

Supplementary information

Fig. S1

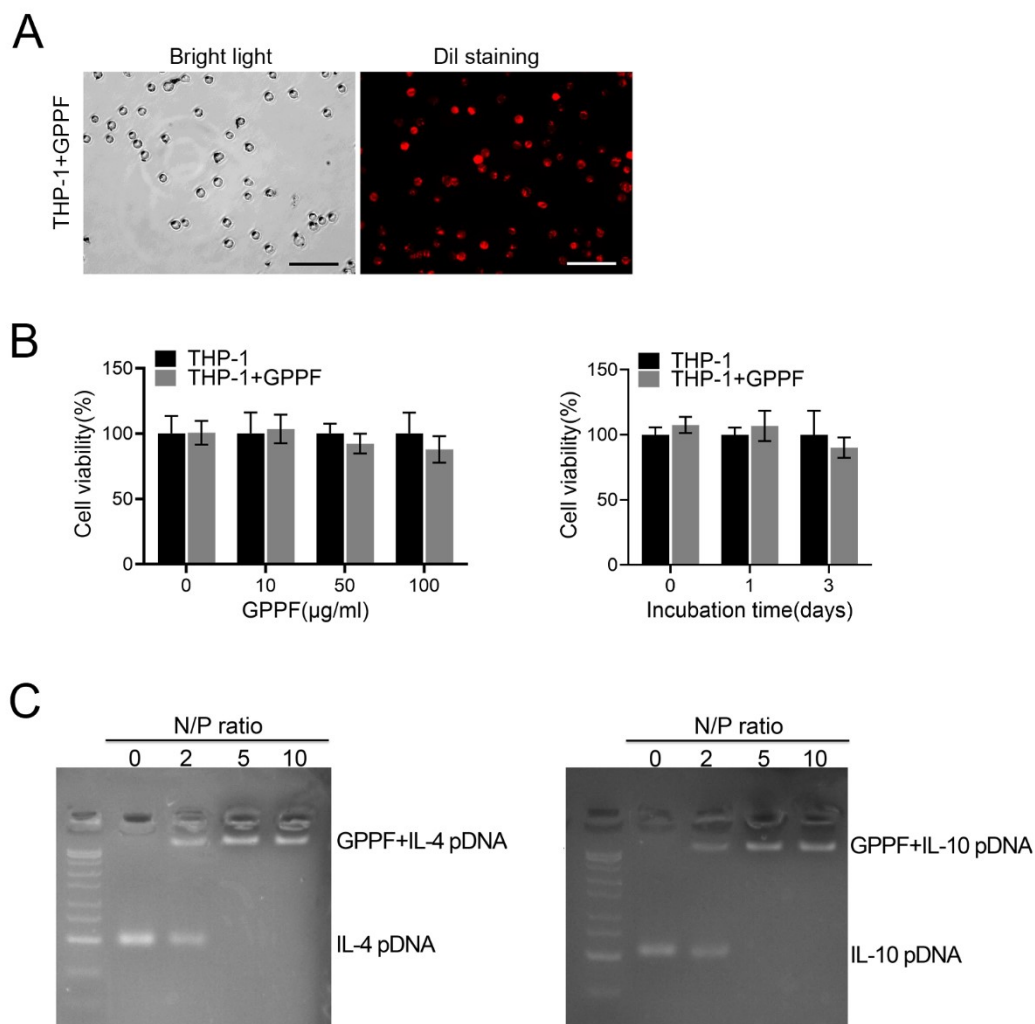


Fig. S1. Uptake and cytotoxicity assay of GPPF. (A) Dil-stained GPPF were uptake by THP-1 macrophage after 4h incubation. Scale bars, 100μm. (B) CCK8 assay kit showed GPPF exerted mere toxic effect on cells across various concentrations and incubation times. (C) The conjugation of GPPF with the two plasmids at various N/P ratios (2, 5, and 10) was evaluated using gel electrophoresis analysis.

Fig. S2

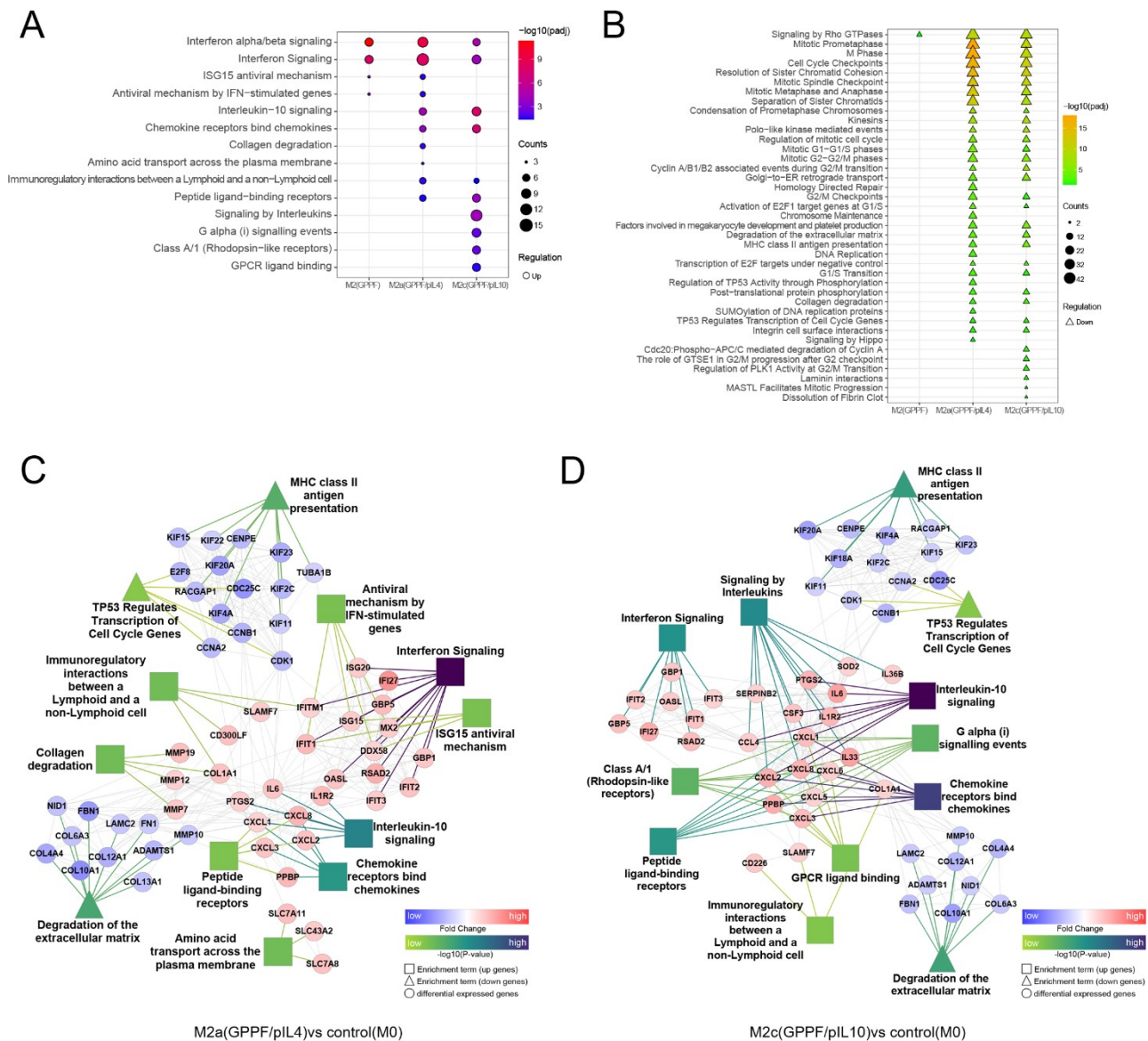


Fig. S2. Reactome pathway analysis of differentially expressed genes (DEGs) in M2 subtypes compared to the control(M0). Reactome pathway differences of (A)up-regulated DEGs or (B)down-regulated DEGs in M2(GPPF), M2a(GPPF/pIL4), and M2c(GPPF/pIL10) macrophages. Visualization of PPI networks and representative Reactome pathway of DEGs in (C)M2a(GPPF/pIL4) and (D)M2c(GPPF/pIL10) using Cytoscape software. Enrichment $Padj < 0.05$.

Fig. S3

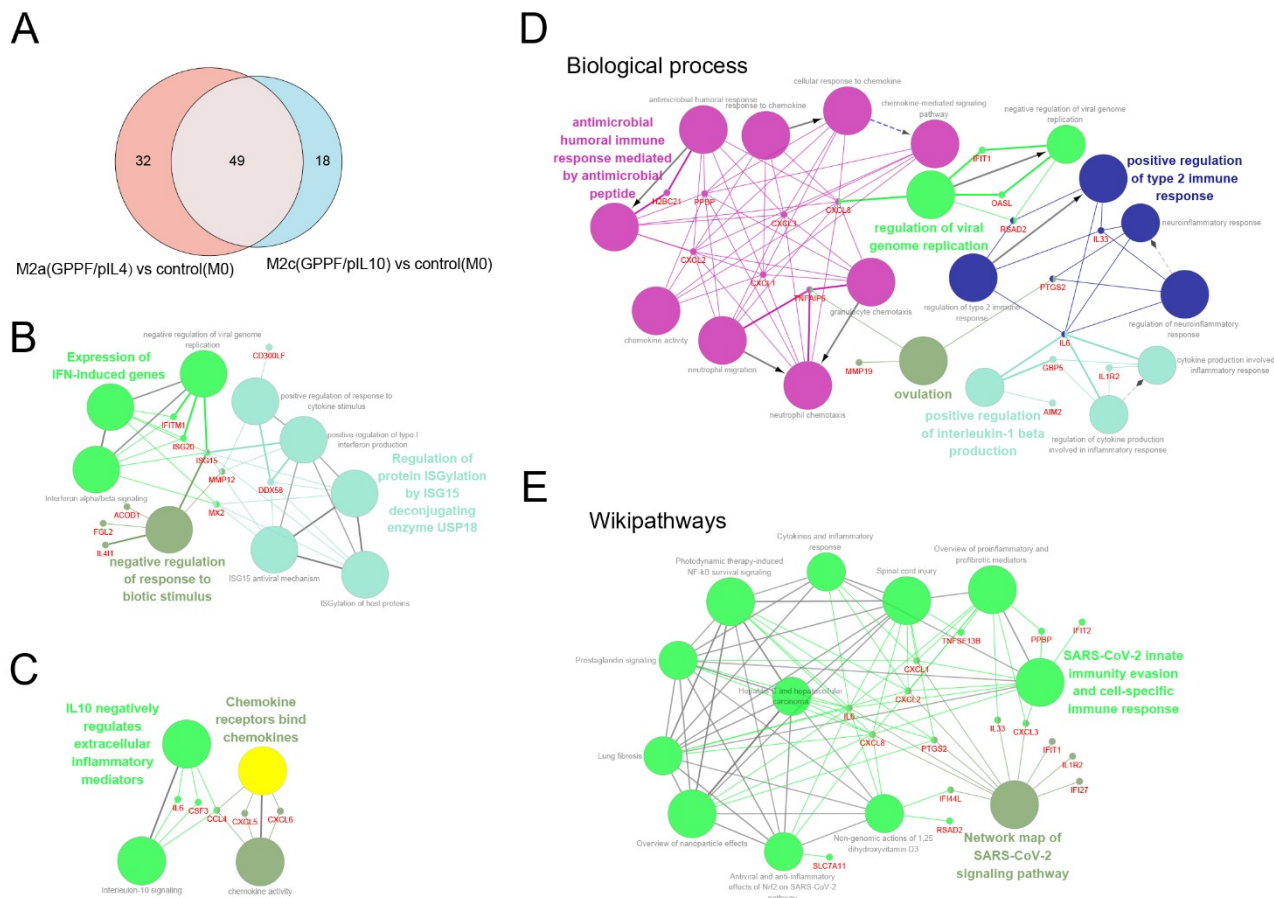


Fig. S3. Identification and functional analysis of up-regulated genes in M2a(GPPF/pIL4) and M2c(GPPF/pIL10) compared to M0 macrophage. (A) Up-regulated differentially expressed genes (DEGs) were analyzed for co-expression and unique expression using a Venn Diagram. (B) Biological process uniquely enriched in M2a(GPPF/pIL4) macrophages. (C) Biological process uniquely enriched in M2c(GPPF/pIL10) macrophages. (D) Biological process revealed that up-regulated co-expressed DEGs in M2a(GPPF/pIL4) and M2c(GPPF/pIL10) were involved in positive regulation of type 2 immune response, antimicrobial and antiviral process. (E) Wikipathway revealed that up-regulated co-expressed DEGs in M2a(GPPF/pIL4) and M2c(GPPF/pIL10) were involved in anti-inflammatory effects on SARS-CoV-2. Enrichment $P_{adj} < 0.05$.

Fig. S4

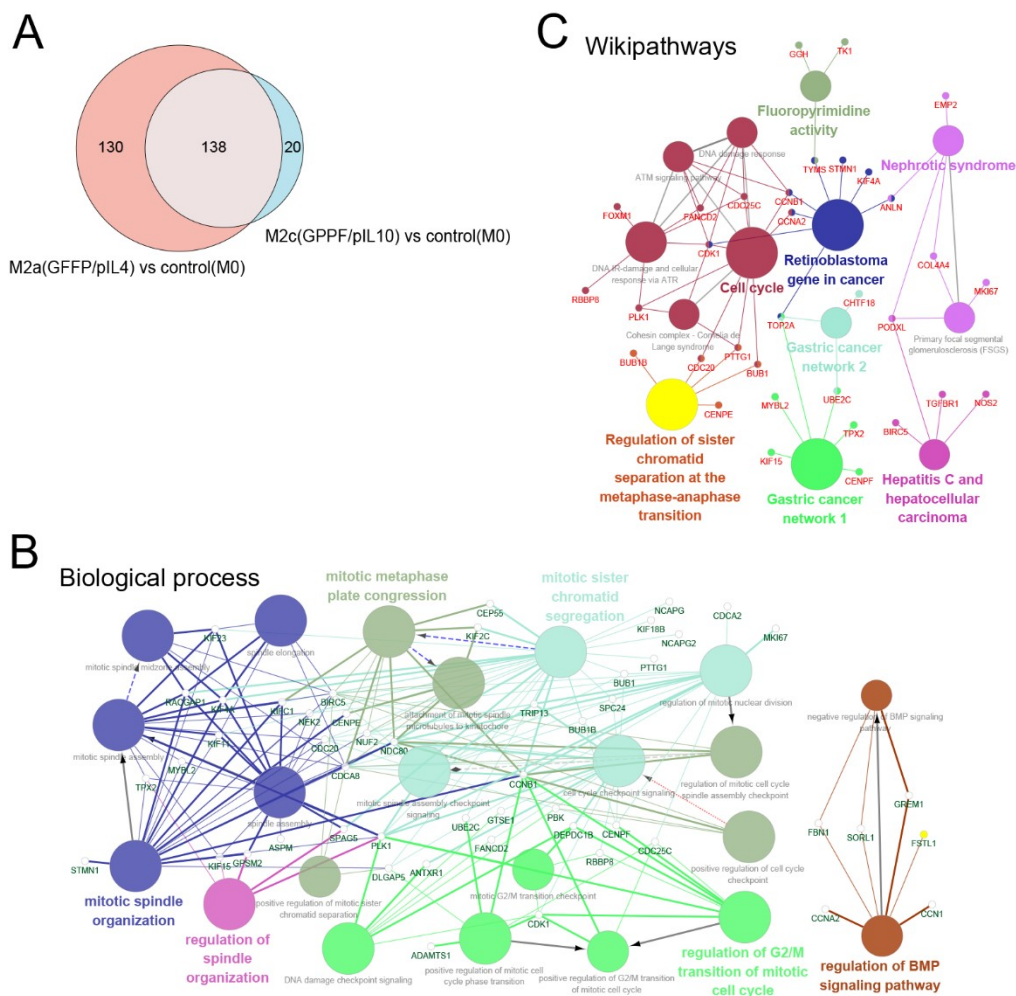


Fig. S4. Identification and functional analysis of down-regulated genes in M2a(GPPF/pIL4) and M2c(GPPF/pIL10) compared to M0 macrophage. (A) Down-regulated differentially expressed genes (DEGs) were analyzed for co-expression and unique expression using a Venn Diagram. (B) Biological process revealed that down-regulated co-expressed DEGs in M2a(GPPF/pIL4) and M2c(GPPF/pIL10) were involved in positive regulation of cell cycle and negative regulation of BMP signaling. (C) Wikipathway revealed that down-regulated co-expressed DEGs in M2a(GPPF/pIL4) and M2c(GPPF/pIL10) were involved in cell cycle and cancer network. Enrichment $P_{adj} < 0.05$.

