Dataset	Platform	Samples Number	Column with same values	Rows-Columns	Control Group	Levels Number	Resampling	MCC	F1 score	AUC	TPR	TNR	PPV	NPV	Present Genes Number	Missing Genes
GSE185263	RNA-seq_illumina HIs…	392	3	392Rows-56Columns	Healthy	348sepsis_44healthy	SMOTE	0.938	0.971	##	0.965	0.9	0.9886	0.9405	53	IFNA1- IFNA2
GSE65682	Microarrays-Affymme…	234	0	234rows - 107columns	Healthy	192sepsis - 42healthy	SMOTE	0.9676	0.9942	0.9994	0.993	0.9737	0.9945	0.9738	41	14 MISSING GENES
GSE236713-D1	Microarray-agilent	155	0	155rows-78columns	Healthy	125sepsis-30healthy	SMOTE	0.9606	0.9917	0.9998	0.988	0.9816	0.9957	0.9572	53	IFNA1 - FCGR1A
GSE131761	Microarray-agilent	96	0	96rows - 75columns	Control	81septic - 15control	SMOTE	1	1	1	1	1	1	1	53	IFNA1 - FCGR1A
GSE54514	Microarray-illumina	71	0	71rows - 76columns	Healthy	35sepsis - 36 healthy	NO-Resa…	0.6326	0.8042	0.8874	0.7957	0.8242	0.8338	0.8123	49	IFNA1 - IFNA2 - IFNB1 - CRP - LBP - PTX3
GSE154918	RNA-seq_illumina HIs…	79	1	79Rows-56columns	Healthy	39sepsis-40healthy	NO-Resa…	0.9499	0.9688	0.998	0.95	0.9937	0.9937	0.9626	52	"CRP" "IFNA1" "IFNA2"
GSE69063- T0	Microarrays-Affymme…	52	0	51Rows- 55Columns	Healthy	19sepsis_33healthy	SMOTE	0.9853	0.988	1	0.98	1	1	0.9914	53	IFNA1 - FCGR1A
GSE57065_hr0	Microarrays-Affymme…	53	0	51rows - 101columns	Healthy	26septic - 25healthy	NO-Resa…	1	1	1	1	1	1	1	55	-
GSE100159	Microarray-illumina	45	0	45rows-86columns	Control	33sepsis-12control	SMOTE	0.9491	0.9803	1	0.965	1	1	0.935	55	-
GSE243217	RNA-seq- MGISEQ-20…	37	5-6	37rows-56columns	Healthy	22sepsis-15healthy	SMOTE	1	1	1	1	1	1	1	54	IFNB1
GSE28750	Microarrays-Affymme…	30	0	30rows-100columns	Healthy	10sepsis-20healthy	SMOTE	0.974	0.9764	1	0.9646	1	1	0.9858	55	-
							Average	0.93	0.97	0.987	0.96	0.97	0.98	0.95		

Dataset	Top 10 features - RF	Top 10 features-Mann-U test	samples	Spearman's Rank Correlation	Kendall's Tau Distance	Overlapped top 10 genes
GSE185263	FCGR1A - S100A9 - IL10 - CD177 - S100A12 - GATA3 - TNFSF10 - S100A8 - C3AR1 - MYD88	FCGR1A - S100A9 - S100A12 - S100A8 - GATA3 - IL10 - CD177 - MYD88 - TNFSF10 - C3AR1	Whole-blood	0.7688276	0.5994194	"FCGR1A" "S100A9" "S100A12" "S100A8" "GATA3" "IL10" "CD177" "MYD88" "TNFSF10" "C3AR1"
GSE65682	S100A12 - S100A8 - CD177 - ARG1 - GATA3 - IL1R2 - MAPK14 - BCL2 - CX3CR1 -HLA-DRA	CD177 - GATA3 - S100A12 - S100A8 - ARG1 - IL1R2 - MAPK14 - BCL2 - CX3CR1 - MMP8	Whole-blood	0.8543554	0.7	"CD177" "GATA3" "S100A12" "S100A8" "ARG1" "IL1R2" "MAPK14" "BCL2" "CX3CR1"
GSE236713-D1	MMP9 - S100A8 - ARG1 - GATA3 - IL10 - TLR2 - CD177 - SOCS3 - S100A12 - HLA-DRA	ARG1 - GATA3 - IL10 - MMP9 - S100A8 - CD177 - S100A12 - SOCS3 - TLR2 - HLA-DRA	Leukocytes	0.9232382	0.7793904	"ARG1" "GATA3" "IL10" "MMP9" "S100A8" "CD177" "S100A12" "SOCS3" "TLR2" "HLA-DRA"
GSE131761	S100A8 - S100A12 - CD177 - IL10 - HLA-DRA - MAPK14 - GATA3 - MMP9 - SOCS3 - BCL2	IL10 - SOCS3 - CCR7 - MMP9 - S100A8 - S100A12 - MAPK14 - HLA-DRA - CD177 - ARG1	Whole-blood	0.9613772	0.8403483	"CD177" "GATA3" "HLA-DRA" "IL10" "MAPK14" "MMP9" "S100A12" "S100A8"
