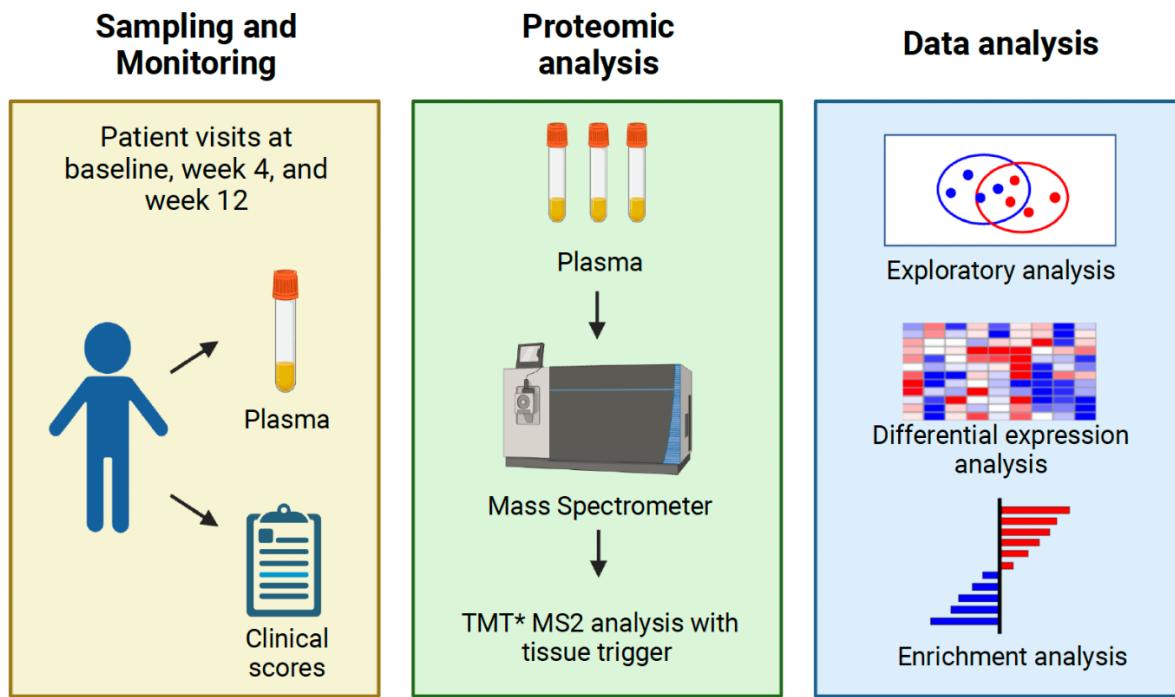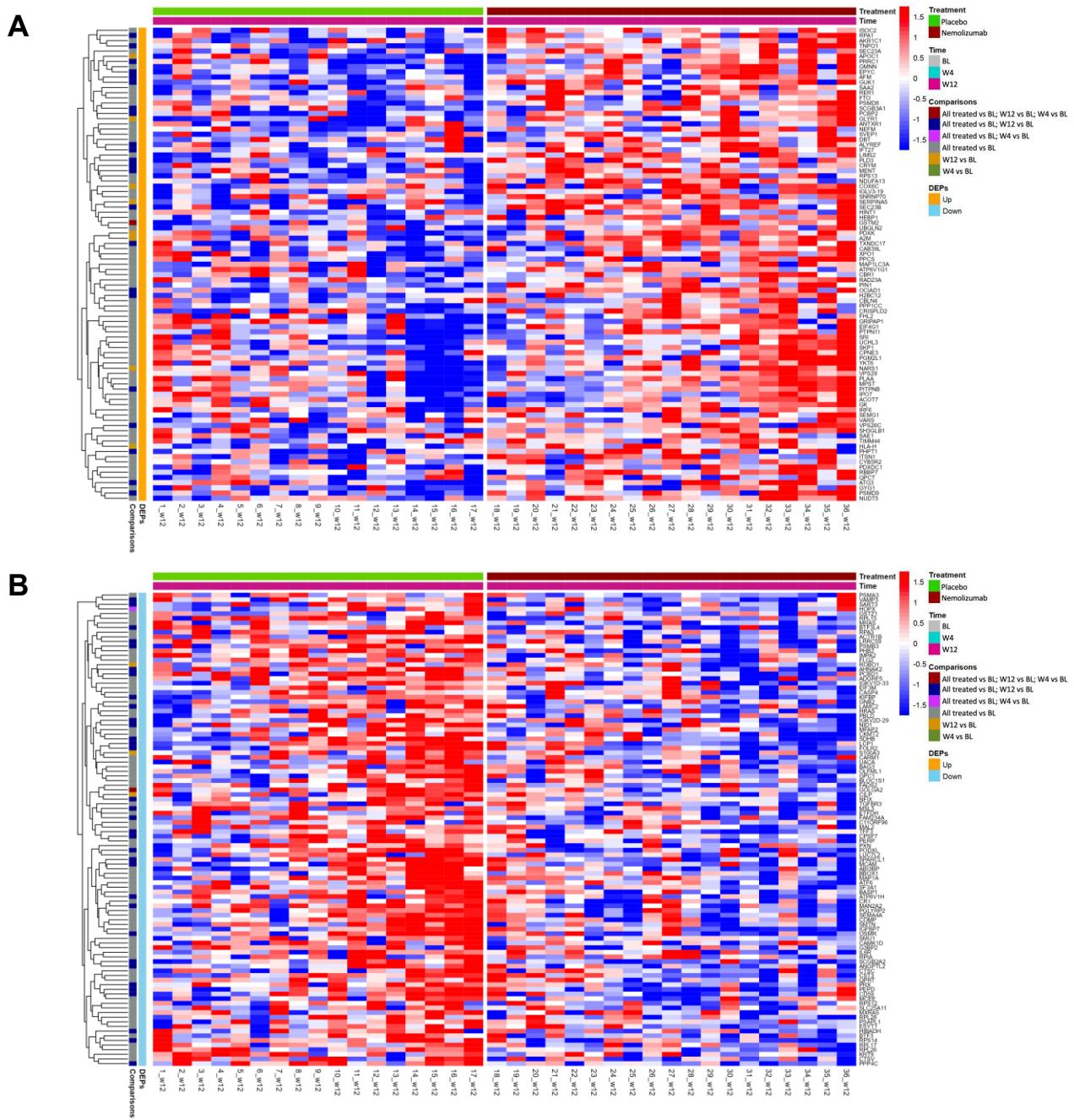

(a) upregulated and (b) downregulated differentially expressed proteins for each individual patient from the nemolizumab responder and placebo non-responder groups at week 12, with correction for the abundances at baseline. Proteins and samples are ordered by hierarchical clustering using Euclidian distances. Red colors represent higher abundance values while blue colors represent lower abundance values.