Tables S1. Primers used for gene expression of M2 macrophage by Real-time PCR

Gene	Forward (5' > 3')	Reverse (5' > 3')
IL4	CCAACTGCTTCCCCCTCTG	TCTGTTACGGTCAACTCGGTG
IL10	AGAGGGGCCTTCCCTACAG	CAGCAGCCTCAAGCCTGAA

Tables S2. Overview of genes uniquely and substantially expressed in M2(GPPF), M2a(GPPF/pIL4) and M2c(GPPF/pIL10)

M2(GPPF)(n=147)

PLEKHN1	C1QTNF12	SCNN1D	TNFRSF25	AGMAT	MT1XP1	RF00092	BEST4
FCGR1CP	AC246680.1	PFN1P3	AC242988.2	SUMO1P3	AL031274.1	MIR3122	RNU6-968P
AC073255.1	HMGA1P8	AC125232.2	MIR5696	TUBA3D	AC092484.1	FZD5	AC012513.3
PLCD1	RPL18AP7	AC109583.2	RNA5SP132	ARHGAP31-AS1	MYLK-AS1	TNK2-AS1	AC139887.4
AC092535.4	HTRA3	RNA5SP155	RNU6-652P	RNU6-431P	AC093890.1	AC010359.1	GUSBP9
RNU6-658P	AC008434.1	RF00019	RF00019	RPS20P4	RF00019	HIST1H1D	TSTD3
MIR4655	RNU6-1091P	HNRNPCP7	AC073850.1	TPI1P2	LINC00685	AC234772.2	USP27X
AC244505.1	MIR6895	AC084026.1	RNU6-323P	AC064807.1	AC016885.3	SLC4A1APP1	RNU7-124P
FAM27B	MIR4668	SLC31A2	MIR601	C9orf139	AC136475.2	CHRM4	MIR3161
GNG3	CNIH2	AP000808.2	MIR548L	PPIAP31	C10orf25	AC018653.3	SNORA2B
RN7SL809P	ARHGEF25	AC002350.1	KDELC1	TRAJ12	TRAJ4	RF00588	MIR7843
AL137779.2	CRIP2	RNU6-610P	AC068722.2	RNU6-181P	AL032819.3	AL032819.2	CLDN9
ZNF213-AS1	AC133550.2	GDPD3	MTSS1L	NECAB2	AC092123.1	SMG6	MIR1180
AC004253.1	AC116407.2	AC243732.1	MIR6779	PTP4A2P1	MIR6781	PTGES3L	MIR4730
FSCN2	AP001178.2	GAREM1	RNU2-69P	AC125437.1	ZNF343	ZNF337	AL359555.1
PI3	MIR6812	MIR941-1	RNU6-1223P	MIR6793	RNA5SP464	AC005776.1	AC020917.4
MIR640	AC022432.1	AC074135.1	AC020910.4	MIR6796	CD79A	RNU6-611P	ZNF137P
ZNF749	SCARF2	AP000553.5	IGLV1-51	DDTL	MIR3909	NOL12	AC254562.3
MIRLET7BHG	SCO2	RPL23P2					

M2a(GPPF/pIL4)(n=174)

RPL23AP24	AL954705.1	MIR5697	AL109811.3	AL035413.1	AL031727.1	AL513365.2	PTAFR
MIR5585	MTMR9LP	RF00019	ATP6V0CP4	AL355480.1	AL355483.2	AC105277.1	MIR3671
MRPL53P1	AL391058.1	PFN1P2	RNVU1-15	MIR4257	C1orf56	RF00015	NR1I3
RF00066	RPL21P28	AL591623.2	NLRC4	AC011247.2	RF00272	CLHC1	AC104653.1

RNU6-1045P	AC018738.1	AC073476.1	RNU6-1024P	UBE2FP1	RNU5B-2P	RF00019	DHFR2
ITGB5-AS1	RNU6-720P	HMGNI1P8	AC090425.1	SLC51A	NDUFB4P12	RN7SL127P	C4orf33
ANAPC10	RF00432	RNU6-173P	AC034231.1	GCSHP1	AC025171.2	ACTBP2	MTRNR2L2
RNU4-90P	AC123595.1	EIF4EBP3	MIR378H	MIR3142	MIR340	ZSCAN26	SNORA38
RPL35P2	ANKRD18EP	CBX3P9	TBC1D32	LINC02544	MIR4648	AC006042.1	AC073210.1
AC114501.1	OR7E7P	TSPAN7	GAPDHP1	MIR222	SOWAHD	FAM122C	AC004908.2
AC023202.1	ADAM28	GNRH1	MIR6842	LETM2	FAM110B	AC055822.1	JPH1
CASC9	SNX16	RNU6-925P	AC012213.4	AC090192.2	RNU6-1255P	AC105118.1	ASS1P12
AL353763.1	CDK2AP2P2	RNA5SP284	EIF4BP3	NIPSNAP3B	RF00108	RF00019	SLC25A25-AS1
AL355987.5	HARBI1	RN7SL652P	OVOL1	MIR326	RNU6-126P	AP003392.6	C1DP1
AC060234.2	RF00019	AL158212.5	AC008115.3	RNA5SP357	AC107016.1	RNU6-595P	AC117503.4
RNU4ATAC12P	FAM207BP	PAN3-AS1	RNU2-6P	TTC5	TPPP2	TRAJ17	RF00151
SNHG10	AL162151.2	SNORD113-9	AL590326.1	RPS20P33	AC124312.2	SNORD116-6	AC092757.2
MIR3680-1	AC145285.6	RNU6-1043P	MIR3183	RN7SL608P	ZMYND15	C17orf75	CYB561
AC025198.1	RF00019	AC124283.2	DLGAP1-AS2	RN7SL862P	AP001542.1	AL117335.1	RF00322
AL133227.1	UBE2V1	RPL12P4	LINC01711	OPRL1	AC011444.1	MIR199A1	ZNF44
ZNF333	AC010319.4	AC005387.1	PDCD2L	AC016582.2	APOC2	MIR643	ZNF549
AC012313.4	AC004832.5	AL021937.2	MEMO1P1	WRB	MT-TI		

M2c(GPPF/pIL10)(n=136)

RNU6-828P	AL445471.1	AC114495.2	AL513327.2	RNU6-584P	RWDD3	AC093019.1	RPSAP19
AL359915.2	MIR765	SNHG28	AC244034.2	MIR194-1	AL355472.3	AC007249.1	UBXN2A
MIR4434	AC007365.1	AC015969.1	AC062037.1	AC019097.1	PAX8	MIR4782	ITGA6-AS1
RNU6-762P	AC010149.1	RF02271	AC092798.1	RNU7-110P	RPL29P11	MIR425	TMED11P
AC096586.2	SNORA26	RF00019	MIR302B	MMAA	RNY4P17	AC139272.1	DTWD2
LEAP2	TIMD4	AC011377.1	RNA5SP203	AL080313.2	AL645940.1	MIR7111	AL583834.1
LINC00472	AL035634.1	RNU6-786P	CCZ1	ZNF680	RF00019	RF00019	AC025594.2
SCML1	AL672207.1	ETDC	FMR1-IT1	AC027702.1	RNU1-124P	RNA5SP268	AC103706.1
MLLT3	FBXO10	PGM5P2	C9orf85	MIR4672	AL359091.5	AC080023.2	WT1-AS
RF00019	AC004923.4	AP002381.2	RNU6-216P	RF00019	AP003084.1	RNU6-1095P	NSUN6
AL161935.3	RNU6-1266P	RNA5SP323	AL162742.1	EIF2S3B	AC022509.4	AC048344.4	AC119044.1
RPL10P13	RNU6-1183P	RILPL1	SLC46A3	AL132800.1	DNAJC8P1	HEATR4	AC124312.4
SNORD116-3	AC135983.5	EIF3J-DT	RPS12P26	MIR6768	MIR3178	KDM8	BOLA2B
SNORA30	SNORD71	RF00019	WVOX	AC009159.3	SPIRE2	RNA5SP435	MIR33B

FOXO3B	AC135721.1	RF00019	RNU6-288P	AC006238.2	POLI	AC027514.2	SMIM25
MIR6813	PCSK4	MIR4748	CCDC159	MIR3188	RNU6-195P	AC243960.2	FUZ
AC010332.1	MIR3198-1	AC016027.5	MIR3928	MIR3687-1	SSR4P1	COL18A1	MT-TQ

Tables S3. Differential expressed genes (DEGs) in M2(GPPF), M2a(GPPF/pIL4) and M2c(GPPF/pIL10) when compared to M0(control)

M2(GPPF)vsM0(control): Up-regulated(n=15)

IFI27	TXNIP	PINLYP	RSAD2	HSPA6	IFIT1	IFIT3	MX2
MMP19	MX1	SERPING1	CMPK2	TP53INP2	IFIT2	CXCL2	

M2(GPPF)vsM0(control): Down-regulated(n=20)

MKI67	CENPF	TCEA1P2	PODXL	PTPN14	ASPM	ANLN	CIT
STMN1	CYR61	NCAPG2	IQGAP3	ANTXR1	SORT1	BX679664.3	SPOCK1
KIF4A	TM4SF19	TOP2A	BUB1B				

M2a(GPPF/pIL4)vsM0(control): Up-regulated(n=81)

TXNIP	TDO2	MMP7	PINLYP	CYP19A1	ADAMDEC1	IFIT1	IFI27
RSAD2	CXCL1	MMP19	IFI44L	CXCL8	CXCL3	AC106865.1	IFIT3
HSPA6	SERPING1	NAMPT	MSR1	SLAMF7	SLC7A11	LUCAT1	IFI44
MX2	ISG15	MARCKS	IL4I1	CXCL2	PTGS2	TYMP	OTOF
DDX58	ARRDC4	IL1R2	IFITM1	CYP27B1	IFIT2	GBP1	CMPK2
TNFAIP6	HIST2H2BE	BIRC3	OASL	AIM2	IL33	PILRA	ANGPTL4
AL592429.1	FGL2	GBP5	NAMPTP1	COL1A1	BATF2	PPBP	SLC43A2
SGSH	AL513283.1	ETV3L	AC245128.3	SERPINB4	CACNA1G	ACOD1	CD274
SLC7A8	GPAT3	ISG20	TNFSF13B	AK1	IL6R-AS1	C2	MIR22HG
FTX	RILP	PDE4B	MMP12	TRPM8	AC093627.4	IL6	AC004988.1
CD300LF							

M2a(GPPF/pIL4)vsM0(control): Down-regulated(n=268)

COL6A3	PODXL	MKI67	CENPF	PLAU	IQGAP3	TOP2A	TGFBI
SLC38A1	STC1	GNLY	MYBL2	NSD2	ATAD2	FN1	CDC20
ASPM	ANLN	NCAPD3	NID1	STMN1	RRM1	TK1	TUBA1B
MCM7	NCAPG2	KIRREL1	ADAMTS1	SPOCK1	NCAPG	PTPN14	KIF2C
GPR88	TPX2	FANCI	CIT	SHCBP1	LMNB1	BUB1	KIFC1
SIGLEC15	CDK1	BIRC5	TGFBR1	ARHGAP11A	BUB1B	TACC3	CCNB1
SORL1	SORT1	COL10A1	FEN1	KIF4A	CYR61	FSTL1	STEAP3
F2R	PLK1	KNTC1	ANTXR1	KIF18B	ZWINT	HJURP	KIF23
DDX11	PLP2	CCNA2	KNL1	PTTG1	SMC4	CDCA5	SERPINA9
RBBP8	POLQ	MT-CO3	TCF19	SHROOM2	SPAG5	NCAPD2	GTSE1

IGFBP5	CKAP2L	POLA1	PTPRF	FANCD2	MARCO	DLGAP5	HMMR
AOX1	CEP55	KIF20A	CHTF18	ESCO2	ALOX5AP	ASF1B	SMC2
PRR11	KIF22	SLC4A4	GPR176	ANOS1	CENPE	FOXN1	RACGAP1
FZD1	PHGDH	SKA3	DIAPH3	KIF14	CDCA8	NRP2	XYLT1
EHF	NDC80	PLS3	STIL	NET1	NCAPH	KIF15	PBK
MELK	DEPDC1B	SRPX	ADCY1	KCNMB1	TYMS	TMEM106C	NOS2
CDCA2	GPSM2	KIF11	CLSPN	HELLS	SORCS2	CX3CR1	CDCA7L
TRIP13	DHCR7	TRIB2	SPC24	NUF2	PNOC	MMS22L	EXO1
FAP	NEK2	PCLAF	PLK4	FBN1	GGH	PLD4	WDR62
ILDR2	FBXO5	RTTN	RFC3	WWTR1	MEGF6	COL4A4	NTM
TCEA1P2	TTK	WWC1	GINS2	CIP2A	CYBRD1	RIMS1	GPX8
RAD54L	BRIP1	SGO2	PYROXD2	GREM1	CENPO	CEP128	RCCD1
PSRC1	FADS2	MMP10	CDH2	WWC3	ROBO4	APOBEC3B	GPC6
SORCS1	CENPM	TRAC	PPFIA2	E2F8	E2F2	AMOTL2	DEPDC1
DDAH1	CDC25C	MBOAT2	VSIG4	GPAM	EME1	LNK1	TICRR
ETV1	AURKB	C1orf112	MFGE8	AC091182.1	DHFRP1	MYO1D	AC091057.1
LAMC2	WIPF3	UNC5A	C3orf80	TM4SF19-AS1	SLC8A1	FAM83D	MYBL1
CENPK	GLRB	C6orf223	COL12A1	RFC5	COL13A1	MZT2B	NMNAT2
TROAP	CES1	MT-TL1	CDKN3	SLC38A5	SNX7	TMTC2	C12orf75
UBE2C	ID1	NOXA1	PLAT	EVA1A	LINC01605	FHL2	EMP2
NUP35	TBC1D4	MIR100HG	FMN1	KCNQ3	AC091806.1	DSCC1	ABCC4
FHL1	RAD51AP1	DDX12P	RGPD5	MCM8	HMGB1P6	SASS6	JPH2
ITGB3BP	AC099850.3	CDKN2D	CNN3	SUV39H1	TSPAN15	CDCA3	IQCD
HRH2	NEURL1B	LIN9	NEIL3				

M2c(GPPF/pIL10)vsM0(control): Up-regulated(n=67)

