JEM

SUPPLEMENTAL MATERIAL

Dienz et al., http://www.jem.org/cgi/content/full/jem.20081571/DC1

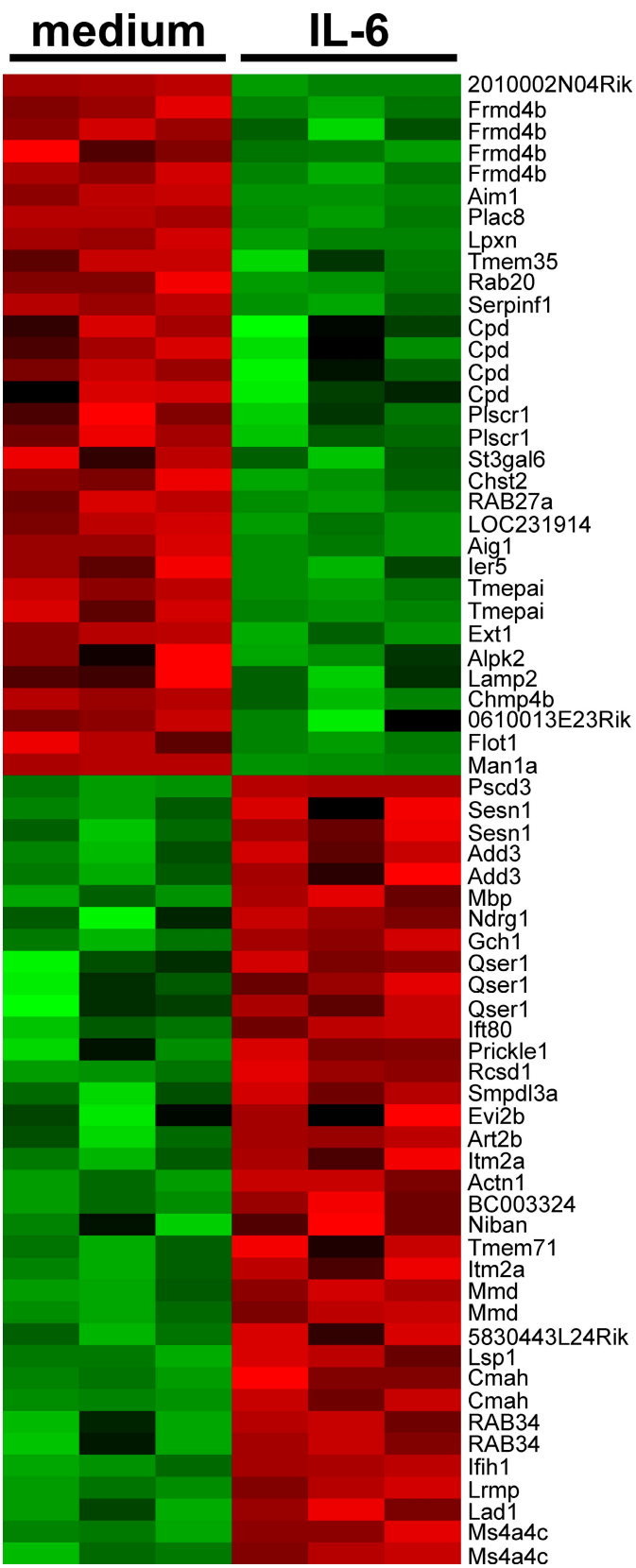

Figure S1. IL-6–induced changes in gene expression in CD4⁺ T cells for genes with unknown or miscellaneous function. Heat map representing the relative expression of genes among IL-6–treated and control samples. Genes were sorted within each group based on their fold change (top, highest fold induction; bottom, highest fold down-regulation). Expression statistics for each gene were centered, scaled, and mapped to a color scale. Red represents relatively low expression, whereas green represents relatively high expression.