eFigure 3. Principal Component Analysis Plot of Protein Abundances by Treatment Type and Class
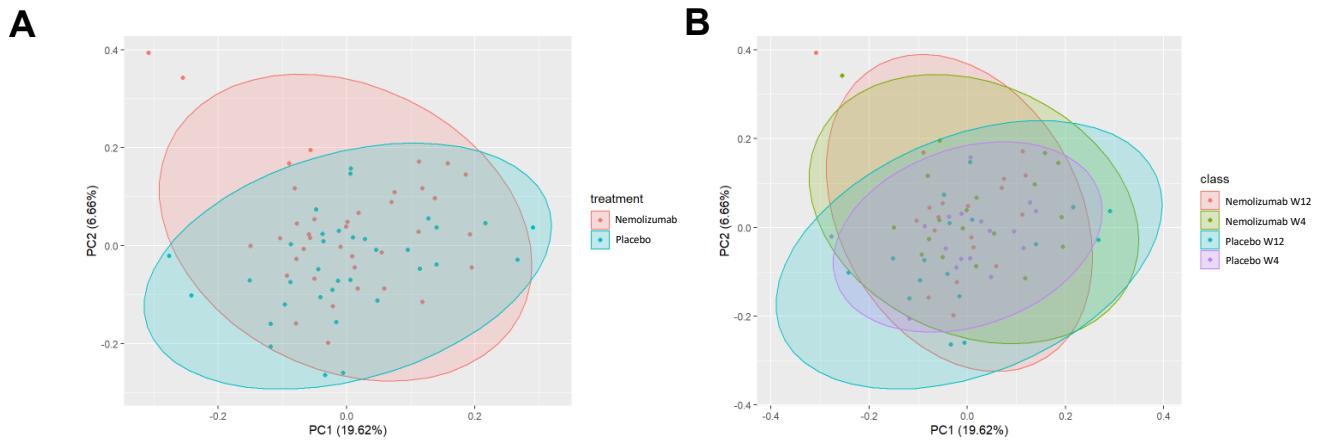
(a) Principal component analysis (PCA) plot of protein abundances by treatment type. (b) PCA plot of protein abundances by class (treatment + time point). Each dot in the PCA plots represents a different sample and each color represents different sample annotations. PC1 and PC2 axis labels indicate the % of variance explained by each one of these components, respectively.