TDO2	TXNIP	CXCL1	CXCL3	PINLYP	NAMPT	PTGS2	AC106865.1
ADAMDEC1	SAMD9	IFIT1	IFI27	RSAD2	CXCL2	MMP19	SOD2
SLC7A11	IFIT3	SERPING1	SLAMF7	MARCKS	CCL4	IL1R2	IFI44L
CXCL8	SERPINB2	CXCL5	HSPA6	GBP1	CMPK2	TNFAIP6	OTOF
IL33	IFIT2	TP53INP2	AIM2	ARRDC4	HIST2H2BE	PPBP	IL6
OASL	AC245128.3	GBP5	ANGPTL4	CYP26B1	MIR222HG	SERPINB4	IL6R-AS1
BATF2	PILRA	CD226	SLC43A2	CSF3	IL36B	CXCL6	BAALC
GPAT3	RIPOR2	CD274	OVCH1	AL513327.1	AC004988.1	PCDH17	AL592429.1
COL1A1	CCNK	TNFSF13B					

M2c(GPPF/pIL10)vsM0(control): Down-regulated(n=158)

PODXL	MKI67	COL6A3	TGFB1	PLAU	CENPF	GNLY	TOP2A
IQGAP3	CDC20	MYBL2	SERPINE1	STMN1	KIRREL1	SPOCK1	NID1
SORL1	PTPN14	ASPM	CYR61	ANLN	CIT	BUB1	TGFB1

SHCBP1	TCEA1P2	TPX2	TK1	SIGLEC15	FSTL1	CCNB1	SORT1
ADAMTS1	KIFC1	COL10A1	NCAPG2	MT2A	MARCO	BIRC5	BUB1B
NOS2	GPR88	KIF2C	SHROOM2	SERPINA9	CHTF18	KIF4A	CDK1
KIF20A	HMMR	NCAPG	GTSE1	FANCD2	ANTXR1	IGFBP5	PLK1
KIF18B	PTTG1	KIF23	CCNA2	ARHGAP11A	POLQ	SPAG5	CENPE
HJURP	AOX1	F2R	PHGDH	ANOS1	CX3CR1	TRIP13	KCNMB1
KNL1	ALOX5AP	CDCA2	NUF2	KIF11	MEGF6	DLGAP5	RBBP8
PLD4	CEP55	RCCD1	SLC4A4	CDCA8	NDC80	FOXM1	PBK
WWC3	MBOAT2	SORCS2	DIAPH3	GPSM2	SRPX	BX679664.3	NEK2
TRAC	RACGAP1	GAS6	PNOC	WIPF3	ADCY1	SKA3	ILDR2
TM4SF19-AS1	EHF	COL4A4	SNX7	PKDCC	AC091182.1	DDX12P	RTTN
CDKN3	GREM1	FAM83D	MYO1D	KIF15	NTM	DEPDC1B	SPC24
CDC25C	GGH	CEP128	TYMS	PSAT1	LINC01605	PRKCH	MMP10
GPAM	TM4SF19	PLB1	AC099850.3	TMTC2	PYROXD2	ITGA11	AC091057.1
KIF18A	CCNB2	ARHGAP33	MCM8	CLEC5A	MFGE8	TM4SF1	RPL39P3
FBN1	CSPG4P13	TMEM178A	DDAH1	UBE2C	EMP2	LAMC2	DHCR7
CENPW	APLNR	ROBO4	COL12A1	CENPM	C1orf112		

Tables S4. GO, KEGG, and Reactome analysis of DEGs in M2(GPPF) macrophage compared with M0 macrophages

Biological processes analysis of up-regulated DEGs in M2(GPPF) macrophage (similarly described enrichment were excluded)

GOID	Description	Padj	GeneName	Count
GO:0060337	type I interferon signaling pathway	5.57E-11	IFI27/RSAD2/IFIT1/IFIT3/MX2/MX1/IFIT2	7
GO:0051607	defense response to virus	1.93E-06	RSAD2/IFIT1/IFIT3/MX2/MX1/IFIT2	6
GO:0035455	response to interferon-alpha	4.90E-05	IFIT3/MX2/IFIT2	3
GO:1903901	negative regulation of viral life cycle	0.001737	RSAD2/IFIT1/MX1	3

Biological processes analysis of down-regulated DEGs in M2(GPPF) macrophage (similarly described enrichment were excluded)

GOID	Description	Padj	GeneName	Count
GO:0000280	nuclear division	7.17E-05	MKI67/CENPF/ASPM/ANLN/KIF4A/TOP2A/BUB1B	7
GO:0000910	cytokinesis	0.002175	ANLN/CIT/STMN1/KIF4A	4
GO:0098813	nuclear chromosome segregation	0.01179	CENPF/KIF4A/TOP2A/BUB1B	4
GO:1902100	negative regulation of metaphase/anaphase transition of cell cycle	0.014212	CENPF/BUB1B	2

GO:0031577	spindle checkpoint	0.014212	CENPF/BUB1B	2
GO:0051985	negative regulation of chromosome segregation	0.015193	CENPF/BUB1B	2
GO:0007051	spindle organization	0.018027	ASPM/STMN1/KIF4A	3
GO:0044784	metaphase/anaphase transition of cell cycle	0.022631	CENPF/BUB1B	2
GO:0051784	negative regulation of nuclear division	0.023204	CENPF/BUB1B	2
GO:0051321	meiotic cell cycle	0.02348	ASPM/TOP2A/BUB1B	3
GO:0000075	cell cycle checkpoint	0.023877	CENPF/TOP2A/BUB1B	3
GO:0045930	negative regulation of mitotic cell cycle	0.045903	CENPF/TOP2A/BUB1B	3
GO:0031589	cell-substrate adhesion	0.047238	CYR61/ANTXR1/SPOCK1	3

KEGG analysis of up-regulated DEGs in M2(GPPF) macrophage

KEGGID	Description	Padj	GeneName	Count
hsa05160	Hepatitis C	0.000613	RSAD2/IFIT1/MX2/MX1	4
hsa05162	Measles	0.006472	HSPA6/MX2/MX1	3
hsa05164	Influenza A	0.010656	RSAD2/MX2/MX1	3
hsa03250	Viral life cycle - HIV-1	0.035842	MX2/MX1	2
hsa05134	Legionellosis	0.035931	HSPA6/CXCL2	2

Reactome analysis of up-regulated DEGs in M2(GPPF) macrophage

ReactomeID	Description	Padj	GeneName	Count
R-HSA-909733	Interferon alpha/beta signaling	4.60E-12	IFI27/RSAD2/IFIT1/IFIT3/MX2/MX1/IFIT2	7
R-HSA-913531	Interferon Signaling	1.08E-08	IFI27/RSAD2/IFIT1/IFIT3/MX2/MX1/IFIT2	7
R-HSA-1169408	ISG15 antiviral mechanism	0.00071 1	IFIT1/MX2/MX1	3
R-HSA-1169410	Antiviral mechanism by IFN-stimulated genes	0.00071 1	IFIT1/MX2/MX1	3

Reactome analysis of down-regulated DEGs in M2(GPPF) macrophage

ReactomeID	Description	Padj	GeneName	Count
R-HSA-194315	Signaling by Rho GTPases	0.032795	CENPF/CIT/IQGAP3/BUB1B	4

Tables S5. GO, KEGG, and Reactome analysis of DEGs in M2a(GPPF/pIL4) macrophage compared with M0 macrophages

Biological processes analysis of up-regulated DEGs in M2a(GPPF/pIL4) macrophage (similarly described enrichment were excluded)

GOID	Description	Padj	GeneName	Count
GO:0051607	defense response to virus	4.90E-14	IFIT1/RSAD2/IFI44L/IFIT3/MX2/ISG15/DDX58/IFITM1/IFIT2/GBP1/BIRC3/OASL/AIM2/IL33/ISG20/MMP12/IL6	17
GO:0060337	type I interferon signaling pathway	1.40E-11	IFIT1/IFI27/RSAD2/IFIT3/MX2/ISG15/IFITM1/IFIT2/OASL/ISG20/MMP12	11
GO:0032496	response to lipopolysaccharide	2.55E-06	CXCL1/CXCL8/CXCL3/CXCL2/PTGS2/CYP27B1/CMPK2/PPBP/ACOD1/CD274/PDE4B/IL6	12
GO:0009617	response to bacterium	2.55E-06	CXCL1/CXCL8/CXCL3/ISG15/CXCL2/PTGS2/CYP27B1/CMPK2/HIST2H2BE/PPBP/ACOD1/CD274/PDE4B/IL6	14
GO:0032103	positive regulation of response to external stimulus	3.73E-06	CXCL1/CXCL8/CXCL3/CXCL2/PTGS2/CYP27B1/IL33/GBP5/PPBP/ACOD1/IL6	11
GO:0050727	regulation of inflammatory response	1.73E-05	CYP19A1/SERPING1/PTGS2/IL1R2/TNFAIP6/BIRC3/IL33/GBP5/ACOD1/C2/IL6	11
GO:0090023	positive regulation of neutrophil chemotaxis	2.04E-05	CXCL1/CXCL8/CXCL3/CXCL2/PPBP	5
GO:0002697	regulation of immune effector process	2.27E-05	IFIT1/RSAD2/SERPING1/DDX58/BIRC3/AIM2/IL33/SERPINB4/C2/MMP12/IL6	11
GO:0071624	positive regulation of granulocyte chemotaxis	2.61E-05	CXCL1/CXCL8/CXCL3/CXCL2/PPBP	5
GO:0031348	negative regulation of defense response	6.40E-05	CYP19A1/IFIT1/SERPING1/IL1R2/TNFAIP6/SERPINB4/ACOD1/MMP12	8
GO:0050663	cytokine secretion	7.14E-05	DDX58/IL1R2/GBP1/AIM2/IL33/GBP5/CD274/MMP12	8
GO:1903901	negative regulation of viral life cycle	8.08E-05	IFIT1/RSAD2/ISG15/IFITM1/OASL/ISG20	6
GO:0002690	positive regulation of leukocyte chemotaxis	9.62E-05	CXCL1/CXCL8/CXCL3/CXCL2/PPBP/IL6	6
GO:0009306	protein secretion	9.62E-05	RSAD2/MARCKS/DDX58/IL1R2/GBP1/AIM2/IL33/GBP5/CD274/TNFSF13B/MMP12/IL6	12
GO:0035455	response to interferon-alpha	0.000102	IFIT3/MX2/IFITM1/IFIT2	4
GO:0045088	regulation of innate immune response	0.000389	RSAD2/SERPING1/DDX58/BIRC3/AIM2/GBP5/SERPINB4/ACOD1/MMP12/CD300LF	10
GO:0002683	negative regulation of immune system process	0.000399	CYP19A1/IFIT1/SERPING1/GBP1/IL33/SERPINB4/ACOD1/CD274/MMP12/CD300LF	10
GO:0070098	chemokine-mediated signaling pathway	0.000417	CXCL1/CXCL8/CXCL3/CXCL2/PPBP	5
GO:0001818	negative regulation of cytokine production	0.000475	ISG15/DDX58/IL1R2/GBP1/IL33/ACOD1/CD274/IL6	8
GO:0030335	positive regulation of cell migration	0.00085	CXCL1/CXCL8/CXCL3/CXCL2/PTGS2/TNFAIP6/COL1A1/PPBP/CD274/IL6	10

GO:0045824	negative regulation of innate immune response	0.001102	SERPING1/SERPINB4/ACOD1/MMP12	4
GO:0002830	positive regulation of type 2 immune response	0.001145	RSAD2/IL33/IL6	3
GO:0034121	regulation of toll-like receptor signaling pathway	0.003134	RSAD2/BIRC3/ACOD1/CD300LF	4
GO:0034341	response to interferon-gamma	0.003443	IFITM1/CYP27B1/GBP1/OASL/GBP5/ACOD1	6
GO:0032963	collagen metabolic process	0.003676	MMP7/MMP19/COL1A1/MMP12/IL6	5
GO:0034612	response to tumor necrosis factor	0.006142	CXCL8/PTGS2/BIRC3/AIM2/COL1A1/ACOD1/TNFSF13B	7
GO:0006959	humoral immune response	0.012137	SERPING1/HIST2H2BE/ACOD1/C2/IL6	5
GO:0002698	negative regulation of immune effector process	0.017389	IFIT1/SERPING1/IL33/SERPINB4	4
GO:0002221	pattern recognition receptor signaling pathway	0.017401	RSAD2/DDX58/BIRC3/ACOD1/CD300LF	5
GO:0050701	interleukin-1 secretion	0.017522	IL1R2/AIM2/GBP5	3
GO:0050729	positive regulation of inflammatory response	0.021196	PTGS2/IL33/GBP5/IL6	4
GO:0032480	negative regulation of type I interferon production	0.021196	ISG15/DDX58/ACOD1	3
GO:0050728	negative regulation of inflammatory response	0.022169	CYP19A1/IL1R2/TNFAIP6/ACOD1	4
GO:0031214	biomineral tissue development	0.024809	ISG15/PTGS2/CYP27B1/COL1A1	4
GO:0002819	regulation of adaptive immune response	0.032221	RSAD2/IL33/TNFSF13B/IL6	4
GO:0032755	positive regulation of interleukin-6 production	0.042904	DDX58/IL33/IL6	3
GO:0001503	ossification	0.047257	ISG15/PTGS2/IFITM1/CYP27B1/COL1A1/IL6	6
GO:0048661	positive regulation of smooth muscle cell proliferation	0.048854	NAMPT/PTGS2/IL6	3

Biological processes analysis of down-regulated DEGs in M2a(GPPF/pIL4) macrophage (similarly described enrichment were excluded)

GOID	Description	Padj	GeneName	Count
GO:0007059	chromosome segregation	9.91E-38	MKI67/CENPF/TOP2A/CDC20/NCAPD3/NCAPG/KIF2C/BUB1/KIFC1/BIRC5/BUB1B/TACC3/CCNB1/FEN1/KIF4A/PLK1/KNTC1/KIF18B/ZWINT/HJURP/KIF23/DDX11/KNL1/PTTG1/SMC4/CDCA5/SPAG5/NCAPD2/FANCD2/DLGAP5/ESCO2/SMC2/KIF22/CENPE/RACGAP1/SKA3/KIF14/CDCA8/NDC80/NCAPH/KIF11/	58