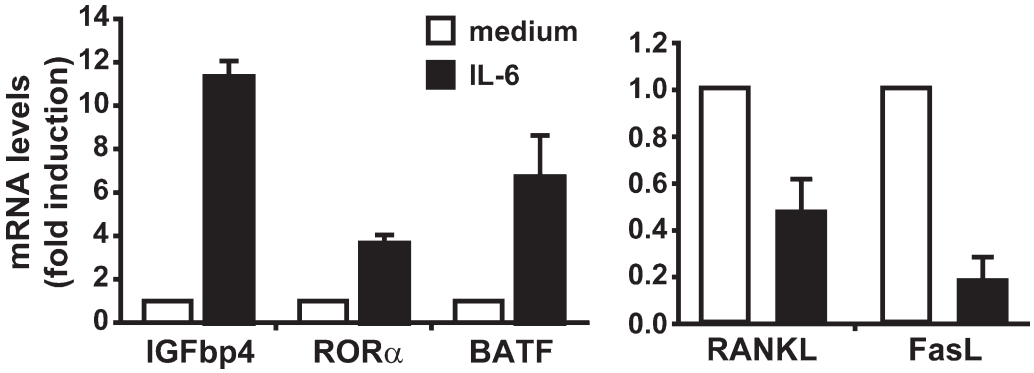

Figure S2. Validation of IL-6 target genes by real-time RT-PCR. FACS-sorted CD4+ T cells were activated with anti-CD3 and anti-CD28 in the absence or presence of IL-6 for 16 h. mRNA levels of the indicated genes were measured by quantitative real-time RT-PCR and normalized to β2-microglobulin expression. The means ± SEM of three experiments are shown.

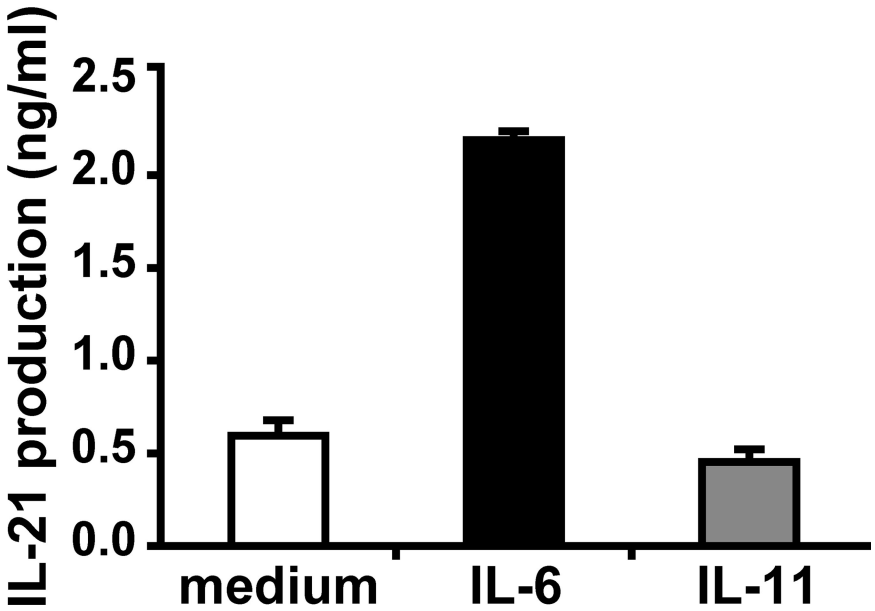

Figure S3. IL-11 is unable to induce IL-21 expression in CD4+ T cells. FACS-sorted CD4+ T cells were activated with anti-CD3 and anti-CD28 mAbs in the presence of medium alone, IL-6, or IL-11 for 3 d. Cell-culture supernatants were analyzed for IL-21 production by ELISA. The means ± SEM of three experiments are shown.