eFigure 4. Upstream Regulators in the Nemolizumab Group vs the Placebo Group
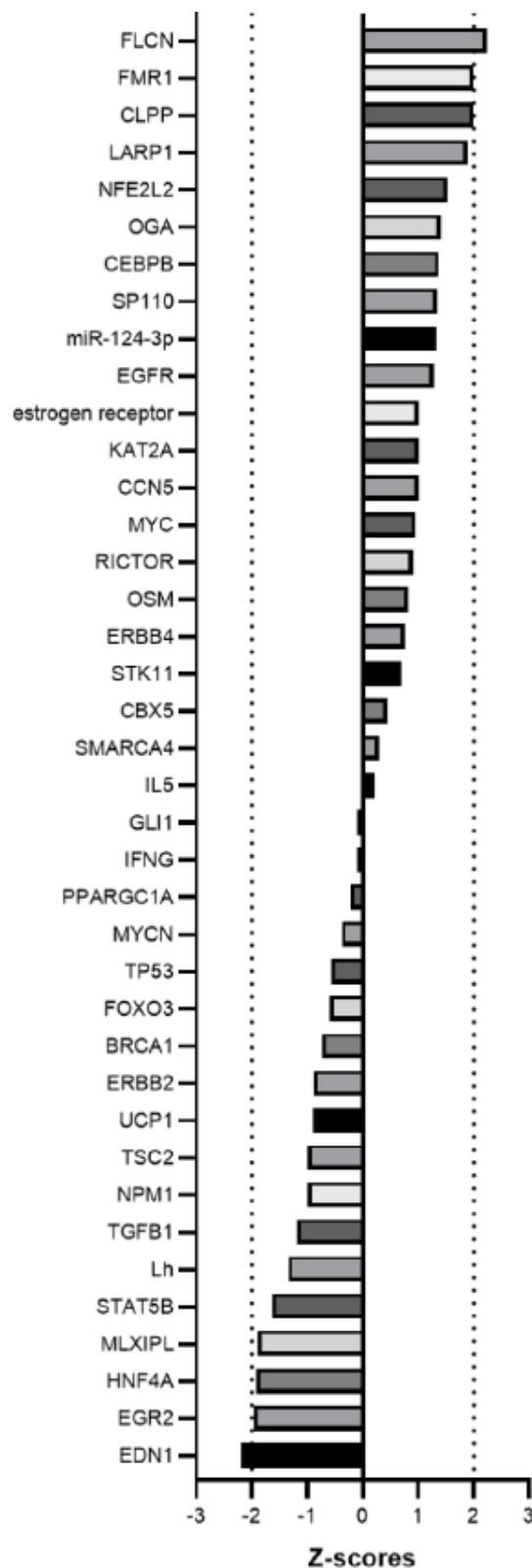
eTable. Differentially Expressed Proteins in Nemolizumab Responder vs Placebo Nonresponder Groups

Gene Name	Log$_2$(fold change)	P-value	Adjusted P-value
IGKV2D-29	-0.504	0.000047	0.006
ACOT7	0.232	0.003	0.049
PSMD9	0.399	0.00000038	0.00026
PODXL	-0.22	0.00003	0.012
PDXK	0.381	0.00065	0.039
IMPA2	-0.298	0.00081	0.044
MRAS	-0.292	0.002	0.047
IRF6	0.27	0.001	0.032
VPS26C	0.468	0.000026	0.005
XPO1	0.193	0.000037	0.005
RER1	0.223	0.001	0.032
YKT6	0.291	0.002	0.044
TIMM44	0.454	0.0005	0.021
GSTZ1	-0.331	0.001	0.032
NARS1	0.673	0.00069	0.04
H2BC12	0.387	0.0000052	0.003
CTSV	-0.363	0.00036	0.03
CPNE3	0.174	0.002	0.038
CILP	-0.184	0.00052	0.037
ATP6V1G1	0.358	0.00094	0.03
GMNN	0.416	0.00054	0.037
BBOX1	-0.222	0.002	0.045