			TRIP13/SPC24/NUF2/NEK2/TTK/BRIP1/SGO2/CENPO/PSRC1/CENPM/EME1/AURKB/FAM83D/CENPK/UBE2C/DSCC1/ITGB3BP	
GO:0098813	nuclear chromosome segregation	4.35E-36	CENPF/TOP2A/CDC20/NCAPD3/NCAPG/KIF2C/BUB1/KIFC1/BIRC5/BUB1B/TACC3/CCNB1/FEN1/KIF4A/PLK1/KNTC1/KIF18B/ZWINT/KIF23/DDX11/KNL1/PTTG1/SMC4/CDCA5/SPAG5/NCAPD2/FANCD2/DLGAP5/SMC2/KIF22/CENPE/RACGAP1/KIF14/CDCA8/NDC80/NCAPH/TRIP13/SPC24/NUF2/NEK2/TTK/BRIP1/SGO2/CENPO/PSRC1/CENPM/EME1/AURKB/FAM83D/CENPK/UBE2C/DSCC1/ITGB3BP	53
GO:0000280	nuclear division	1.93E-30	MKI67/CENPF/TOP2A/MYBL2/CDC20/ASPM/ANLN/NCAPD3/NCAPG/KIF2C/TPX2/BUB1/KIFC1/BIRC5/BUB1B/TACC3/CCNB1/KIF4A/PLK1/KNTC1/KIF18B/ZWINT/KIF23/PTTG1/SMC4/CDCA5/SPAG5/NCAPD2/FANCD2/DLGAP5 / SMC2/KIF22/CENPE/RACGAP1/KIF14/CDCA8/NDC80/NCAPH/KIF11/TRIP13/NUF2/NEK2/FBXO5/TTK/BRIP1/SGO2/PSRC1/CDC25C/EME1/AURKB/MYBL1/UBE2C/DSCC1	53
GO:0007052	mitotic spindle organization	3.12E-16	MYBL2/CDC20/STMN1/TPX2/KIFC1/BIRC5/TACC3/CCNB1/KIF4A/PLK1/KIF23/CENPE/RACGAP1/NDC80/STIL/GPSM2/KIF11/NUF2/NEK2/WDR62/TTK/PSRC1/AURKB	23
GO:0007051	spindle organization	1.24E-14	MYBL2/CDC20/ASPM/STMN1/TPX2/KIFC1/BIRC5/TACC3/CCNB1/KIF4A/PLK1/KIF23/SPAG5/CENPE/RACGAP1/NDC80/STIL/GPSM2/KIF11/NUF2/NEK2/WDR62/FBXO5/TTK/PSRC1/AURKB	26
GO:0051321	meiotic cell cycle	1.11E-12	TOP2A/CDC20/ASPM/NCAPD3/BUB1/CDK1/BUB1B/PLK1/PTTG1/SMC4/RBBP8/NCAPD2/FANCD2/SMC2/NCAPH/TRIP13/NUF2/EXO1/NEK2/FBXO5/TTK/RAD54L/BRIP1/SGO2/EME1/MYBL1	26
GO:0051310	metaphase plate congression	7.41E-11	CENPF/KIF2C/KIFC1/CCNB1/CDCA5/SPAG5/KIF22/CENPE/KIF14/CDCA8/NDC80/NUF2/PSRC1/FAM83D	14
GO:0000075	cell cycle checkpoint	2.88E-09	CENPF/TOP2A/FANCI/BUB1/CDK1/BUB1B/CCNB1/PLK1/KNTC1/ZWINT/RBBP8/GTSE1/NDC80/CLSPN/TRIP13/TTK/BRIP1/E2F8/CDC25C/EME1/TICRR/AURKB	22
GO:0044784	metaphase/anaphase transition	4.13E-09	CENPF/BUB1/BUB1B/TACC3/CCNB1/PLK1/	12

	of cell cycle		DLGAP5/CENPE/NDC80/TRIP13/TTK/UBE2C	
GO:0006323	DNA packaging	8.48E-09	TOP2A/NCAPD3/NCAPG2/NCAPG/CDK1/CCNB1/HJURP/KNL1/SMC4/CDCA5/NCAPD2/ASF1B/SMC2/NCAPH/HELLS/CENPO/CENPM/CENPK/ITGB3BP	19
GO:0008608	attachment of spindle microtubules to kinetochore	1.02E-08	KIF2C/CCNB1/KNL1/SPAG5/CENPE/RACGAP1/NDC80/NUF2/NEK2/AURKB	10
GO:0006260	DNA replication	1.29E-08	RRM1/MCM7/CDK1/FEN1/DDX11/RBBP8/POLQ/POLA1/CHTF18/ESCO2/CLSPN/MMS22L/EXO1/PCLAF/RFC3/GINS2/BRIP1/E2F8/CDC25C/EME1/TICRR/RFC5/DSCC1/MCM8	24
GO:0045930	negative regulation of mitotic cell cycle	8.24E-08	CENPF/TOP2A/FANCI/BUB1/CDK1/BUB1B/CCNB1/PLK1/KNTC1/ZWINT/PTTG1/GTSE1/NDC80/CLSPN/TRIP13/FAP/TTK/E2F8/CDC25C/EME1/TICRR/AURKB/FHL1	23
GO:0070192	chromosome organization involved in meiotic cell cycle	1.88E-07	NCAPD3/BUB1/BUB1B/SMC4/NCAPD2/FANCD2/SMC2/NCAPH/TRIP13/BRIP1/SGO2	11
GO:0031577	spindle checkpoint	2.44E-07	CENPF/BUB1/BUB1B/CCNB1/PLK1/NDC80/TRIP13/TTK/AURKB	9
GO:0051985	negative regulation of chromosome segregation	8.64E-07	CENPF/BUB1/BUB1B/CCNB1/PLK1/PTTG1/NDC80/TRIP13/TTK	9
GO:0044839	cell cycle G2/M phase transition	1.16E-06	CENPF/TPX2/FANCI/CIT/CDK1/CCNB1/PLK1/CCNA2/GTSE1/HMMR/FOXM1/KIF14/MELK/CLSPN/NEK2/PLK4/CDC25C/TICRR/AURKB/FHL1	20
GO:0051784	negative regulation of nuclear division	1.27E-06	CENPF/BUB1/BUB1B/CCNB1/PLK1/PTTG1/NDC80/TRIP13/FBXO5/TTK	10
GO:0010948	negative regulation of cell cycle process	1.63E-06	CENPF/FANCI/BUB1/CDK1/BUB1B/CCNB1/PLK1/PTTG1/RBBP8/GTSE1/NDC80/CLSPN/TRIP13/NEK2/FBXO5/TTK/E2F8/CDC25C/TICRR/AURKB/FHL1/CDKN2D	22
GO:0051383	kinetochore organization	1.86E-06	CENPF/SMC4/SMC2/CENPE/NDC80/NUF2/CENPK	7
GO:1902100	negative regulation of metaphase/anaphase transition of cell cycle	2.29E-06	CENPF/BUB1/BUB1B/CCNB1/PLK1/NDC80/TRIP13/TTK	8
GO:1901988	negative regulation of cell cycle phase transition	4.09E-06	CENPF/FANCI/BUB1/CDK1/BUB1B/CCNB1/PLK1/GTSE1/NDC80/CLSPN/TRIP13/TTK/E2F8/CDC25C/TICRR/AURKB/FHL1/CDKN2D	18
GO:0045787	positive regulation of cell cycle	4.60E-06	CIT/CDK1/CCNB1/FEN1/KIF23/DDX11/CDCA5/SPAG5/GTSE1/DLGAP5/RACGAP1/KIF14/NDC80/GPSM2/FAP/PLK4/PSRC1/E2F8/CDC25C/AURKB/FAM83D/UBE2C	22
GO:0044843	cell cycle G1/S phase transition	2.39E-05	IQGAP3/MCM7/CDK1/CCNB1/CCNA2/RBBP8/	18

			GTSE1/POLA1/KIF14/TYMS/FBXO5/E2F8/ CDC25C/FAM83D/CDKN3/FHL1/MCM8/CDKN2D	
GO:0031570	DNA integrity checkpoint	0.00022	TOP2A/FANCI/CDK1/CCNB1/PLK1/RBBP8/ GTSE1/CLSPN/BRIP1/E2F8/CDC25C/EME1/TICRR	13
GO:0034724	DNA replication-independent nucleosome organization	0.000562	HJURP/KNL1/ASF1B/CENPO/CENPM/ CENPK/ITGB3BP	7
GO:0000910	cytokinesis	0.000564	ANLN/STMN1/CIT/KIF4A/PLK1/KIF23/CEP55/ KIF20A/RACGAP1/KIF14/E2F8/AURKB	12
GO:0061641	CENP-A containing chromatin organization	0.001119	HJURP/KNL1/CENPO/CENPM/CENPK/ITGB3BP	6
GO:0032467	positive regulation of cytokinesis	0.001628	CIT/KIF23/RACGAP1/KIF14/AURKB	5
GO:0006890	retrograde vesicle-mediated transport, Golgi to ER	0.002245	KIF2C/KIF4A/KIF23/KIF22/CENPE/RACGAP1/ KIF15/KIF11	8
GO:2000573	positive regulation of DNA biosynthetic process	0.002417	CHTF18/NEK2/RFC3/GREM1/AURKB/ RFC5/DSCC1	7
GO:0002495	antigen processing and presentation of peptide antigen via MHC class II	0.005222	KIF2C/KIF4A/KIF23/KIF22/CENPE/RACGAP1/ KIF15/KIF11	8
GO:0072331	signal transduction by p53 class mediator	0.005222	TPX2/CDK1/CCNB1/RBBP8/GTSE1/FOXM1/ EXO1/RFC3/BRIP1/E2F8/E2F2/CDC25C/ AURKB/RFC5	14
GO:1901989	positive regulation of cell cycle phase transition	0.008083	CDK1/CCNB1/CDCA5/DLGAP5/CDC25C/ FAM83D/UBE2C	7
GO:0031589	cell-substrate adhesion	0.010316	PLAU/FN1/NID1/SPOCK1/CYR61/ANTXR1/ KIF14/NET1/GREM1/PPFIA2/COL13A1/ ID1/EMP2/FMN1	14
GO:0003206	cardiac chamber morphogenesis	0.032667	NSD2/ADAMTS1/TGFBR1/CYR61/FZD1/ NRP2/FHL2	7

KEGG analysis of up-regulated DEGs in M2a(GPPF/pIL4) macrophage

KEGGID	Description	Padj	GeneName	Count
hsa04621	NOD-like receptor signaling pathway	8.21E-08	TXNIP/CXCL1/CXCL8/CXCL3/NAMPT/ CXCL2/GBP1/BIRC3/AIM2/GBP5/NAMPTP1/IL6	12
hsa05146	Amoebiasis	2.56E-07	CXCL1/CXCL8/CXCL3/AC106865.1/CXCL2 /IL1R2/COL1A1/SERPINB4/IL6	9
hsa04064	NF-kappa B signaling pathway	6.24E-06	CXCL1/CXCL8/CXCL3/CXCL2/PTGS2/ DDX58/BIRC3/TNFSF13B	8
hsa05323	Rheumatoid arthritis	2.20E-05	CXCL1/CXCL8/CXCL3/AC106865.1/ CXCL2/TNFSF13B/IL6	7
hsa05134	Legionellosis	8.59E-05	CXCL1/CXCL8/CXCL3/AC106865.1/ HSPA6/CXCL2/IL6	7

hsa04060	Cytokine-cytokine receptor interaction	0.00013	CXCL1/CXCL8/CXCL3/CXCL2/IL1R2/IL33/PPBP/TNFSF13B/IL6	9
hsa04061	Viral protein interaction with cytokine and cytokine receptor	0.00013	CXCL1/CXCL8/CXCL3/CXCL2/PPBP/IL6	6
hsa04657	IL-17 signaling pathway	0.000232	CXCL1/CXCL8/CXCL3/CXCL2/PTGS2/IL6	6
hsa04668	TNF signaling pathway	0.0013	CXCL1/CXCL3/CXCL2/PTGS2/BIRC3/IL6	6
hsa04936	Alcoholic liver disease	0.0013	CXCL1/CXCL8/CXCL3/CXCL2/C2/IL6	6
hsa05417	Lipid and atherosclerosis	0.00556	CXCL1/CXCL8/CXCL3/AC106865.1/HSPA6/CXCL2/IL6	7
hsa04623	Cytosolic DNA-sensing pathway	0.009011	DDX58/AIM2/IL33/IL6	4
hsa05133	Pertussis	0.01012	CXCL8/SERPING1/C2/IL6	4
hsa05164	Influenza A	0.01012	RSAD2/CXCL8/MX2/DDX58/IL33/IL6	6
hsa05120	Epithelial cell signaling in Helicobacter pylori infection	0.012037	CXCL1/CXCL8/CXCL3/CXCL2	4
hsa05162	Measles	0.012367	AC106865.1/HSPA6/MX2/DDX58/IL6	5
hsa05144	Malaria	0.014667	CXCL8/AC106865.1/IL6	3
hsa05167	Kaposi sarcoma-associated herpesvirus infection	0.014667	CXCL1/CXCL8/CXCL3/CXCL2/PTGS2/IL6	6
hsa04062	Chemokine signaling pathway	0.034681	CXCL1/CXCL8/CXCL3/CXCL2/PPBP	5
hsa04622	RIG-I-like receptor signaling pathway	0.035468	CXCL8/ISG15/DDX58	3

KEGG analysis of down-regulated DEGs in M2a(GPPF/pIL4) macrophage

KEGGID	Description	Padj	GeneName	Count
hsa04110	Cell cycle	8.77E-13	CDC20/MCM7/BUB1/CDK1/BUB1B/CCNB1/PLK1/DDX11/CCNA2/KNL1/PTTG1/CDCA5/ESCO2/NDC80/TRIP13/FBXO5/TTK/E2F2/CDC25C/TICRR/AURKB/DDX12P/CDKN2D	23
hsa04814	Motor proteins	0.003213	TUBA1B/KIF2C/KIFC1/KIF4A/KIF18B/KIF23/KIF20A/KIF22/CENPE/KIF14/KIF15/KIF11/MYO1D	13
hsa04914	Progesterone-mediated oocyte maturation	0.013038	BUB1/CDK1/CCNB1/PLK1/CCNA2/KIF22/ADCY1/CDC25C	8
hsa03030	DNA replication	0.013041	MCM7/FEN1/POLA1/RFC3/RFC5	5
hsa04114	Oocyte meiosis	0.01798	CDC20/BUB1/CDK1/CCNB1/PLK1/PTTG1/ADCY1/FBXO5/CDC25C	9
hsa01523	Antifolate resistance	0.039447	TYMS/GGH/DHFRP1/ABCC4	4
hsa03410	Base excision repair	0.045619	FEN1/RFC3/RFC5/HMGB1P6/NEIL3	5
hsa04974	Protein digestion and absorption	0.045619	COL6A3/COL10A1/COL4A4/SLC8A1/COL12A1/COL13A1	6

Reactome analysis of up-regulated DEGs in M2a(GPPF/pIL4) macrophage

ReactomeID	Description	Padj	GeneName	Count
R-HSA-909733	Interferon alpha/beta signaling	4.07E-10	IFIT1/IFI27/RSAD2/IFIT3/MX2/ISG15/	10

			IFITM1/IFIT2/OASL/ISG20	
R-HSA-913531	Interferon Signaling	9.25E-09	IFIT1/IFI27/RSAD2/IFIT3/MX2/ISG15/DDX58/IFITM1/IFIT2/GBP1/OASL/GBP5/ISG20	13
R-HSA-6783783	Interleukin-10 signaling	3.92E-05	CXCL1/CXCL8/CXCL2/PTGS2/IL1R2/IL6	6
R-HSA-380108	Chemokine receptors bind chemokines	0.000235	CXCL1/CXCL8/CXCL3/CXCL2/PPBP	5
R-HSA-1442490	Collagen degradation	0.021998	MMP7/MMP19/COL1A1/MMP12	4
R-HSA-352230	Amino acid transport across the plasma membrane	0.021998	SLC7A11/SLC43A2/SLC7A8	3
R-HSA-198933	Immunoregulatory interactions between a Lymphoid and a non-Lymphoid cell	0.021998	SLAMF7/IFITM1/PILRA/COL1A1/CD300LF	5
R-HSA-1169408	ISG15 antiviral mechanism	0.030073	IFIT1/MX2/ISG15/DDX58	4
R-HSA-1169410	Antiviral mechanism by IFN-stimulated genes	0.030073	IFIT1/MX2/ISG15/DDX58	4
R-HSA-375276	Peptide ligand-binding receptors	0.037238	CXCL1/CXCL8/CXCL3/CXCL2/PPBP	5