Table S1. Overview of the genes affected by IL-6 treatment of activated CD4+ T cells				
Transcriptional regulators				
Molecule	Name	Accession no.	Fold change	p-value
Rorc	RAR-related orphan receptor gamma	AJ132394	4.3	0.000
Rora	RAR-related orphan receptor alpha	NM_013646	4.2	0.000
Rora	RAR-related orphan receptor alpha	BI660199	3.7	0.002
Batf	basic leucine zipper transcription factor, ATF-like	NM_016767	4.2	0.000
Arid5b	AT rich interactive domain 5B (Mrf1 like)	BB699910	4.0	0.005
Nfil3	nuclear factor, interleukin 3, regulated	AY061760	3.6	0.000
Satb1	special AT-rich sequence binding protein 1	AV172776	3.2	0.000
Satb1	special AT-rich sequence binding protein 1	AV172776	3.0	0.002
Satb1	special AT-rich sequence binding protein 1	BG092481	2.9	0.004
Id2	inhibitor of DNA binding 2	BF019883	3.1	0.001
Id2	inhibitor of DNA binding 2	NM_010496	2.7	0.003
Id2	inhibitor of DNA binding 2	NM_010496	2.1	0.048
Etv6	ets variant gene 6 (TEL oncogene)	BB068442	3.1	0.000
Chd7	chromodomain helicase DNA binding protein 7	BG084683	2.7	0.001
Bcl3	B-cell leukemia/lymphoma 3	NM_033601	2.6	0.000
Ahr	aryl-hydrocarbon receptor	BE989096	2.5	0.001
Cebpb	CCAAT/enhancer binding protein (C/EBP), beta	NM_009883	2.5	0.001
Lbh	limb-bud and heart	BC026827	2.5	0.031
Tiparp	TCDD-inducible poly(ADP-ribose) polymerase	BB707122	2.3	0.013
Tiparp	TCDD-inducible poly(ADP-ribose) polymerase	BB707122	2.1	0.036
Tiparp	TCDD-inducible poly(ADP-ribose) polymerase	BB707122	2.1	0.036
Twsg1	twisted gastrulation homolog 1 (Drosophila)	BC004850	2.3	0.007
Twsg1	twisted gastrulation homolog 1 (Drosophila)	BC004850	2.3	0.006
Twsg1	twisted gastrulation homolog 1 (Drosophila)	BC004850	2.1	0.021
Slfn8	schlafen 8	BC024709	2.2	0.000
Junb	Jun-B oncogene	NM_008416	2.1	0.000
Gfi1	growth factor independent 1	NM_010278	2.1	0.001
Hdac7a	histone deacetylase 7A	BB277517	-2.0	0.009
Hdac7a	histone deacetylase 7A	BB277517	-2.1	0.006
Stat4	signal transducer and activator of transcription 4	NM_011487	-2.1	0.010
Hivep1	human immunodeficiency virus type I enhancer binding protein 1	NM_007772	-2.2	0.001
Klf3	Kruppel-like factor 3 (basic)	NM_008453	-2.2	0.030
Pou2f2	POU domain, class 2, transcription factor 2	X57938	-2.2	0.004
Eomes	eomesodermin homolog (Xenopus laevis)	BB128925	-2.8	0.053
Irf6	interferon regulatory factor 6	NM_016851	-3.2	0.000
Ifi203	interferon activated gene 203	BC008167	-2.8	0.047
Ifi203	interferon activated gene 203	NM_008328	-3.7	0.030
Myb	myeloblastosis oncogene	NM_033597	-3.8	0.002
Myb	myeloblastosis oncogene	NM_033597	-4.2	0.000
Myb	myeloblastosis oncogene	BC011513	-4.6	0.000
Ifi205	interferon activated gene 205	M74124	-4.5	0.017
Ifi205	interferon activated gene 205	M74124	-4.6	0.015
Cell-surface receptors				
Molecule	Name	Accession no.	Fold change	p-value
Timp1	tissue inhibitor of metalloproteinase 1	BC008107	12.7	0.000
Gja1	gap junction membrane channel protein alpha 1	BB039269	6.3	0.005
Gja1	gap junction membrane channel protein alpha 1	BB142324	4.6	0.058
Gja1	gap junction membrane channel protein alpha 1	M63801	4.4	0.067
Gja1	gap junction membrane channel protein alpha 1	AV330726	2.7	0.031
Gja1	gap junction membrane channel protein alpha 1	BB043407	2.2	0.106