GSE54514	HMGB1 - MYD88 - CD14 - IL1R2 - C3AR1 - HIF1A - TNFSF10 - TNF - CX3CR1 - PLAUR	IL1R2 - C3AR1 - HMGB1 - MYD88 - CX3CR1 - HIF1A - PLAUR - CD14 - IL8 - TNFSF10	Whole-blood	0.7626531	0.5714286	"IL1R2" "C3AR1" "HMGB1" "MYD88" "CX3CR1" "HIF1A" "PLAUR" "CD14" "TNFSF10"
GSE154918	FCGR1A - S100A8 - CD177 - ARG1 - MAPK14 - C3AR1 - S100A12 - GATA3 - S100A9 - SOCS3	FCGR1A - ARG1 - CD177 - S100A8 - S100A9 - S100A12 - SOCS3 - C3AR1 - TNFSF10 - MAPK14	Peripherial-boold	0.951763	0.8220211	"FCGR1A" "ARG1" "CD177" "S100A8" "S100A9" "S100A12" "SOCS3" "C3AR1" "MAPK14"
GSE69063- T0	S100A12 - IL1R2 - SOCS3 - MMP9 - S100A8 - MAPK14 - ARG1 - CD177 - TLR4 - S100A9	MAPK14 - S100A8 - S100A12 - IL1R2 - SOCS3 - GATA3 - ARG1 - CD177 - S100A9 - TLR2	Peripherial-boold	0.9508144	0.8185776	"MAPK14" "S100A8" "S100A12" "IL1R2" "SOCS3" "ARG1" "CD177" "S100A9"
GSE57065_hr0	S100A9 - ITGAM - MAPK14 - S100A12 - CD177 - MMP8 - GATA3 - IL1R2 - LCN2 - CCR7	ARG1 - CD177 - GATA3 - ITGAM - MAPK14 - MMP8 - S100A12 - S100A9 - BCL2 - S100A8	Leukocytes	0.9334776	0.7858586	"CD177" "GATA3" "ITGAM" "MAPK14" "MMP8" "S100A12" "S100A9"
GSE100159	MMP8 - MYD88 - CD177 - MMP9 - ITGAM - S100A12 - TLR4 - S100A8 - S100A9 - GATA3	BCL2 - CD177 - ITGAM - MAPK14 - MMP8 - MMP9 - MYD88 - S100A12 - S100A8 - S100A9	Whole-blood	0.9428571	0.8141414	"CD177" "ITGAM" "MMP8" "MMP9" "MYD88" "S100A12" "S100A8" "S100A9"
GSE243217	S100A8 - S100A9 - S100A12 - ARG1 - GATA3 - CD177 - SOCS3 - MMP9 - ITGAM - MAPK14	ARG1 - CD177 - FCGR1A - GATA3 - IL1R2 - ITGAM - LCN2 - MAPK14 - MMP9 - S100A12	PBMCs	0.9619592	0.8378756	"ARG1" "CD177" "GATA3" "ITGAM" "MAPK14" "MMP9" "S100A12"
GSE28750	MMP8 - S100A9 - S100A12 - CCR7 - CD177 - C3AR1 - ELANE - IL10 - S100A8 - MMP9	C3AR1 - CCR7 - CD177 - ELANE - GATA3 - MMP8 - S100A12 - S100A8 - S100A9 - SOCS3	Whole-blood	0.945671	0.8047138	"C3AR1" "CCR7" "CD177" "ELANE" "MMP8" "S100A12" "S100A8" "S100A9"

Dataset	Normalization method	Batch effect correction	Genes in the top 25% of predicted importance by Linear Regression Model	Active Immune response type
GSE185263	DEseq2+vsd	Combat(sva)collection location	FCGR1A - S100A9 - S100A12 - S100A8 - GATA3 - IL10 - CD177 - MYD88 - TNFSF10 - C3AR1 - BCL2 - MAPK14 - SOCS3	1. Toll-like receptor (TLR) and MyD88 signaling → Drives early inflammatory response. 2. S100-Alarmin Pathway (DAMPs response) → Activates neutrophils & macrophages. 3. Cytokine-Immunoregulation (IL-10, TNFSF10, BCL2) → Balances inflammation & apoptosis.
GSE65682	RMA	Combat(sva)	CD177 - GATA3 - S100A12 - S100A8 - ARG1 - IL1R2 - MAPK14 - BCL2 - CX3CR1 - MMP8	Toll-Like Receptor (TLR) Pathway → Innate immune activation in response to infection (Sepsis-related). 2. Cytokine & Chemokine Signaling → Regulates inflammation and immune response. 3. Antigen Presentation & Adaptive Immunity → HLA-DRA suggests T-cell activation is involved. 4. Neutrophil & Macrophage Activation → CD177, FCGR1A, and ARG1 are markers of immune cell function in sepsis.