Reactome analysis of down-regulated DEGs in M2a(GPPF/pIL4) macrophage

ReactomeID	Description	Padj	GeneName	Count
R-HSA-68877	Mitotic Prometaphase	8.02E-19	CENPF/CDC20/TUBA1B/NCAPG/KIF2C/BUB1/CDK1/BIRC5/BUB1B/CCNB1/PLK1/KNTC1/ZWINT/KNL1/SMC4/CDCA5/NCAPD2/SMC2/CENPE/CDCA8/NDC80/NCAPH/SPC24/NUF2/NEK2/PLK4/SGO2/CENPO/CENPM/AURKB/CENPK/MZT2B/ITGB3BP	33
R-HSA-68886	M Phase	4.76E-18	CENPF/CDC20/NCAPD3/TUBA1B/NCAPG2/NCAPG/KIF2C/LMNB1/BUB1/CDK1/BIRC5/BUB1B/CCNB1/PLK1/KNTC1/ZWINT/KIF23/KNL1/PTTG1/SMC4/CDCA5/NCAPD2/KIF20A/SMC2/CENPE/CDCA8/NDC80/NCAPH/SPC24/NUF2/NEK2/PLK4/FBXO5/SGO2/CENPO/CENPM/AURKB/CENPK/MZT2B/UBE2C/NUP35/ITGB3BP	42
R-HSA-69620	Cell Cycle Checkpoints	2.77E-17	CENPF/NSD2/CDC20/MCM7/KIF2C/BUB1/CDK1/BIRC5/BUB1B/CCNB1/PLK1/KNTC1/ZWINT/CCNA2/KNL1/RBBP8/GTSE1/CENPE/CDCA8/NDC80/CLSPN/SPC24/NUF2/EXO1/RFC3/BRIP1/SGO2/CENPO/CENPM/CDC25C/AURKB/CENPK/RFC5/UBE2C/MCM8/ITGB3BP	36
R-HSA-2500257	Resolution of Sister Chromatid Cohesion	2.20E-16	CENPF/CDC20/TUBA1B/KIF2C/BUB1/CDK1/BIRC5/ / BUB1B/CCNB1/PLK1/KNTC1/ZWINT/KNL1/CDCA5/	25

			CENPE/CDCA8/NDC80/SPC24/NUF2/SGO2/CENPO/ CENPM/AURKB/CENPK/ITGB3BP	
R-HSA-69618	Mitotic Spindle Checkpoint	2.40E-14	CENPF/CDC20/KIF2C/BUB1/BIRC5/BUB1B/PLK1/ KNTC1/ZWINT/KNL1/CENPE/CDCA8/NDC80/ SPC24/NUF2/SGO2/CENPO/CENPM/AURKB/ CENPK/UBE2C/ITGB3BP	22
R-HSA-2555396	Mitotic Metaphase and Anaphase	1.24E-13	CENPF/CDC20/TUBA1B/KIF2C/LMNB1/BUB1/ BIRC5/BUB1B/PLK1/KNTC1/ZWINT/KNL1/ PTTG1/CDCA5/CENPE/CDCA8/NDC80/SPC24/NUF 2/ FBXO5/SGO2/CENPO/CENPM/AURKB/CENPK/ UBE2C/ITGB3BP	27
R-HSA-2467813	Separation of Sister Chromatids	1.73E-12	CENPF/CDC20/TUBA1B/KIF2C/BUB1/BIRC5/ BUB1B/PLK1/KNTC1/ZWINT/KNL1/PTTG1/CDCA5 / CENPE/CDCA8/NDC80/SPC24/NUF2/SGO2/CENPO/ CENPM/AURKB/CENPK/UBE2C/ITGB3BP	25
R-HSA-194315	Signaling by Rho GTPases	9.28E-11	CENPF/IQGAP3/CDC20/TUBA1B/KIF2C/CIT/BUB1/ BIRC5/ARHGAP11A/BUB1B/PLK1/KNTC1/ZWINT/ KNL1/CENPE/RACGAP1/DIAPH3/KIF14/CDCA8/ NDC80/NET1/DEPDC1B/SPC24/NUF2/SGO2/ CENPO/CENPM/CDC25C/AURKB/ARHGAP11B/ WIPF3/CENPK/NOXA1/ITGB3BP	34
R-HSA-2514853	Condensation of Prometaphase Chromosomes	1.50E-08	NCAPG/CDK1/CCNB1/SMC4/NCAPD2/SMC2/NCAP H	7
R-HSA-983189	Kinesins	2.48E-08	TUBA1B/KIF2C/KIFC1/KIF4A/KIF18B/KIF23/ KIF20A/KIF22/CENPE/RACGAP1/KIF15/KIF11	12
R-HSA-156711	Polo-like kinase mediated events	4.17E-07	CENPF/MYBL2/CCNB1/PLK1/FOXM1/CDC25C/LIN 9	7
R-HSA-453276	Regulation of mitotic cell cycle	2.57E-05	CDC20/CDK1/BUB1B/CCNB1/PLK1/CCNA2/ PTTG1/NEK2/FBXO5/AURKB/UBE2C	11
R-HSA-453279	Mitotic G1-G1/S phases	3.78E-05	TOP2A/MYBL2/TK1/MCM7/CDK1/CCNB1/CCNA2/ POLA1/TYMS/FBXO5/E2F2/MCM8/CDKN2D/LIN9	14
R-HSA-453274	Mitotic G2-G2/M phases	4.22E-05	CENPF/MYBL2/TUBA1B/TPX2/CDK1/CCNB1/PLK1 / CCNA2/GTSE1/HMMR/FOXM1/NEK2/PLK4/ CDC25C/MZT2B/LIN9	16
R-HSA-69273	Cyclin A/B1/B2 associated events during G2/M transition	0.000186	CDK1/CCNB1/PLK1/CCNA2/FOXM1/CDC25C	6
R-HSA-8856688	Golgi-to-ER retrograde transport	0.000214	TUBA1B/KIF2C/KIFC1/KIF4A/KIF18B/KIF23/ KIF20A/KIF22/CENPE/RACGAP1/KIF15/KIF11	12
R-HSA-5693538	Homology Directed Repair	0.000214	NSD2/FEN1/CCNA2/RBBP8/POLQ/CLSPN/EXO1/	12

			RFC3/BRIP1/EME1/RFC5/RAD51AP1	
R-HSA-69481	G2/M Checkpoints	0.000305	NSD2/MCM7/CDK1/CCNB1/RBBP8/GTSE1/ CLSPN/EXO1/RFC3/BRIP1/CDC25C/RFC5/MCM8	13
R-HSA-539107	Activation of E2F1 target genes at G1/S	0.000305	TK1/CDK1/POLA1/TYMS/FBXO5/LIN9	6
R-HSA-73886	Chromosome Maintenance	0.000479	FEN1/HJURP/KNL1/POLA1/RFC3/CENPO/ CENPM/CENPK/RFC5/ITGB3BP	10
R-HSA-983231	Factors involved in megakaryocyte development and platelet production	0.000534	TUBA1B/KIF2C/KIFC1/KIF4A/KIF18B/KIF23/ KIF20A/KIF22/CENPE/RACGAP1/KIF15/KIF11	12
R-HSA-1474228	Degradation of the extracellular matrix	0.000618	COL6A3/FN1/NID1/ADAMTS1/COL10A1/FBN1/ COL4A4/MMP10/LAMC2/COL12A1/COL13A1	11
R-HSA-2132295	MHC class II antigen presentation	0.001505	TUBA1B/KIF2C/KIF4A/KIF23/KIF20A/KIF22/ CENPE/RACGAP1/KIF15/KIF11	10
R-HSA-69306	DNA Replication	0.002606	MCM7/FEN1/CCNA2/POLA1/RFC3/GINS2/ E2F2/RFC5/UBE2C/MCM8	10
R-HSA-1362300	Transcription of E2F targets under negative control	0.002902	MYBL2/CDK1/CCNA2/LIN9	4
R-HSA-69206	G1/S Transition	0.003435	TK1/MCM7/CDK1/CCNB1/CCNA2/POLA1/ TYMS/FBXO5/MCM8/LIN9	10
R-HSA-6804756	Regulation of TP53 Activity through Phosphorylation	0.005212	TPX2/CCNA2/RBBP8/EXO1/RFC3/BRIP1/ AURKB/RFC5	8
R-HSA-8957275	Post-translational protein phosphorylation	0.005455	FN1/CYR61/FSTL1/IGFBP5/FBN1/CDH2/ MFGE8/EVA1A	8
R-HSA-1442490	Collagen degradation	0.010153	COL6A3/COL10A1/COL4A4/MMP10/ COL12A1/COL13A1	6
R-HSA-4615885	SUMOylation of DNA replication proteins	0.013426	TOP2A/BIRC5/CDCA8/AURKB/NUP35	5
R-HSA-6791312	TP53 Regulates Transcription of Cell Cycle Genes	0.019403	CDK1/CCNB1/CCNA2/E2F8/CDC25C	5
R-HSA-216083	Integrin cell surface interactions	0.024949	COL6A3/FN1/COL10A1/FBN1/COL4A4/COL13A1	6
R-HSA-2028269	Signaling by Hippo	0.041454	WWTR1/WWC1/AMOTL2	3

Tables S6. GO, KEGG, and Reactome analysis of DEGs in M2c(GPPF/pIL10) macrophage compared with M0 macrophages

Biological processes analysis of up-regulated DEGs in M2c(GPPF/pIL10) macrophage (similarly described enrichment were excluded)

GOID	Description	Padj	GeneName	Count
GO:0090023	positive regulation of neutrophil chemotaxis	2.32E-10	CXCL1/CXCL3/CXCL2/CXCL8/CXCL5/ PPBP/CXCL6/RIPOR2	8
GO:0071624	positive regulation of granulocyte chemotaxis	2.32E-10	CXCL1/CXCL3/CXCL2/CXCL8/CXCL5/ PPBP/CXCL6/RIPOR2	8
GO:0002690	positive regulation of leukocyte chemotaxis	2.38E-10	CXCL1/CXCL3/CXCL2/CCL4/CXCL8/ CXCL5/PPBP/IL6/CXCL6/RIPOR2	10
GO:0032103	positive regulation of response to external stimulus	2.11E-09	CXCL1/CXCL3/PTGS2/CXCL2/CCL4/ CXCL8/CXCL5/IL33/PPBP/IL6/GBP5/ CXCL6/RIPOR2	13
GO:0030335	positive regulation of cell migration	8.38E-09	CXCL1/CXCL3/PTGS2/CXCL2/SOD2/ CCL4/CXCL8/CXCL5/TNFAIP6/PPBP/ IL6/CXCL6/RIPOR2/CD274/COL1A1	15
GO:0070098	chemokine-mediated signaling pathway	1.32E-08	CXCL1/CXCL3/CXCL2/CCL4/CXCL8/ CXCL5/PPBP/CXCL6	8
GO:0032496	response to lipopolysaccharide	1.02E-07	CXCL1/CXCL3/PTGS2/CXCL2/CXCL8/ CXCL5/CMPK2/PPBP/IL6/CSF3/CXCL6/ CD274	12
GO:0051607	defense response to virus	2.23E-07	IFIT1/RSAD2/IFIT3/IFI44L/GBP1/IL33/ IFIT2/AIM2/IL6/OASL	10
GO:0009617	response to bacterium	6.09E-07	CXCL1/CXCL3/PTGS2/CXCL2/CXCL8/ CXCL5/CMPK2/HIST2H2BE/PPBP/IL6/ CSF3/CXCL6/CD274	13
GO:0060337	type I interferon signaling pathway	1.76E-05	IFIT1/IFI27/RSAD2/IFIT3/IFIT2/OASL	6
GO:0009306	protein secretion	0.000624	RSAD2/MARCKS/IL1R2/GBP1/IL33/ AIM2/IL6/GBP5/CD274/TNFSF13B	10
GO:0050727	regulation of inflammatory response	0.000798	PTGS2/SERPING1/CCL4/IL1R2/TNFAIP6 / IL33/IL6/GBP5	8
GO:0002830	positive regulation of type 2 immune response	0.000957	RSAD2/IL33/IL6	3
GO:0002697	regulation of immune effector process	0.00097	IFIT1/RSAD2/SERPING1/IL33/AIM2/IL6/ SERPINB4/CD226	8
GO:0050729	positive regulation of inflammatory response	0.001636	PTGS2/CCL4/IL33/IL6/GBP5	5
GO:0050663	cytokine secretion	0.00175	IL1R2/GBP1/IL33/AIM2/GBP5/CD274	6
GO:0002819	regulation of adaptive immune response	0.003165	RSAD2/IL33/IL6/CD226/TNFSF13B	5
GO:1903901	negative regulation of viral life cycle	0.004608	IFIT1/RSAD2/OASL/CCNK	4
GO:0031348	negative regulation of defense response	0.009028	IFIT1/SERPING1/IL1R2/TNFAIP6/ SERPINB4	5
GO:0002698	negative regulation of immune effector process	0.010593	IFIT1/SERPING1/IL33/SERPINB4	4
GO:0002683	negative regulation of immune system process	0.012769	IFIT1/SERPING1/GBP1/IL33/SERPINB4/ RIPOR2/CD274	7

GO:0050701	interleukin-1 secretion	0.013357	IL1R2/AIM2/GBP5	3
GO:0034612	response to tumor necrosis factor	0.013892	PTGS2/CCL4/CXCL8/AIM2/COL1A1/ TNFSF13B	6
GO:0002706	regulation of lymphocyte mediated immunity	0.014981	RSAD2/IL6/SERPINB4/CD226	4
GO:0002228	natural killer cell mediated immunity	0.016842	SLAMF7/SERPINB4/CD226	3
GO:0001818	negative regulation of cytokine production	0.033654	IL1R2/GBP1/IL33/IL6/CD274	5
GO:0006959	humoral immune response	0.036765	SERPING1/HIST2H2BE/IL6/CXCL6	4
GO:0035455	response to interferon-alpha	0.038076	IFIT3/IFIT2	2
GO:0048661	positive regulation of smooth muscle cell proliferation	0.040241	NAMPT/PTGS2/IL6	3
GO:0071346	cellular response to interferon-gamma	0.041721	CCL4/GBP1/OASL/GBP5	4
GO:0045088	regulation of innate immune response	0.04219	RSAD2/SERPING1/AIM2/GBP5/ SERPINB4/CD226	6
GO:0042102	positive regulation of T cell proliferation	0.04219	IL6/CD274/TNFSF13B	3

Biological processes analysis of down-regulated DEGs in M2c(GPPF/pIL10) macrophage (similarly described enrichment were excluded)