Emp1	epithelial membrane protein 1	U25633	5.9	0.002
Ccr5	chemokine (C-C motif) receptor 5	D83648	3.8	0.004
Ccr5	chemokine (C-C motif) receptor 5	X94151	2.1	0.028
Calcrl	calcitonin receptor-like	AF209905	3.7	0.003
Calcrl	calcitonin receptor-like	AB015595	2.1	0.012
Ifitm3	interferon induced transmembrane protein 3	BC010291	2.6	0.079
Selp	selectin, platelet	M72332	2.3	0.001
Sema7a	sema domain, immunoglobulin domain (Ig), and GPI membrane anchor, (semaphorin) 7A	AA144045	2.3	0.001
Sema7a	sema domain, immunoglobulin domain (Ig), and GPI membrane anchor, (semaphorin) 7A	AF176670	2.0	0.012
Gpr65	G-protein coupled receptor 65	NM_008152	2.3	0.000
Gpr146	G protein-coupled receptor 146	BI103049	2.2	0.011
Lilrb4	leukocyte immunoglobulin-like receptor, subfamily B, member 4	U05264	2.1	0.028
Il4ra	interleukin 4 receptor, alpha	AF000304	2.2	0.000
Il4ra	interleukin 4 receptor, alpha	NM_010557	2.0	0.000
Cd4	CD4 antigen	NM_013488	-2.0	0.005
Cd83	CD83 antigen	NM_009856	-2.2	0.000
Cd96	CD96 antigen	NM_032465	-2.3	0.002
Cd8b1	CD8 antigen, beta chain 1	U34882	-2.3	0.012
Il7r	interleukin 7 receptor	AI573431	-3.0	0.000
Il7r	interleukin 7 receptor	AI573431	-3.2	0.000
Igh-6	immunoglobulin heavy chain 6 (heavy chain of IgM)	AI326478	-3.1	0.000
Igh-6	immunoglobulin heavy chain 6 (heavy chain of IgM)	BB226392	-3.4	0.000
Cd97	CD97 antigen	NM_011925	-3.6	0.000
Cd160	CD160 antigen	AU045688	-3.2	0.003
Cd160	CD160 antigen	NM_018767	-3.7	0.006
Tnfsf11	tumor necrosis factor (ligand) superfamily, member 11	AB032771	-4.6	0.005
Tnfsf11	tumor necrosis factor (ligand) superfamily, member 11	NM_011613	-6.1	0.004
Intracellular signaling molecules				
Molecule	Name	Accession no.	Fold change	p-value
Egln3	EGL nine homolog 3 (C. elegans)	BB284358	9.7	0.001
Egln3	EGL nine homolog 3 (C. elegans)	BB284358	6.0	0.014
Socs3	suppressor of cytokine signaling 3	BB831725	6.2	0.002
Socs3	suppressor of cytokine signaling 3	BB241535	5.7	0.002
Socs3	suppressor of cytokine signaling 3	NM_007707	4.3	0.002
Gadd45g	growth arrest and DNA-damage-inducible 45 gamma	AK007410	4.8	0.000
Sgk	serum/glucocorticoid regulated kinase	NM_011361	2.8	0.030
Jak3	Janus kinase 3	L40172	2.5	0.001
Scap2	src family associated phosphoprotein 2	NM_018773	2.3	0.000
Pla2g12a	phospholipase A2, group XIIA	AY007382	2.1	0.000
Sh3kbp1	SH3-domain kinase binding protein 1	AK007283	-2.0	0.002
Sh3kbp1	SH3-domain kinase binding protein 1	BB326929	-2.0	0.011
Vav3	vav 3 oncogene	BC027242	-2.1	0.002
Stk39	serine/threonine kinase 39, STE20/SPS1 homolog (yeast)	BG919998	-2.2	0.018
Arhgef3	Rho guanine nucleotide exchange factor (GEF) 3	BC012262	-2.2	0.000
Mpa2l	macrophage activation 2 like	BM241485	-2.5	0.005
AI586015	STAP-1/Brdg1/expressed sequence AI586015	AI586015	-7.4	0.000
Apoptosis				
Molecule	Name	Accession no.	Fold change	p-value
Gzmb	granzyme B	NM_013542	3.8	0.000
Casp6	caspase 6	NM_009811	2.6	0.000
Ier3	immediate early response 3	NM_133662	2.6	0.007
Bcl2l11	BCL2-like 11 (apoptosis facilitator)	BB667581	-2.1	0.004