GSE236713-D1	75th percentile normalization	NO batch effect	ARG1 - GATA3 - IL10 - MMP9 - S100A8 - CD177 - S100A12 - SOCS3 - TLR2 - HLA-DRA - BCL2 - C3AR1 - TLR4	1. Innate immunity activation (neutrophils, monocytes) with pro-inflammatory signaling via TLR2, TLR4, S100A8, S100A12, MMP9. 2. Th2-skewed adaptive immune response, likely suppressing excessive inflammation (GATA3, IL10, HLA-DRA). 3. Immune suppression and resolution mechanisms (ARG1, SOCS3, BCL2) suggest a regulatory response to control inflammation.
GSE131761	Limma	NO batch effect	ARG1 - CCR7 - CD177 - GATA3 - HLA-DRA - IL10 - MAPK14 - MMP9 - S100A12 - S100A8 - SOCS3 - C3AR1 - S100A9	1. systemic inflammation (S100A...) 2. Th2-skewed immune response (e.g., chronic inflammation, post-infection recovery, or allergy-related conditions)(GATA3, IL10, ...) 3. Immune suppression / resolution phase of infection (elevated IL-10, SOCS3, and ARG1 suggest immune dampening)
GSE54514	not mentioned	NO batch effect	IL1R2 - C3AR1 - HMGB1 - MYD88 - CX3CR1 - HIF1A - PLAUR - CD14 - IL8 - TNFSF10 - ICAM1 - CCR2	1. Dominant Immune Response: Innate & Myeloid Activation 2. Secondary Immune Response: Some T-cell and Adaptive Immune Involvement
GSE154918	Deseq2+vsd	NO batch effect	FCGR1A - ARG1 - CD177 - S100A8 - S100A9 - S100A12 - SOCS3 - C3AR1 - TNFSF10 - MAPK14 - MMP8 - IL1R2	1. Innate immune activation (Neutrophils & Monocytes) 2. Toll-like receptor & complement signaling (S100A proteins, C3AR1) 3. Cytokine storm and inflammatory response (IL1R2, SOCS3, MAPK14) 4. Macrophage polarization & immune suppression (ARG1, TNFSF10)
GSE69063- T0	RMA	NO batch effect	MAPK14 - S100A8 - S100A12 - IL1R2 - SOCS3 - GATA3 - ARG1 - CD177 - S100A9 - TLR2 - TLR4 - MMP8 - MMP9	1.Innate immunity activation (neutrophils, monocytes/macrophagesS100, TLR and MMPs) 2.Pro-inflammatory response (TLRs, S100 proteins, MMPs) 3.Immune suppression (SOCS3, ARG1, IL1R2) 4.Th2 skewing (GATA3, ARG1)
GSE57065_hr0	RMA	limma	ARG1 - CD177 - GATA3 - ITGAM - MAPK14 - MMP8 - S100A12 - S100A9 - BCL2 - S100A8 - IL1R2 - SOCS3	1.Th2-Skewed Innate Inflammation: gene list suggests sepsis-driven innate immune activation (neutrophil-dominant) with a secondary shift towards Th2 and immune regulation. 2. Dominant Innate Immune Activation (Neutrophilic Response)→CD177, ITGAM, MMP8, S100A8, S100A9, S100A12 3. Potential Shift to Th2 / Immunosuppression in Later Stages → The presence of GATA3, ARG1, SOCS3
GSE100159	log2 - Limma	NO batch effect	BCL2 - CD177 - ITGAM - MAPK14 - MMP8 - MMP9 - MYD88 - S100A12 - S100A8 - S100A9 - TLR4 - FCGR1A - GATA3 - IL1R2	1. Primary Immune Response: Neutrophil & Myeloid Activation (S100A8, S100A9, S100A12, CD177, MMP8, MMP9, ITGAM, TLR4, MYD88, MAPK14) 2. Secondary Immune Modulation: Th2-like and Immune Regulation (GATA3, IL1R2, BCL2)
GSE243217	DEseq-vsd	NO batch effect	ARG1 - CD177 - FCGR1A - GATA3 - IL1R2 - ITGAM - LCN2 - MAPK14 - MMP9 - S100A12 - S100A8 - S100A9 - SOCS3 - TLR2	1. Active Immune Type: Innate Myeloid (Neutrophilic) Inflammation 2.Early Th2 Regulation + Immunosuppression. This profile aligns with acute bacterial sepsis, where neutrophilic inflammation is dominant, but Th2 and regulatory mechanisms begin to emerge.
GSE28750	RMA	NO batch effect	C3AR1 - CCR7 - CD177 - ELANE - GATA3 - MMP8 - S100A12 - S100A8 - S100A9 - SOCS3 - ARG1 - IL10	1. Strong Innate Immune Activation (Neutrophil & Complement System) 2.Secondary: Emerging Th2 Response & Immunosuppressive Signals