GOID	Description	Padj	GeneName	Count
GO:0007059	chromosome segregation	3.07E-23	MKI67/CENPF/TOP2A/CDC20/BUB1/CCNB1/ KIFC1/BIRC5/BUB1B/KIF2C/KIF4A/NCAPG/ FANCD2/PLK1/KIF18B/PTTG1/KIF23/SPAG5/ CENPE/HJURP/TRIP13/KNL1/NUF2/KIF11/ DLGAP5/CDCA8/NDC80/NEK2/RACGAP1/ SKA3/FAM83D/SPC24/KIF18A/UBE2C/ CENPW/CENPM	36
GO:0098813	nuclear chromosome segregation	3.35E-20	CENPF/TOP2A/CDC20/BUB1/CCNB1/KIFC1/ BIRC5/BUB1B/KIF2C/KIF4A/NCAPG/FANCD2/ PLK1/KIF18B/PTTG1/KIF23/SPAG5/CENPE/ TRIP13/KNL1/NUF2/DLGAP5/CDCA8/NDC80/ NEK2/RACGAP1/FAM83D/SPC24/KIF18A/ UBE2C/CENPM	31
GO:0000280	nuclear division	3.99E-20	MKI67/CENPF/TOP2A/CDC20/MYBL2/ASPM/ ANLN/BUB1/TPX2/CCNB1/KIFC1/BIRC5/ BUB1B/KIF2C/KIF4A/NCAPG/FANCD2/ PLK1/KIF18B/PTTG1/KIF23/SPAG5/CENPE/ TRIP13/NUF2/KIF11/DLGAP5/CDCA8/NDC80/ NEK2/RACGAP1/CDC25C/KIF18A/UBE2C	34
GO:0007052	mitotic spindle organization	2.90E-13	CDC20/MYBL2/STMN1/TPX2/CCNB1/KIFC1/ BIRC5/KIF4A/PLK1/KIF23/CENPE/NUF2/ KIF11/NDC80/GPSM2/NEK2/RACGAP1	17
GO:0007051	spindle organization	3.99E-12	CDC20/MYBL2/STMN1/ASPM/TPX2/CCNB1/	19

			KIFC1/BIRC5/KIF4A/PLK1/KIF23/SPAG5/CENPE/ NUF2/KIF11/NDC80/GPSM2/NEK2/RACGAP1	
GO:0051310	metaphase plate congression	1.07E-09	CENPF/CCNB1/KIFC1/KIF2C/SPAG5/CENPE/ NUF2/CDCA8/NDC80/FAM83D/KIF18A	11
GO:0008608	attachment of spindle microtubules to kinetochore	2.88E-09	CCNB1/KIF2C/SPAG5/CENPE/KNL1/NUF2/ NDC80/NEK2/RACGAP1	9
GO:0044784	metaphase/anaphase transition of cell cycle	6.24E-09	CENPF/BUB1/CCNB1/BUB1B/PLK1/CENPE/ TRIP13/DLGAP5/NDC80/UBE2C	10
GO:0051985	negative regulation of chromosome segregation	2.37E-07	CENPF/BUB1/CCNB1/BUB1B/PLK1/PTTG1/ TRIP13/NDC80	8
GO:1902100	negative regulation of metaphase/anaphase transition of cell cycle	1.43E-06	CENPF/BUB1/CCNB1/BUB1B/PLK1/TRIP13/ NDC80	7
GO:0051321	meiotic cell cycle	1.98E-06	TOP2A/CDC20/ASPM/BUB1/BUB1B/CDK1/ FANCD2/PLK1/PTTG1/TRIP13/NUF2/RBBP8/ NEK2/KIF18A	14
GO:0031577	spindle checkpoint	2.14E-06	CENPF/BUB1/CCNB1/BUB1B/PLK1/TRIP13/ NDC80	7
GO:0051784	negative regulation of nuclear division	2.87E-06	CENPF/BUB1/CCNB1/BUB1B/PLK1/PTTG1/ TRIP13/NDC80	8
GO:0006890	retrograde vesicle-mediated transport, Golgi to ER	6.61E-05	KIF2C/KIF4A/KIF23/CENPE/KIF11/ RACGAP1/KIF15/KIF18A	8
GO:0051383	kinetochore organization	7.22E-05	CENPF/CENPE/NUF2/NDC80/CENPW	5
GO:0000075	cell cycle checkpoint	8.78E-05	CENPF/TOP2A/BUB1/CCNB1/BUB1B/CDK1/ GTSE1/PLK1/TRIP13/RBBP8/NDC80/CDC25C	12
GO:0044839	cell cycle G2/M phase transition	8.78E-05	CENPF/CIT/TPX2/CCNB1/CDK1/HMMR/GTSE1/ PLK1/CCNA2/FOXM1/NEK2/CDC25C/CCNB2	13
GO:0002495	antigen processing and presentation of peptide antigen via MHC class II	0.000168	KIF2C/KIF4A/KIF23/CENPE/KIF11/ RACGAP1/KIF15/KIF18A	8
GO:0010948	negative regulation of cell cycle process	0.000633	CENPF/BUB1/CCNB1/BUB1B/CDK1/GTSE1/ PLK1/PTTG1/TRIP13/RBBP8/NDC80/NEK2/ CDC25C	13
GO:0000910	cytokinesis	0.000821	STMN1/ANLN/CIT/KIF4A/KIF20A/PLK1/ KIF23/CEP55/RACGAP1	9
GO:0045787	positive regulation of cell cycle	0.001162	CIT/CCNB1/CDK1/GTSE1/KIF23/SPAG5/ DLGAP5/NDC80/GPSM2/RACGAP1/ FAM83D/CDC25C/UBE2C	13
GO:0045930	negative regulation of mitotic cell cycle	0.001162	CENPF/TOP2A/BUB1/CCNB1/BUB1B/CDK1/ GTSE1/PLK1/PTTG1/TRIP13/NDC80/CDC25C	12
GO:0006323	DNA packaging	0.001657	TOP2A/CCNB1/NCAPG2/CDK1/NCAPG/ HJURP/KNL1/CENPW/CENPM	9
GO:0044843	cell cycle G1/S phase transition	0.001911	IQGAP3/CCNB1/CDK1/GTSE1/CCNA2/	11

			RBBP8/CDKN3/FAM83D/CDC25C/TYMS/MCM8	
GO:1901988	negative regulation of cell cycle phase transition	0.003198	CENPF/BUB1/CCNB1/BUB1B/CDK1/GTSE1/PLK1/TRIP13/NDC80/CDC25C	10
GO:1901989	positive regulation of cell cycle phase transition	0.003266	CCNB1/CDK1/DLGAP5/FAM83D/CDC25C/UBE2C	6
GO:0033627	cell adhesion mediated by integrin	0.004507	PODXL/PLAU/SERPINE1/ITGA11/FBN1	5
GO:0061641	CENP-A containing chromatin organization	0.011702	HJURP/KNL1/CENPW/CENPM	4
GO:0031589	cell-substrate adhesion	0.013181	PLAU/SERPINE1/SPOCK1/NID1/CYR61/ANTXR1/GAS6/GREM1/ITGA11/EMP2	10
GO:1903010	regulation of bone development	0.020109	SIGLEC15/GREM1/FBN1	3
GO:0031570	DNA integrity checkpoint	0.023878	TOP2A/CCNB1/CDK1/GTSE1/PLK1/RBBP8/CDC25C	7
GO:0034724	DNA replication-independent nucleosome organization	0.024052	HJURP/KNL1/CENPW/CENPM	4
GO:0032467	positive regulation of cytokinesis	0.030224	CIT/KIF23/RACGAP1	3
GO:0070192	chromosome organization involved in meiotic cell cycle	0.043048	BUB1/BUB1B/FANCD2/TRIP13	4
GO:0072604	interleukin-6 secretion	0.043751	NOS2/F2R/GAS6	3

KEGG analysis of up-regulated DEGs in M2c(GPPF/pIL10) macrophage

KEGGID	Description	Padj	GeneName	Count
hsa04060	Cytokine-cytokine receptor interaction	8.10E-11	CXCL1/CXCL3/CXCL2/CCL4/IL1R2/CXCL8/CXCL5/IL33/PPBP/IL6/CSF3/IL36B/CXCL6/TNFSF13B	14
hsa04061	Viral protein interaction with cytokine and cytokine receptor	3.90E-09	CXCL1/CXCL3/CXCL2/CCL4/CXCL8/CXCL5/PPBP/IL6/CXCL6	9
hsa05146	Amoebiasis	1.67E-08	CXCL1/CXCL3/AC106865.1/CXCL2/IL1R2/CXCL8/IL6/SERPINB4/COL1A1	9
hsa05323	Rheumatoid arthritis	1.22E-07	CXCL1/CXCL3/AC106865.1/CXCL2/CXCL8/CXCL5/IL6/TNFSF13B	8
hsa04657	IL-17 signaling pathway	1.51E-07	CXCL1/CXCL3/PTGS2/CXCL2/CXCL8/CXCL5/IL6/CSF3	8
hsa04621	NOD-like receptor signaling pathway	1.51E-07	TXNIP/CXCL1/CXCL3/NAMPT/CXCL2/CXCL8/GBP1/AIM2/IL6/GBP5	10
hsa05134	Legionellosis	5.89E-06	CXCL1/CXCL3/AC106865.1/CXCL2/CXCL8/HSPA6/IL6	7
hsa04064	NF-kappa B signaling pathway	6.61E-06	CXCL1/CXCL3/PTGS2/CXCL2/CCL4/CXCL8/TNFSF13B	7
hsa04062	Chemokine signaling pathway	2.89E-05	CXCL1/CXCL3/CXCL2/CCL4/CXCL8/CXCL5/PPBP/CXCL6	8
hsa05417	Lipid and atherosclerosis	0.000101	CXCL1/CXCL3/AC106865.1/CXCL2/SOD2/CXCL8/HSPA6/IL6	8

hsa04668	TNF signaling pathway	0.000234	CXCL1/CXCL3/PTGS2/CXCL2/CXCL5/IL6	6
hsa05144	Malaria	0.000352	AC106865.1/CXCL8/IL6/CSF3	4
hsa04936	Alcoholic liver disease	0.002092	CXCL1/CXCL3/CXCL2/CXCL8/IL6	5
hsa04623	Cytosolic DNA-sensing pathway	0.002092	CCL4/IL33/AIM2/IL6	4
hsa05133	Pertussis	0.002789	SERPING1/CXCL8/CXCL5/IL6	4
hsa05167	Kaposi sarcoma-associated herpesvirus infection	0.00288	CXCL1/CXCL3/PTGS2/CXCL2/CXCL8/IL6	6
hsa05120	Epithelial cell signaling in Helicobacter pylori infection	0.003712	CXCL1/CXCL3/CXCL2/CXCL8	4
hsa04620	Toll-like receptor signaling pathway	0.00589	AC106865.1/CCL4/CXCL8/IL6	4
hsa04640	Hematopoietic cell lineage	0.035132	IL1R2/IL6/CSF3	3
hsa05235	PD-L1 expression and PD-1 checkpoint pathway in cancer	0.049414	AC106865.1/BATF2/CD274	3

KEGG analysis of down-regulated DEGs in M2c(GPPF/pIL10) macrophage

KEGGID	Description	Padj	GeneName	Count
hsa04110	Cell cycle	7.15E-08	CDC20/BUB1/CCNB1/BUB1B/CDK1/PLK1/PTTG1/CCNA2/TRIP13/KNL1/NDC80/DDX12P/CDC25C/CCNB2	14
hsa04814	Motor proteins	0.000216	KIFC1/KIF2C/KIF4A/KIF20A/KIF18B/KIF23/CENPE/KIF11/MYO1D/KIF15/KIF18A	11
hsa04914	Progesterone-mediated oocyte maturation	0.000216	BUB1/CCNB1/CDK1/PLK1/CCNA2/ADCY1/CDC25C/CCNB2	8
hsa04114	Oocyte meiosis	0.00023	CDC20/BUB1/CCNB1/CDK1/PLK1/PTTG1/ADCY1/CDC25C/CCNB2	9
hsa04218	Cellular senescence	0.00461	MYBL2/SERPINE1/TGFBR1/CCNB1/CDK1/CCNA2/FOXMI/CCNB2	8
hsa04115	p53 signaling pathway	0.01065	SERPINE1/CCNB1/CDK1/GTSE1/CCNB2	5
hsa04512	ECM-receptor interaction	0.019855	COL6A3/HMMR/COL4A4/ITGA11/LAMC2	5

Reactome analysis of up-regulated DEGs in M2c(GPPF/pIL10) macrophage

ReactomeID	Description	padj	geneName	Count
R-HSA-6783783	Interleukin-10 signaling	1.84E-08	CXCL1/PTGS2/CXCL2/CCL4/IL1R2/CXCL8/IL6/CSF3	8
R-HSA-380108	Chemokine receptors bind chemokines	7.23E-08	CXCL1/CXCL3/CXCL2/CXCL8/CXCL5/PPBP/CXCL6	7
R-HSA-909733	Interferon alpha/beta signaling	2.05E-05	IFIT1/IFI27/RSAD2/IFIT3/IFIT2/OASL	6
R-HSA-449147	Signaling by Interleukins	5.53E-05	CXCL1/PTGS2/CXCL2/SOD2/CCL4/IL1R2/CXCL8/SERPINB2/IL33/IL6/CSF3/IL36B	12
R-HSA-913531	Interferon Signaling	0.000102	IFIT1/IFI27/RSAD2/IFIT3/GBP1/IFIT2/OASL/GBP5	8
R-HSA-375276	Peptide ligand-binding receptors	0.000141	CXCL1/CXCL3/CXCL2/CXCL8/CXCL5/PPBP/CXCL6	7

R-HSA-418594	G alpha (i) signalling events	0.00431	CXCL1/CXCL3/CXCL2/CCL4/CXCL8/ CXCL5/PPBP/CXCL6	8
R-HSA-373076	Class A/1 (Rhodopsin-like receptors)	0.00431	CXCL1/CXCL3/CXCL2/CXCL8/CXCL5/ PPBP/CXCL6	7
R-HSA-500792	GPCR ligand binding	0.028753	CXCL1/CXCL3/CXCL2/CXCL8/CXCL5/ PPBP/CXCL6	7
R-HSA-198933	Immunoregulatory interactions between a Lymphoid and a non- Lymphoid cell	0.042766	SLAMF7/PILRA/CD226/COL1A1	4

Reactome analysis of down-regulated DEGs in M2c(GPPF/pIL10) macrophage.