IPO7	0.366	0.001	0.032
BAG3	-0.183	0.001	0.032
FADS2	-0.167	0.002	0.048
A2M	0.402	0.00094	0.048
CST3	-0.132	0.001	0.032
HRAS	-0.426	0.00031	0.018
IGKV1D-33	-0.458	0.001	0.032
IGLV3-19	0.837	0.00084	0.028
HLA-H	0.284	0.00065	0.039
APOC1	0.688	0.00032	0.031
SEMG1	0.461	0.002	0.038
SERPINA5	0.436	0.00025	0.027
NEFM	0.208	0.00028	0.017
SNRNP70	0.123	0.002	0.047
IL6R	-0.231	0.001	0.034
COX6C	0.284	0.00058	0.039
SAA2	0.34	0.003	0.05
DBT	0.194	0.001	0.033
PEPD	-0.226	0.000031	0.005
LCP1	-0.236	5.2E-08	0.000046
CD59	-0.292	0.000011	0.003
FOLR2	-0.243	0.00016	0.012
NID1	-0.145	0.00024	0.016
UCHL3	0.235	0.002	0.048

CBR1	0.134	0.00017	0.013
CKMT2	-0.5	0.002	0.039
CR1	-0.307	0.00051	0.021
RPL17	-0.183	0.00012	0.011
ATF6	-0.24	0.00008	0.018
BTF3	-0.414	0.00016	0.012
SDHB	-0.168	0.0000064	0.003
MPST	0.249	0.0009	0.044
RPS12	-0.191	0.000033	0.005
PSMA3	-0.131	0.001	0.037
VARS	0.135	0.00045	0.02
RPA1	0.278	0.000035	0.005
GSTM2	0.27	4.6E-08	0.000046
PBLD	-0.274	0.00094	0.03
SRI	0.178	0.00028	0.017
HIBADH	-0.266	0.000072	0.008
GK	0.277	0.00096	0.045
S100A3	-0.33	0.00075	0.042
GPC1	-0.345	0.002	0.039
RPA3	-0.251	0.00067	0.026
KRT9	-0.796	0.00075	0.027
PPP1CC	0.875	0.00011	0.023
ACTR1B	-0.487	0.001	0.034
MCAM	-0.145	0.00034	0.019

AFM	0.285	0.000058	0.012
RPL28	-0.205	0.00037	0.019
GYG1	0.273	0.00038	0.019
PSMD8	0.384	0.00035	0.019
PITPNB	0.339	0.00002	0.004
PXN	-0.458	0.00026	0.017
RPIA	-0.24	0.001	0.033
MAN2A2	-0.273	0.0000067	0.003
CASP4	-0.288	0.00015	0.012
PSMB3	-0.236	0.00014	0.018
COMP	-0.194	0.00067	0.026
HINT1	0.171	0.002	0.044
CTSC	-0.13	0.002	0.048
SMTN	-0.355	0.00058	0.023
RAD23A	0.168	0.002	0.044
MFAP2	-0.299	0.00083	0.028
PPP4C	-0.344	0.000012	0.003
RPL26	-0.632	0.00009	0.009
RPL15	-0.194	0.002	0.046
PCBD1	-0.248	0.00031	0.018
RPS14	-0.416	0.00036	0.031
RPS13	0.136	0.00044	0.02
GNB2	-0.343	0.00056	0.023
SKP1	0.295	0.002	0.047

