

**Table S1. Roles of bacterial and host factors in dermatitis and itch, Related to Figure 2.**

<b>BACTERIAL MECHANISMS</b>			
<b><i>S. aureus</i> virulence factor</b>	<b>Function</b>	<b>Required for dermatitis</b>	<b>Required for itch</b>
Agr	Quorum sensing; regulation of secreted virulence factors	yes	yes
Phenol soluble modulins (Psms)	Cytolytic toxin	yes	no
Alpha toxin (Hla)	Cytolytic toxin	no	no
Staphopains (ScpA, SspB)	Cysteine proteases	no	no
Aureolysin (Aur)	Metalloprotease	no	no
Serine protease-like proteases (SplA-F)	Serine proteases	no	no
V8 protease (SspA)	Serine protease	yes	<b>yes</b>

<b>HOST MECHANISMS</b>			
<b>Host factor</b>	<b>Function</b>	<b>Required for dermatitis</b>	<b>Required for itch</b>
MYD88	Toll-like receptor signaling	yes	no
C-kit	C-kit deficient mice lack mast cells	no	no
Basophils	Secretion of endogenous pruritogens (e.g histamine, cytoines)	no	no
IL31RA	Linked to itch sensation	no	no
IL4RA	IL13 and IL4 signlaing; linked to itch sensation	no	no
RAG2/IL2RG	Lymphocytes	no	no
MRGPR (Mas-related G coupled receptors)	Linked to itch sensation	not tested	no
PAR2 (Proteinase-activated receptor 2, <i>F2rl1</i> )	Activated by proteolytic cleavage; induces calcium influx in neurons	no	no
PAR1 (Proteinase-activated receptor 1, <i>F2r</i> )	Activated by proteolytic cleavage; induces calcium influx in neurons	no	<b>yes</b>

**Table S3. Demographic details of organ donors and human subjects involved in this study, Related to STAR Methods.**

DORSAL ROOT GANGLIA					
Experiment	Donor ID	Sex	Age (y)	Race	COD
RNAScope	AICP197	F	29	White	Overdose
	AICS171	M	19	White	Overdose
	AIDC291	M	34	White	Stroke
	AIEB188	F	75	White	Stroke
Calcium imaging	AJAM174	F	25	Black	Head Trauma
	AIKB238	F	43	White	Anoxia

SKIN SWAB SAMPLES				
Group	Subject ID	Sex	Age (y)	Race
Healthy subjects	H01	F	51	Hispanic or Latino/White
	H02	F	22	Hispanic or Latino/White
	H03	F	40	Hispanic or Latino/White
	H04	F	45	White
	H05	M	27	White
	H06	F	23	Asian
	H07	F	23	Hispanic or Latino/White
	H08	F	31	Black/White
	H09	F	28	White
	H10	M	40	Asian
	H11	F	55	Asian
	H12	M	58	Asian
	H13	M	21	White
	H14	M	27	Hispanic or Latino/White
Subjects with atopic dermatitis	AD01	M	44	Black
	AD02	F	26	Asian
	AD03	M	53	White
	AD04	M	23	Asian
	AD05	F	21	Asian
	AD06	M	40	White
	AD07	F	20	Asian
	AD08	M	20	White
	AD09	F	36	Hispanic or Latino/White
	AD10	F	51	White
	AD11	F	21	White
	AD12	M	18	Asian
	AD13	F	18	Asian

All samples were collected on the antecubital fossa skin. None of the subjects were undergoing treatment at the time of collection.