ReactomeID	Description	Padj	GeneName	Count
R-HSA-2500257	Resolution of Sister Chromatid Cohesion	1.84E-12	CENPF/CDC20/BUB1/CCNB1/BIRC5/BUB1B/ KIF2C/CDK1/PLK1/CENPE/KNL1/NUF2/ CDCA8/NDC80/SPC24/KIF18A/CCNB2/CENPM	18
R-HSA-69620	Cell Cycle Checkpoints	3.15E-12	CENPF/CDC20/BUB1/CCNB1/BIRC5/BUB1B/ KIF2C/CDK1/GTSE1/PLK1/CCNA2/CENPE/KNL1/ NUF2/RBBP8/CDCA8/NDC80/SPC24/CDC25C/ KIF18A/CCNB2/MCM8/UBE2C/CENPM	24
R-HSA-68877	Mitotic Prometaphase	1.84E-11	CENPF/CDC20/BUB1/CCNB1/BIRC5/BUB1B/KIF2C/ CDK1/NCAPG/PLK1/CENPE/KNL1/NUF2/CDCA8/ NDC80/NEK2/SPC24/KIF18A/CCNB2/CENPM	20
R-HSA-69618	Mitotic Spindle Checkpoint	1.87E-11	CENPF/CDC20/BUB1/BIRC5/BUB1B/KIF2C/PLK1/ CENPE/KNL1/NUF2/CDCA8/NDC80/SPC24/ KIF18A/UBE2C/CENPM	16
R-HSA-68886	M Phase	7.54E-11	CENPF/CDC20/BUB1/CCNB1/NCAPG2/BIRC5/ BUB1B/KIF2C/CDK1/KIF20A/NCAPG/PLK1/ PTTG1/KIF23/CENPE/KNL1/NUF2/CDCA8/NDC80/ NEK2/SPC24/KIF18A/CCNB2/UBE2C/CENPM	25
R-HSA-194315	Signaling by Rho GTPases	5.84E-10	CENPF/IQGAP3/CDC20/CIT/BUB1/BIRC5/BUB1B/ KIF2C/PLK1/ARHGAP11A/CENPE/KNL1/NUF2/ CDCA8/NDC80/DIAPH3/RACGAP1/WIPF3/ DEPDC1B/SPC24/CDC25C/ARHGAP11B/KIF18A/ ARHGAP33/CENPM	25
R-HSA-983189	Kinesins	1.03E-09	KIFC1/KIF2C/KIF4A/KIF20A/KIF18B/KIF23/ CENPE/KIF11/RACGAP1/KIF15/KIF18A	11
R-HSA-2467813	Separation of Sister Chromatids	2.13E-09	CENPF/CDC20/BUB1/BIRC5/BUB1B/KIF2C/ PLK1/PTTG1/CENPE/KNL1/NUF2/CDCA8/ NDC80/SPC24/KIF18A/UBE2C/CENPM	17
R-HSA-2555396	Mitotic Metaphase and Anaphase	4.49E-09	CENPF/CDC20/BUB1/BIRC5/BUB1B/KIF2C/ PLK1/PTTG1/CENPE/KNL1/NUF2/CDCA8/ NDC80/SPC24/KIF18A/UBE2C/CENPM	17
R-HSA-156711	Polo-like kinase mediated	7.35E-09	CENPF/MYBL2/CCNB1/PLK1/FOXMI1/	7

	events		CDC25C/CCNB2	
R-HSA-69273	Cyclin A/B1/B2 associated events during G2/M transition	2.64E-07	CCNB1/CDK1/PLK1/CCNA2/FOXM1/ CDC25C/CCNB2	7
R-HSA-8856688	Golgi-to-ER retrograde transport	6.05E-06	KIFC1/KIF2C/KIF4A/KIF20A/KIF18B/KIF23/ CENPE/KIF11/RACGAP1/KIF15/KIF18A	11
R-HSA-453274	Mitotic G2-G2/M phases	8.44E-06	CENPF/MYBL2/TPX2/CCNB1/CDK1/HMMR/ GTSE1/PLK1/CCNA2/FOXM1/NEK2/CDC25C/CCNB 2	13
R-HSA-453276	Regulation of mitotic cell cycle	1.02E-05	CDC20/CCNB1/BUB1B/CDK1/PLK1/PTTG1/ CCNA2/NEK2/UBE2C	9
R-HSA-983231	Factors involved in megakaryocyte development and platelet production	1.37E-05	KIFC1/KIF2C/KIF4A/KIF20A/KIF18B/KIF23/ CENPE/KIF11/RACGAP1/KIF15/KIF18A	11
R-HSA-2514853	Condensation of Prometaphase Chromosomes	8.02E-05	CCNB1/CDK1/NCAPG/CCNB2	4
R-HSA-2132295	MHC class II antigen presentation	0.000112	KIF2C/KIF4A/KIF20A/KIF23/CENPE/KIF11/ RACGAP1/KIF15/KIF18A	9
R-HSA-1474228	Degradation of the extracellular matrix	0.000236	COL6A3/NID1/ADAMTS1/COL10A1/COL4A4/ MMP10/FBN1/LAMC2/COL12A1	9
R-HSA-453279	Mitotic G1-G1/S phases	0.003326	TOP2A/MYBL2/TK1/CCNB1/CDK1/CCNA2/ TYMS/MCM8	8
R-HSA-1442490	Collagen degradation	0.006515	COL6A3/COL10A1/COL4A4/MMP10/COL12A1	5
R-HSA-1362300	Transcription of E2F targets under negative control	0.006617	MYBL2/CDK1/CCNA2	3
R-HSA-8957275	Post-translational protein phosphorylation	0.007134	CYR61/FSTL1/IGFBP5/GAS6/MFGE8/FBN1	6
R-HSA-174184	Cdc20:Phospho-APC/C mediated degradation of Cyclin A	0.010863	CDC20/BUB1B/CDK1/CCNA2/UBE2C	5
R-HSA-8852276	The role of GTSE1 in G2/M progression after G2 checkpoint	0.012577	CCNB1/CDK1/GTSE1/PLK1/CCNB2	5
R-HSA-216083	Integrin cell surface interactions	0.014434	COL6A3/COL10A1/COL4A4/ITGA11/FBN1	5
R-HSA-6791312	TP53 Regulates Transcription of Cell Cycle Genes	0.015812	CCNB1/CDK1/CCNA2/CDC25C	4
R-HSA-69481	G2/M Checkpoints	0.016628	CCNB1/CDK1/GTSE1/RBBP8/CDC25C/ CCNB2/MCM8	7
R-HSA-2565942	Regulation of PLK1	0.023579	CCNB1/CDK1/PLK1/NEK2/CCNB2	5

	Activity at G2/M Transition			
R-HSA-539107	Activation of E2F1 target genes at G1/S	0.024546	TK1/CDK1/TYMS	3
R-HSA-69206	G1/S Transition	0.026096	TK1/CCNB1/CDK1/CCNA2/TYMS/MCM8	6
R-HSA-3000157	Laminin interactions	0.026277	NID1/COL4A4/LAMC2	3
R-HSA-2465910	MASTL Facilitates Mitotic Progression	0.03056	CCNB1/CDK1	2
R-HSA-75205	Dissolution of Fibrin Clot	0.034982	PLAU/SERPINE1	2

Tables S7. The (non)common DEGs of M2a(GPPF/pIL4) and M2c(GPPF/pIL10) macrophages when compared with M0 macrophages.

Co-expressed up-regulated genes: 49

TXNIP	TDO2	PINLYP	ADAMDEC1	IFIT1	IFI27	RSAD2	CXCL1
MMP19	IFI44L	CXCL8	CXCL3	AC106865.1	IFIT3	HSPA6	SERPING1
NAMPT	SLAMF7	SLC7A11	MARCKS	CXCL2	PTGS2	OTOF	ARRDC4
IL1R2	IFIT2	GBP1	CMPK2	TNFAIP6	HIST2H2BE	OASL	AIM2
IL33	PILRA	ANGPTL4	AL592429.1	GBP5	COL1A1	BATF2	PPBP
SLC43A2	AC245128.3	SERPINB4	CD274	GPAT3	TNFSF13B	IL6R-AS1	IL6
AC004988.1							

Co-expressed down-regulated genes: 138

COL6A3	PODXL	MKI67	CENPF	PLAU	IQGAP3	TOP2A	TGFB1
GNLY	MYBL2	CDC20	ASPM	ANLN	NID1	STMN1	TK1
NCAPG2	KIRREL1	ADAMTS1	SPOCK1	NCAPG	PTPN14	KIF2C	GPR88
TPX2	CIT	SHCBP1	BUB1	KIFC1	SIGLEC15	CDK1	BIRC5
TGFBR1	ARHGAP11A	BUB1B	CCNB1	SORL1	SORT1	COL10A1	KIF4A
CYR61	FSTL1	F2R	PLK1	ANTXR1	KIF18B	HJURP	KIF23
CCNA2	KNL1	PTTG1	SERPINA9	RBBP8	POLQ	SHROOM2	SPAG5
GTSE1	IGFBP5	FANCD2	MARCO	DLGAP5	HMMR	AOX1	CEP55
KIF20A	CHTF18	ALOX5AP	SLC4A4	ANOS1	CENPE	FOXO1	RACGAP1
PHGDH	SKA3	DIAPH3	CDCA8	EHF	NDC80	KIF15	PBK
DEPDC1B	SRPX	ADCY1	KCNMB1	TYMS	NOS2	CDCA2	GPSM2
KIF11	SORCS2	CX3CR1	TRIP13	DHCR7	SPC24	NUF2	PNOC
NEK2	FBN1	GGH	PLD4	ILDR2	RITN	MEGF6	COL4A4
NTM	TCEA1P2	PYROXD2	GREM1	CEP128	RCCD1	MMP10	WWC3
ROBO4	CENPM	TRAC	DDAH1	CDC25C	MBOAT2	GPAM	C1orf112
MFGE8	AC091182.1	MYO1D	AC091057.1	LAMC2	WIPF3	TM4SF19-AS1	FAM83D
COL12A1	CDKN3	SNX7	TMTC2	UBE2C	LINC01605	EMP2	DDX12P
MCM8	AC099850.3						

Uniquely expressed up-regulated genes in M2a(GPPF/pIL4):32

MMP7	CYP19A1	MSR1	LUCAT1	IFI44	MX2	ISG15	IL4I1
TYMP	DDX58	IFITM1	CYP27B1	BIRC3	FGL2	NAMPTP1	SGSH
AL513283.1	ETV3L	CACNA1G	ACOD1	SLC7A8	ISG20	AK1	C2
MIR22HG	FTX	RILP	PDE4B	MMP12	TRPM8	AC093627.4	CD300LF

Uniquely expressed up-regulated genes in M2c(GPPF/pIL10):18

SAMD9	SOD2	CCL4	SERPINB2	CXCL5	TP53INP2	CYP26B1	MIR222HG
CD226	CSF3	IL36B	CXCL6	BAALC	RIPOR2	OVCH1	AL513327.1
PCDH17	CCNK						

Uniquely expressed down-regulated genes in M2a(GPPF/pIL4):130

SLC38A1	STC1	NSD2	ATAD2	FN1	NCAPD3	RRM1	TUBA1B
MCM7	FANCI	LMNB1	TACC3	FEN1	STEAP3	KNTC1	ZWINT
DDX11	PLP2	SMC4	CDCA5	MT-CO3	TCF19	NCAPD2	CKAP2L
POLA1	PTPRF	ESCO2	ASF1B	SMC2	PRR11	KIF22	GPR176
FZD1	KIF14	NRP2	XYLT1	PLS3	STIL	NET1	NCAPH
MELK	TMEM106C	CLSPN	HELLS	CDCA7L	TRIB2	MMS22L	EXO1
FAP	PCLAF	PLK4	WDR62	FBXO5	RFC3	WWTR1	TTK
WWC1	GIN52	CIP2A	CYBRD1	RIMS1	GPX8	RAD54L	BRIP1
SGO2	CENPO	PSRC1	FADS2	CDH2	APOBEC3B	GPC6	SORCS1
PPFIA2	E2F8	E2F2	AMOTL2	DEPDC1	VSIG4	EME1	LNX1
TICRR	ETV1	AURKB	DHFRP1	UNC5A	C3orf80	SLC8A1	MYBL1
CENPK	GLRB	C6orf223	RFC5	COL13A1	MZT2B	NMNAT2	TROAP
CES1	MT-TL1	SLC38A5	C12orf75	ID1	NOXA1	PLAT	EVA1A
FHL2	NUP35	TBC1D4	MIR100HG	FMN1	KCNQ3	AC091806.1	DSCC1
ABCC4	FHL1	RAD51AP1	RGPD5	HMGB1P6	SASS6	JPH2	ITGB3BP
CDKN2D	CNN3	SUV39H1	TSPAN15	CDCA3	IQCD	HRH2	NEURL1B
LIN9	NEIL3						

Uniquely expressed down-regulated genes in M2c(GPPF/pIL10):20

SERPINE1	MT2A	BX679664.3	GAS6	PKDCC	PSAT1	PRKCH	TM4SF19
PLB1	ITGA11	KIF18A	CCNB2	ARHGAP33	CLEC5A	TM4SF1	RPL39P3
CSPG4P13	TMEM178A	CENPW	APLNR				

Tables S8. DisGeNET analysis of DEGs in M2(GPPF), M2a(GPPF/pIL4) and M2c(GPPF/pIL10) macrophage compared with M0 macrophages

The disease associated with up-regulated genes in M2(GPPF) macrophage.

DisGeNETID	Description	Padj	GeneName	Count
C0021400	Influenza	8.72E-08	IFI27/RSAD2/IFIT1/IFIT3/MX2/MX1/ SERPING1/IFIT2/CXCL2	9

C1096184	West Nile viral infection	0.005146	RSAD2/MX1/IFIT2	3
C0206750	Coronavirus Infections	0.005146	MX1/CXCL2	2

The disease associated with down-regulated genes in M2(GPPF) macrophage.

DisGeNETID	Description	Padj	GeneName	Count
C0010606	Adenoid Cystic Carcinoma	0.001451	MKI67/CENPF/ASPM/CYR61/TOP2A	5
C0206721	Inverted Papilloma	0.031613	MKI67/STMN1	2
C1855081	MICROCEPHALY, PRIMARY AUTOSOMAL RECESSIVE, 1	0.031613	ASPM/CIT	2
C0175754	Agenesis of corpus callosum	0.031613	CENPF/CIT/TOP2A/BUB1B	4
C0027708	Nephroblastoma	0.035893	PODXL/CYR61/TOP2A/BUB1B	4
C3839280	High grade serous carcinoma	0.035893	STMN1/TOP2A	2
C0206685	Acinar Cell Carcinoma	0.044158	MKI67/CENPF	2
C0025958	Microcephaly	0.044158	CENPF/ASPM/BUB1B	3
C0206728	Plexiform Neurofibroma	0.044158	CYR61/BUB1B	2
C0853879	Invasive carcinoma of breast	0.044158	PTPN14/CYR61/ANTXR1/TOP2A	4

The top20 disease associated with up-regulated genes in M2a(GPPF/pIL4) macrophage.

DisGeNETID	Description	Padj	GeneName	Count
C0021400	Influenza	2.58E-14	IFIT1/IFI27/RSAD2/IFI44L/CXCL8/CXCL3/IFIT3/SERPING1/IFI44/MX2/ISG15/CXCL2/PTGS2/DDX58/IFITM1/IFIT2/GBP1/TNFAIP6/BIRC3/OASL/PPBP/CD274/ISG20/IL6	24
C0035235	Respiratory Syncytial Virus Infections	4.97E-10	IFI27/CXCL1/CXCL8/CXCL3/IFI44/ISG15/CXCL2/PTGS2/DDX58/IL1R2/IFITM1/IFIT2/PPBP/CD274/IL6	15
C3714514	Infection	1.18E-06	CYP19A1/IFIT1/CXCL8/HSPA6/NAMPT/PTGS2/DDX58/IL1R2/IFIT2/BIRC3/IL33/PILRA/COL1A1/CD274/TNFSF13B/IL6	16
C0037274	Dermatologic disorders	1.18E-06	CYP19A1/CXCL1/CXCL8/CXCL3/HSPA6/CXCL2/PTGS2/DDX58/IL1R2/TNFAIP6/IL33/COL1A1/PDE4B/MMP12/IL6	15
C0019158	Hepatitis	1.66E-06	TXNIP/CYP19A1/CXCL8/NAMPT/MARCKS/CXCL2/PTGS2/IL33/FGL2/SERPINB4/CD274/IL6	12
C0021368	Inflammation	1.76E-06	TXNIP/CYP19A1/CXCL1/CXCL8/HSPA6/SERPING1/NAMPT/CXCL2/PTGS2/IL1R2/TNFAIP6/IL33/COL1A1/SERPINB4/TNFSF13B/IL6	16
C0524910	Hepatitis C, Chronic	4.84E-06	MMP7/CXCL1/CXCL8/IFI44/ISG15/PTGS2/DDX58/CYP27B1/OASL/CD274/ISG20/MMP12/IL6	13
C0031099	Periodontitis	1.43E-05	CXCL8/SLAMF7/PTGS2/IL1R2/FGL2/COL1A1/ISG20/TNFSF13B/MMP12/IL6	10
C0022876	Premature Obstetric Labor	7.17E-05	MMP7/MMP19/CXCL8/NAMPT/PTGS2/IL1R2/	10

			FGL2/COL1A1/MMP12/IL6	
C0036202	Sarcoidosis	9.83E-05	ADAMDEC1/CXCL8/IL4I1/PTGS2/CYP27B1/ COL1A1/ISG20/MMP12/IL6	9
C0019159	Hepatitis A	0.000108	CYP19A1/CXCL8/NAMPT/MARCKS/CXCL2/ PTGS2/IL33/FGL2/SERPINB4	9
C0149678	Epstein-Barr Virus Infections	0.000108	CXCL8/PTGS2/GBP1/TNFAIP6/GBP5/CD274/ ISG20/TNFSF13B/IL6	9
C0375023	Respiratory syncytial virus (RSV) infection in conditions classified elsewhere and of unspecified site	0.000114	IFI27/CXCL8/ISG15/CXCL2/PTGS2/DDX58/ OASL/TNFSF13B/IL6	9
C0524909	Hepatitis B, Chronic	0.000123	CXCL8/PTGS2/CYP27B1/OASL/FGL2/ COL1A1/CD274/ISG20/IL6	9
C1527336	Sjogren's Syndrome	0.000123	CYP19A1/IFI27/CXCL1/CXCL8/IL33/PPBP/ CD274/TNFSF13B/IL6	9
C2919032	Infection of amniotic sac and membranes	0.000175	MMP7/MMP19/CXCL8/PTGS2/IL1R2/ COL1A1/MMP12/IL6	8
C0032964	Pregnancy Complications, Hematologic	0.000175	CYP19A1/CXCL8/HSPA6/PTGS2/IL1R2/ COL1A1/IL6	7
C0032285	Pneumonia	0.000175	CXCL1/CXCL8/NAMPT/CXCL2/PTGS2/ IL1R2/BIRC3/IL33/CD274/ISG20/MMP12/IL6	12
C0034069	Pulmonary Fibrosis	0.000175	MMP7/IFI27/MMP19/CXCL8/MSR1/CXCL2/ PTGS2/COL1A1/ISG20/MMP12/IL6	11
C0016059	Fibrosis	0.000175	MMP7/CYP19A1/CXCL8/PTGS2/TYMP/ COL1A1/MMP12/IL6	8

The top20 disease associated with down-regulated genes in M2a(GPPF/pIL4) macrophage.