Bcl2l11	BCL2-like 11 (apoptosis facilitator)	BM120925	-2.2	0.008
Ifi202b	interferon activated gene 202B	AI481797	-2.3	0.021
Ifi202b	interferon activated gene 202B	AI481797	-3.8	0.035
Fasl	Fas ligand (TNF superfamily, member 6)	NM_010177	-8.7	0.003
Fasl	Fas ligand (TNF superfamily, member 6)	NM_010177	-11.7	0.001
Cell cycle				
Molecule	Name	Accession no.	Fold change	p-value
Cdkn2d	cyclin-dependent kinase inhibitor 2D (p19, inhibits CDK4)	BC013898	2.5	0.008
Nek6	NIMA (never in mitosis gene a)-related expressed kinase 6	BC019524	2.5	0.009
Nek6	NIMA (never in mitosis gene a)-related expressed kinase 6	BB528391	2.2	0.002
Trib2	tribbles homolog 2 (Drosophila)	BB354684	2.3	0.016
Trib2	tribbles homolog 2 (Drosophila)	BB354684	2.1	0.023
Evi5	ecotropic viral integration site 5	AI255184	2.2	0.034
Sfi1	Sfi1 homolog, spindle assembly associated (yeast)	AW744519	-2.3	0.006
Soluble factors				
Molecule	Name	Accession no.	Fold change	p-value
Il21	interleukin 21	NM_021782	211.4	0.000
Igfbp4	insulin-like growth factor binding protein 4	BC019836	3.8	0.002
Igfbp4	insulin-like growth factor binding protein 4	NM_010517	3.4	0.002
Igfbp4	insulin-like growth factor binding protein 4	BB787243	3.2	0.005
Igfbp4	insulin-like growth factor binding protein 4	BB787243	2.9	0.006
Igfbp4	insulin-like growth factor binding protein 4	BC019836	2.9	0.002
Igfbp4	insulin-like growth factor binding protein 4	NM_010517	2.7	0.000
Pros1	protein S (alpha)	Z25469	2.7	0.000
Il10	interleukin 10	NM_010548	2.6	0.001
Lif	leukemia inhibitory factor	AF065917	2.5	0.022
Spp1	secreted phosphoprotein 1	NM_009263	2.4	0.010
Ccl1	chemokine (C-C motif) ligand 1	NM_011329	-2.7	0.035
Xcl1	chemokine (C motif) ligand 1	NM_008510	-2.9	0.002
Tgn	thyroglobulin	NM_009375	-2.9	0.002
Miscellaneous				
Molecule	Name	Accession no.	Fold change	p-value
2010002N04Rik	RIKEN cDNA 2010002N04 gene	BI963682	14.1	0.000
Frmd4b	FERM domain containing 4B	BB009122	9.4	0.001
Frmd4b	FERM domain containing 4B	BG067753	6.1	0.002
Frmd4b	FERM domain containing 4B	AF327857	2.1	0.007
Frmd4b	FERM domain containing 4B	BG067753	2.0	0.012
Aim1	absent in melanoma 1	BM233292	6.5	0.000
Plac8	placenta-specific 8	AF263458	4.3	0.000
Lpxn	leupaxin	BC026563	3.5	0.000
Tmem35	transmembrane protein 35	NM_026239	3.1	0.008
Rab20	RAB20, member RAS oncogene family	BG066967	3.1	0.001
Serpinf1	serine (or cysteine) peptidase inhibitor, clade F, member 1	NM_011340	2.7	0.001
Cpd	carboxypeptidase D	1455009_at	2.7	0.012
Cpd	carboxypeptidase D	NM_007754	2.5	0.028
Cpd	carboxypeptidase D	NM_007754	2.2	0.032
Cpd	carboxypeptidase D	AW550842	2.1	0.039
Plscr1	phospholipid scramblase 1	BF319989	2.7	0.007
Plscr1	phospholipid scramblase 1	BF319989	2.4	0.028
St3gal6	ST3 beta-galactoside alpha-2,3-sialyltransferase 6	NM_018784	2.7	0.025
Chst2	carbohydrate sulfotransferase 2	NM_018763	2.6	0.001
Rab27a	RAB27A, member RAS oncogene family	AB046693	2.6	0.002
LOC231914	NA	BB777344	2.5	0.001