BLOC1S1	-0.287	0.002	0.039
MAP1A	-0.208	0.00077	0.027
BASP1	-0.211	0.001	0.032
SLC25A11	-0.205	0.00025	0.03
TGFBR3	-0.184	0.002	0.046
EIF4G1	0.147	0.001	0.036
AKR1C1	0.432	0.001	0.033
PTPN11	0.255	0.002	0.046
TFF3	-0.33	0.00005	0.006
GOLGA2	-0.474	3.2E-09	0.000011
SCGB2A2	-0.466	0.000014	0.003
PIN1	0.265	0.00038	0.019
LAMC2	-0.231	0.00069	0.026
FHL2	0.271	0.002	0.044
SPARCL1	-0.169	0.000066	0.007
CRYM	0.303	0.00056	0.023
NFIX	-0.328	0.00025	0.016
SART3	-0.181	0.00072	0.026
QPRT	-0.422	0.0001	0.01
PCBP2	0.488	0.00011	0.016
SEC23A	0.158	0.002	0.047
SEC23B	0.343	0.00013	0.011
SF3A1	-0.215	0.00044	0.02
ITSN1	0.342	0.0006	0.038

VAMP3	-0.618	5.3E-08	0.000046
ETFDH	-0.297	0.00082	0.044
IGFBP7	-0.167	0.00061	0.024
RBBP7	0.421	0.002	0.044
QPCT	0.438	0.00058	0.023
GUK1	0.292	0.000047	0.006
SMU1	-0.293	0.0004	0.019
GLYR1	0.569	0.000072	0.012
SVEP1	0.367	0.00012	0.011
GRIPAP1	0.613	0.001	0.034
FLG2	-0.158	0.00034	0.019
CYB5R2	0.207	0.000064	0.007
PSAPL1	-0.188	0.002	0.044
PDXDC1	0.389	0.00069	0.026
PGM2L1	0.392	0.001	0.032
OLFML1	-0.171	0.00017	0.013
EIF3M	-0.259	0.002	0.044
LIMS2	0.423	0.000031	0.005
ABI3BP	-0.127	0.002	0.044
C11ORF96	-0.446	0.003	0.05
ALYREF	0.47	0.00022	0.015
CARM1	-0.265	0.002	0.044
CAMK1D	-0.443	0.00012	0.011
PLD3	0.193	0.00034	0.019

AHNAK2	-0.101	0.00013	0.011
ADGRF5	-0.13	0.002	0.039
MSL3	-0.291	0.00015	0.012
CPSF7	-0.287	0.0007	0.026
TNPO1	0.309	0.000023	0.004
MAL2	-0.293	0.00099	0.031
ISOC2	0.406	0.001	0.034
LRRC59	-0.166	0.001	0.034
KIFBP	-0.186	0.00039	0.019
PERP	-0.375	0.00038	0.019
BTF3L4	-0.645	0.0000055	0.016
PRRC1	0.48	0.00006	0.012
PGLYRP2	-0.104	0.002	0.041
MCEE	-0.303	0.00082	0.028
SCGB3A1	0.577	0.00034	0.031
PHB2	-0.132	0.002	0.044
EPYC	0.688	0.000029	0.005
OSMR	-0.203	0.00036	0.019
HOPX	-0.942	0.00000035	0.00062
TXNDC17	0.307	0.0000068	0.003
ESYT1	-0.203	0.001	0.032
MENT	0.331	0.00017	0.013
IFT27	0.368	0.0002	0.014
PRX	-0.28	0.00062	0.024

UACA	-0.393	0.003	0.049
FTO	0.204	0.00071	0.026
CRISPLD2	0.335	0.00045	0.02
FAM234A	-0.737	0.000009	0.003
SEMA4A	-0.192	0.001	0.032
MAP1LC3A	0.304	0.001	0.032
ANTXR1	0.35	0.000099	0.01
CAB39L	0.366	0.00032	0.03
PPCS	0.202	0.002	0.044
MXRA5	-0.186	0.001	0.036
HEBP1	0.23	0.00082	0.028
PHPT1	0.318	0.0000078	0.003
ATG3	0.543	0.000031	0.005
CBLN4	0.243	0.002	0.044
OCIAD1	0.53	0.001	0.033
NDUFA13	0.448	0.000019	0.004
SAE1	0.176	0.002	0.044
VPS29	0.218	0.002	0.047
UBQLN2	0.379	0.002	0.039
ATP6V1H	-0.353	0.000047	0.012
NUDT5	0.171	0.000082	0.009
ANGPTL2	-0.413	0.000074	0.012
G3BP2	-0.66	0.00048	0.021
PLAA	0.331	0.00075	0.027

SH3GLB1	0.35	0.00036	0.019
LUC7L2	-0.468	0.0005	0.021
ROBO1	-0.256	0.00047	0.036