DisGeNETID	Description	Padj	GeneName	Count
C0679427	myeloblastosis	2.24E-05	TOP2A/MYBL2/RRM1/CCNB1/FOXM1/ UBE2C/PLAT/LIN9	8
C1855081	MICROCEPHALY, PRIMARY AUTOSOMAL RECESSIVE, 1	0.000211	ASPM/CIT/KNL1/STIL/WDR62/SASS6	6
C0025958	Microcephaly	0.000211	CENPF/ASPM/BUB1B/PLK1/DDX11/KNL1/ PHGDH/KIF14/STIL/KIF11/DHCR7/PLK4/ WDR62/LAMC2	14
C0035335	Retinoblastoma	0.000211	MKI67/PLAU/STC1/MYBL2/STMN1/CDK1/ BIRC5/CCNB1/PLK1/RBBP8/ANOS1/FOXM1/ KIF14/TYMS/NOS2/HELLS/EXO1/FAP/ WWTR1/GPC6/CDC25C/CDKN3/UBE2C/ CDKN2D/SUV39H1/LIN9	26
C0431350	Primary microcephaly	0.000505	ASPM/KNL1/STIL/WDR62/RTTN/SASS6	6

C1857679	Sloping forehead	0.000646	CIT/DDX11/CENPE/PHGDH/KIF14/STIL/ KIF11/PLK4	8
C3539878	Triple Negative Breast Neoplasms	0.002387	TOP2A/FN1/CDC20/ASPM/RRM1/FANCI/ CDK1/BIRC5/CYR61/PLK1/SPAG5/PTPRF/ FANCD2/CENPE/FOXM1/FZD1/KIF14/ NRP2/NOS2/NEK2/TTK/KIAA1524/ MFGE8/CENPK/SUV39H1	25
C3711387	Autosomal Recessive Primary Microcephaly	0.00536	ASPM/KNL1/STIL/WDR62/SASS6	5
C0004135	Ataxia Telangiectasia	0.007564	PLAU/TOP2A/FN1/MCM7/CDK1/CCNB1/ CYR61/FSTL1/PLK1/FANCD2/FOXM1/ CLSPN/PCLAF/TTK/CDC25C/LAMC2/ CDKN3/C12orf75/PLAT	19
C0000786	Spontaneous abortion	0.007564	COL6A3/TGFBI/GNLY/FN1/RRM1/TGFBR1/ STEAP3/SPAG5/TYMS/CYBRD1/BRIP1/COL13A1	12
C0376545	Hematologic Neoplasms	0.016655	TOP2A/GNLY/CDC20/STMN1/CDK1/TGFBR1/ BUB1B/FEN1/PLK1/POLA1/FANCD2/PBK/ TYMS/NOS2/KIF11/PLK4/RFC3/KIAA1524/ RFC5/CDKN3/UBE2C	21
C1857130	Hypoplastic mandible condyle	0.016655	CENPF/NSD2/BUB1/TGFBR1/BUB1B/COL10A1/ RBBP8/CENPE/PHGDH/HELLS/DHCR7/PLK4/ FBN1/GPC6/COL13A1	15
C0025990	Micrognathism	0.016655	CENPF/NSD2/BUB1/TGFBR1/BUB1B/COL10A1/ RBBP8/CENPE/PHGDH/HELLS/DHCR7/PLK4/ FBN1/GPC6/COL13A1	15
C0240295	Mandibular hypoplasia	0.016655	CENPF/NSD2/BUB1/TGFBR1/BUB1B/COL10A1/ RBBP8/CENPE/PHGDH/HELLS/DHCR7/PLK4/ FBN1/GPC6/COL13A1	15
C0206716	Ganglioglioma	0.016655	CDK1/CCNB1/CCNA2/CDCA5/PNOC/CDKN2D	6
C0346153	Breast Cancer, Familial	0.016655	BIRC5/TGFBR1/BUB1B/POLQ/FANCD2/CENPE/ CLSPN/TTK/RAD54L/BRIP1	10
C0010606	Adenoid Cystic Carcinoma	0.016867	MKI67/CENPF/TOP2A/FN1/ASPM/CYR61/TYMS/ NOS2/GINS2/KIAA1524/MYBL1/ID1	12
C0266470	Cerebellar Hypoplasia	0.038929	CENPF/BUB1B/RBBP8/CENPE/PHGDH/KIF14/ GPSM2	7
C0007138	Carcinoma, Transitional Cell	0.041343	MKI67/PLAU/TGFBI/FN1/CDC20/STMN1/BIRC5/ TACC3/CCNA2/IGFBP5/CEP55/GGH/KIAA1524 /CDKN3/EMP2/HRH2	16
C0424688	Small head	0.041343	CENPF/NSD2/FANCI/CIT/BUB1/BUB1B/DDX11/ RBBP8/FANCD2/CENPE/PHGDH/KIF14/STIL/ KIF11/DHCR7/PLK4/RTTN	17

The top20 disease associated with up-regulated genes in M2c(GPPF/pIL10) macrophage.

DisGeNETID	Description	Padj	GeneName	Count
C0021400	Influenza	1.56E-10	CXCL3/PTGS2/SAMD9/IFIT1/IFI27/RSAD2/ CXCL2/IFIT3/SERPING1/IFI44L/CXCL8/GBP1/ TNFAIP6/IFIT2/PPBP/IL6/OASL/CSF3/CD274	19
C0035235	Respiratory Syncytial Virus Infections	4.95E-10	CXCL1/CXCL3/PTGS2/IFI27/CXCL2/IL1R2/ CXCL8/CXCL5/IFIT2/PPBP/IL6/CSF3/CXCL6/ CD274	14
C3714514	Infection	6.21E-09	NAMPT/PTGS2/SAMD9/IFIT1/SOD2/IL1R2/ CXCL8/CXCL5/HSPA6/IL33/IFIT2/IL6/PILRA/ CSF3/CD274/COL1A1/TNFSF13B	17
C0021368	Inflammation	1.38E-08	TXNIP/CXCL1/NAMPT/PTGS2/CXCL2/SOD2/ SERPING1/IL1R2/CXCL8/HSPA6/TNFAIP6/ IL33/IL6/SERPINB4/CXCL6/COL1A1/TNFSF13B	17
C0006274	Bronchiolitis, Viral	3.92E-08	CXCL1/CXCL3/PTGS2/CXCL2/IL1R2/CXCL8/ CXCL5/PPBP/IL6/CSF3/CXCL6	11
C0037274	Dermatologic disorders	4.96E-06	CXCL1/CXCL3/PTGS2/SAMD9/CXCL2/SOD2/ IL1R2/CXCL8/HSPA6/TNFAIP6/IL33/IL6/COL1A1	13
C0004626	Pneumonia, Bacterial	6.14E-06	CXCL1/NAMPT/CXCL2/IL6/CSF3	5
C0151526	Premature Birth	1.29E-05	PTGS2/MMP19/SOD2/IL1R2/CXCL8/SERPINB2/ CXCL5/HSPA6/IL6/CSF3/COL1A1	11
C0019158	Hepatitis	1.63E-05	TXNIP/NAMPT/PTGS2/CXCL2/MARCKS/ CXCL8/IL33/IL6/SERPINB4/CD274	10
C0042373	Vascular Diseases	4.18E-05	TXNIP/NAMPT/PTGS2/IFI27/SOD2/CXCL8/ HSPA6/GBP1/IL33/IL6/CSF3	11
C0031154	Peritonitis	5.47E-05	CXCL1/PTGS2/CXCL8/CXCL5/IL33/IL6/CSF3	7
C0023283	Leishmaniasis, Cutaneous	7.12E-05	CXCL3/CXCL8/CXCL5/IL6/COL1A1	5
C0022876	Premature Obstetric Labor	7.79E-05	NAMPT/PTGS2/MMP19/IL1R2/CXCL8/ CXCL5/IL6/CSF3/COL1A1	9
C0020517	Hypersensitivity	0.000104	CXCL1/PTGS2/IL1R2/CXCL5/PPBP/ IL6/CD274	7
C0010278	Craniosynostosis	0.000145	CXCL1/PTGS2/CXCL8/CXCL5/IL6/ CYP26B1/CXCL6	7
C0003872	Arthritis, Psoriatic	0.000153	TXNIP/CXCL1/PTGS2/SOD2/CXCL8/ IL33/IL6/COL1A1	8
C0035126	Reperfusion Injury	0.000153	CXCL1/PTGS2/CXCL2/SOD2/CXCL8/ IL6/CXCL6	7
C0149678	Epstein-Barr Virus Infections	0.000153	PTGS2/CXCL8/GBP1/TNFAIP6/IL6/GBP5/ CD274/TNFSF13B	8
C0032285	Pneumonia	0.000153	CXCL1/NAMPT/PTGS2/CXCL2/IL1R2/ CXCL8/CXCL5/IL33/IL6/CSF3/CD274	11
C1527336	Sjogren's Syndrome	0.000225	CXCL1/IFI27/CXCL8/IL33/PPBP/IL6/ CD274/TNFSF13B	8

The top20 disease associated with down-regulated genes in M2c(GPPF/pIL10) macrophage.

DisGeNETID	Description	Padj	GeneName	Count
C0853879	Invasive carcinoma of breast	0.004629	PLAU/TOP2A/SERPINE1/PTPN14/CYR61/ TGFB1/CDK1/FANCD2/ANTXR1/PLK1/ CCNA2/F2R/GGH/TYMS/CCNB2	15
C0679427	myeloblastosis	0.005985	TOP2A/MYBL2/CCNB1/FOXM1/UBE2C	5
C0019348	Herpes Simplex Infections	0.009826	PLAU/MYBL2/CYR61/NOS2/CDK1/FANCD2 /KIF23/CCNA2/POLQ/PHGDH/CX3CR1/PBK/ CDKN3/TYMS/PSAT1/LAMC2	16
C0025958	Microcephaly	0.011693	CENPF/ASPM/BUB1B/PLK1/PHGDH/KNL1/ KIF11/LAMC2/DHCR7	9
C0035335	Retinoblastoma	0.012078	MKI67/PLAU/MYBL2/STMN1/CCNB1/BIRC5/ NOS2/CDK1/PLK1/ANOS1/RBBP8/FOXM1/ CDKN3/CDC25C/TYMS/UBE2C	16
C0010964	Dandy-Walker Syndrome	0.012204	NID1/BUB1/BUB1B/PHGDH/DHCR7	5
C0333186	Restenosis	0.012204	TGFB1/SERPINE1/CYR61/CCNB1/NOS2/CCNA2/ F2R/CX3CR1/ALOX5AP/CDKN3	10
C0032580	Adenomatous Polyposis Coli	0.012204	MKI67/SERPINE1/CCNB1/NOS2/CDK1/F2R/ PHGDH/NDC80/FOXM1/GPSM2/CDKN3 /PSAT1/PLB1	13
C1704272	Benign Prostatic Hyperplasia	0.012204	MKI67/TOP2A/CYR61/CCNB1/ADAMTS1/NOS2/ HMMR/IGFBP5/PLK1/F2R/CEP55/PSAT1/TM4SF1	13
C0042373	Vascular Diseases	0.012204	SERPINE1/SORL1/CYR61/TGFB1/FSTL1/SORT1/ NOS2/ANTXR1/IGFBP5/CX3CR1/FOXM1/PLB1/ FBN1	13
C0007766	Intracranial Aneurysm	0.012204	TGFB1/SERPINE1/TGFB1/NOS2/RBBP8/ CDKN3/NTM	7
C0266470	Cerebellar Hypoplasia	0.012204	CENPF/BUB1B/CENPE/PHGDH/RBBP8/GPSM2	6
C0376545	Hematologic Neoplasms	0.012204	GNLY/TOP2A/CDC20/STMN1/TGFB1/BUB1B/ NOS2/CDK1/FANCD2/PLK1/KIF11/PBK/ CDKN3/TYMS/UBE2C	15
C0004135	Ataxia Telangiectasia	0.012204	PLAU/TOP2A/CYR61/FSTL1/CCNB1/CDK1/ FANCD2/PLK1/FOXM1/CDKN3/CDC25C/ CCNB2/LAMC2	13
C1857130	Hypoplastic mandible condyle	0.012204	CENPF/BUB1/TGFB1/COL10A1/BUB1B/ CENPE/PHGDH/RBBP8/PSAT1/FBN1/DHCR7	11
C1658953	tumor vasculature	0.012204	TGFB1/PLAU/SERPINE1/CYR61/ANTXR1/ TM4SF1/APLNR	7
C0025990	Micrognathism	0.012204	CENPF/BUB1/TGFB1/COL10A1/BUB1B/ CENPE/PHGDH/RBBP8/PSAT1/FBN1/DHCR7	11
C0240295	Mandibular hypoplasia	0.012204	CENPF/BUB1/TGFB1/COL10A1/BUB1B/ CENPE/PHGDH/RBBP8/PSAT1/FBN1/DHCR7	11
C0007103	Malignant neoplasm of	0.012204	PLAU/SERPINE1/STMN1/NID1/CYR61/FSTL1/	15

	endometrium		ADAMTS1/BIRC5/BUB1B/FANCD2/IGFBP5/ F2R/NDC80/TYMS/EMP2	
C1883486	Uterine Corpus Cancer	0.012204	PLAU/SERPINE1/STMN1/NID1/CYR61/FSTL1/ ADAMTS1/BIRC5/BUB1B/FANCD2/IGFBP5/ F2R/NDC80/TYMS/EMP2	15