Aig1	androgen-induced 1	NM_025446	2.4	0.001
Ier5	immediate early response 5	BB667115	2.3	0.009
Tmepai	transmembrane, prostate androgen induced RNA	AV370981	2.3	0.001
Tmepai	transmembrane, prostate androgen induced RNA	AV370981	2.1	0.005
Ext1	exostoses (multiple) 1	NM_010162	2.2	0.001
Alpk2	alpha-kinase 2	AY044451	2.1	0.028
Lamp2	lysosomal membrane glycoprotein 2	NM_010685	2.1	0.039
Chmp4b	chromatin modifying protein 4B	BC011429	2.1	0.002
0610013E23Rik	RIKEN cDNA 0610013E23 gene	AK002624	2.1	0.033
Flot1	flotillin 1	NM_008027	2.0	0.003
Man1a	mannosidase 1, alpha	BB070019	2.0	0.000
Pscd3	pleckstrin homology, Sec7 and coiled-coil domains 3	NM_011182	−2.0	0.000
Sesn1	sestrin 1	BG076140	−2.0	0.012
Sesn1	sestrin 1	BG076140	−2.2	0.038
Add3	adducin 3 (gamma)	BI410363	−2.0	0.010
Add3	adducin 3 (gamma)	BM239842	−2.1	0.023
Mbp	myelin basic protein	BB181247	−2.0	0.005
Ndrg1	N-myc downstream regulated gene 1	AV309418	−2.0	0.038
Gch1	GTP cyclohydrolase 1	NM_008102	−2.1	0.002
Qser1	glutamine and serine rich 1	BC021511	−2.1	0.030
Qser1	glutamine and serine rich 1	BC021511	−2.2	0.009
Qser1	glutamine and serine rich 1	BC021511	−2.4	0.025
Ift80	intraflagellar transport 80 homolog (Chlamydomonas)	AK019542	−2.1	0.002
Prickle1	prickle like 1 (Drosophila)	BC022643	−2.1	0.032
Rcsd1	RCSD domain containing 1	BC025872	−2.2	0.002
Smpdl3a	sphingomyelin phosphodiesterase, acid-like 3A	NM_020561	−2.2	0.013
Evi2b	ecotropic viral integration site 2b	AI122415	−2.2	0.111
Art2b	ADP-ribosyltransferase 2b	NM_019915	−2.3	0.010
Itm2a	integral membrane protein 2A	BI966443	−2.3	0.012
Actn1	actinin, alpha 1	BE853286	−2.3	0.001
BC003324	cDNA sequence BC003324	BG076340	−2.3	0.006
Niban	niban protein	NM_022018	−2.3	0.051
Tmem71	transmembrane protein 71	AV173260	−2.3	0.028
Itm2a	integral membrane protein 2A	BI966443	−2.5	0.010
Mmd	monocyte to macrophage differentiation-associated	BC021914	−2.6	0.001
Mmd	monocyte to macrophage differentiation-associated	BC021914	−2.6	0.001
5830443L24Rik	RIKEN cDNA 5830443L24 gene	NM_029509	−2.7	0.019
Lsp1	lymphocyte specific 1	NM_019391	−2.8	0.000
Cmah	cytidine monophospho-N-acetylneuraminic acid hydroxylase	AB061276	−2.1	0.002
Cmah	cytidine monophospho-N-acetylneuraminic acid hydroxylase	NM_007717	−3.1	0.002
Rab34	RAB34, member of RAS oncogene family	AF327929	−2.4	0.018
Rab34	RAB34, member of RAS oncogene family	AF327929	−3.1	0.018
Ifih1	interferon induced with helicase C domain 1	AY075132	−3.8	0.000
Lrmp	lymphoid-restricted membrane protein	NM_008511	−4.3	0.000
Lad1	ladinin	NM_133664	−4.9	0.009
Ms4a4c	membrane-spanning 4-domains, subfamily A, member 4C	NM_029499	−2.3	0.002
Ms4a4c	membrane-spanning 4-domains, subfamily A, member 4C	NM_022429	−6.0	0.001
Only genes with a fold change of IL-6-treated to untreated of at least 2 are shown.				