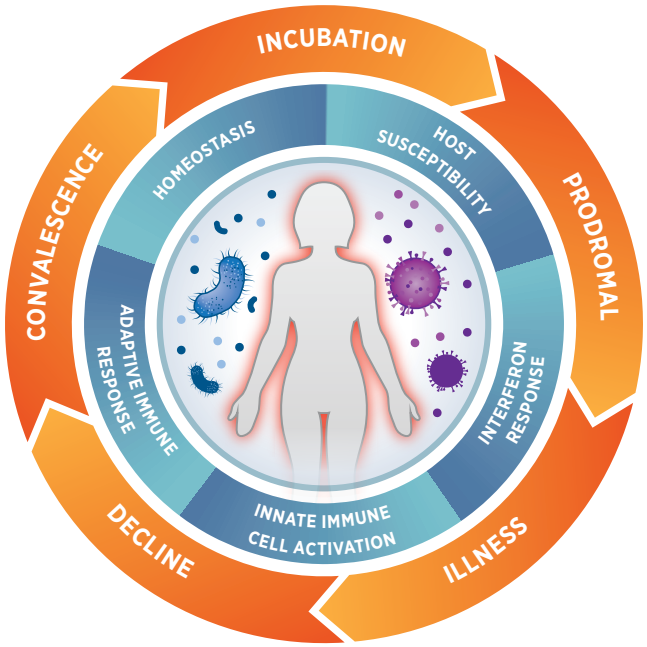
nCounter® Host Response Panel

Gene Expression Panel

Pathogenesis • Immune Response Dynamics • Vaccine & Therapy Development

Study the phases and progression of infection across the five major components of the host response with pathogen-agnostic content optimized for blood but suitable for all sample types. Set up experiments in minutes and get results in less than 24 hours to rapidly advance knowledge about emerging infectious disease.

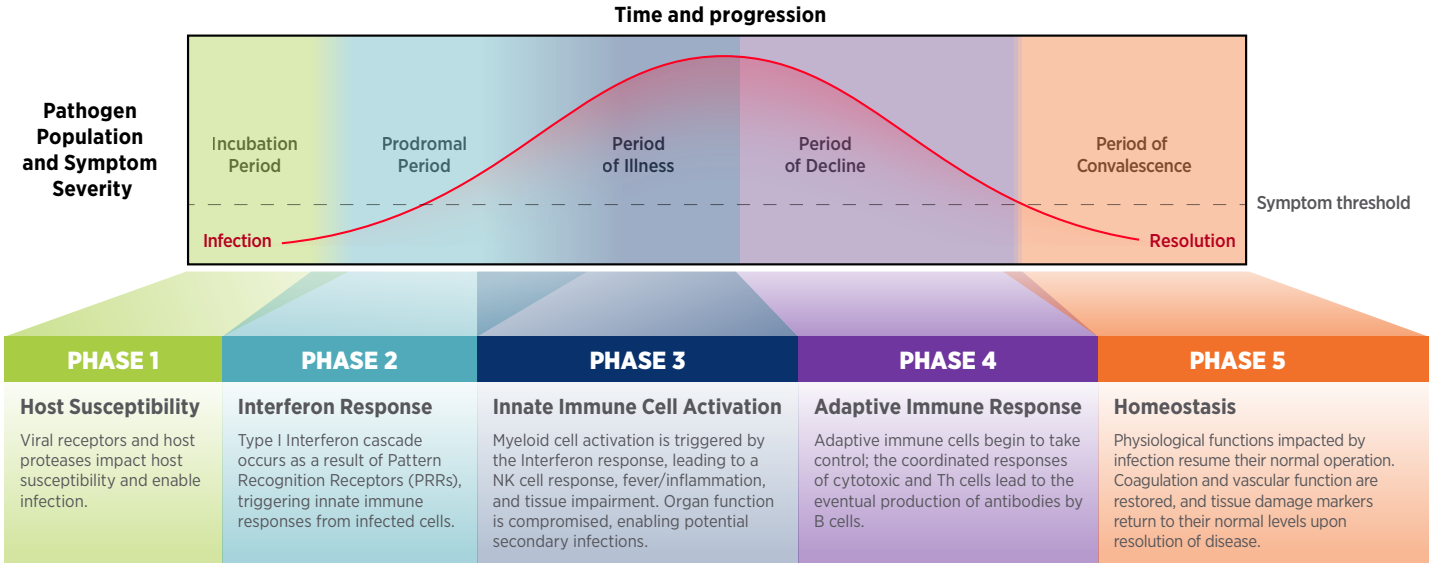


Product Highlights

- Profile 785 genes across 50+ pathways
- Study the five elements of the host response
  - Host Susceptibility
  - Interferon Response
  - Innate Immune Cell Activation
  - Adaptive Immune Response
  - Homeostasis
- Detect the presence of a pathogen and evaluate organ-specific tissue damage with a Panel Plus spike-in
- Develop signatures of host response dynamics
- Identify and validate biomarkers for disease severity
- Evaluate the effect of vaccines & therapies
- Quantify the presence and relative abundance of 14 different immune cell types

Feature	Specifications
Number of Targets	785 (Human), including 12 internal reference genes
Sample Input - Standard (No amplification required)	25-300 ng
Sample Input - Low Input	As little as 1 ng with nCounter Low Input Kit and Primer Pools (sold separately)
Sample Type(s)	Cultured cells/cell lysates, sorted cells, FFPE-derived RNA, total RNA, fragmented RNA, PBMCs, and whole blood/plasma
Customizable	Add up to 55 unique genes with Panel Plus and/or up to 10 custom protein targets
Time to Results	Approximately 24 hours
Data Analysis	nSolver™ Analysis Software (RUO)

Biological Framework of the Host Response Panel



Pathway Annotations Across the Five Functions of the Host Response

Host Susceptibility (26 Genes)	Interferon Response (288 Genes)	Innate Immune Cell Activation (567 Genes)	Adaptive Immune Response (483 Genes)	Homeostasis (282 Genes)
Angiotensin System	ALPK1 Signaling	Chemokine Signaling	BCR Signaling	Angiotensin System
Virus-Host Interaction	DNA Sensing	Cytotoxicity	Complement System	Apoptosis
	Glycan Sensing	Host Defense Peptides	Immune Exhaustion	Autophagy
	Inflammasomes	IL-1 Signaling	Immune Memory	Coagulation
	Interferon Response Genes	IL-2 Signaling	Lymphocyte Trafficking	HIF1A Signaling
	JAK/STAT Signaling	IL-6 Signaling	MHC Class I Antigen Presentation	Leukotriene and Prostaglandin Inflammation
	MAPK Signaling	IL-17 Signaling	MHC Class II Antigen Presentation	Lysosomes
	NLR Signaling	Mononuclear Cell Migration	Mononuclear Cell Migration	Oxidative Stress Response
	RNA Sensing	Myeloid Activation	T cell Costimulation	Proteotoxic Stress
	TLR Signaling	Myeloid Inflammation	TCR Signaling	Tissue Stress
	TNF Signaling	NK Activity	TH1 Differentiation	TNF Signaling
	Type I Interferon Signaling	NF-kappaB Signaling	TH2 Differentiation	
	Type II Interferon Signaling	NO Signaling	TH9 Differentiation	
	Type III Interferon Signaling	Other Interleukin Signaling	TH17 Differentiation	
		Oxidative Stress Response	Treg Differentiation	
		Phagocytosis		
		PPAR Signaling		
		TGF-beta Signaling		
		TNF Signaling		

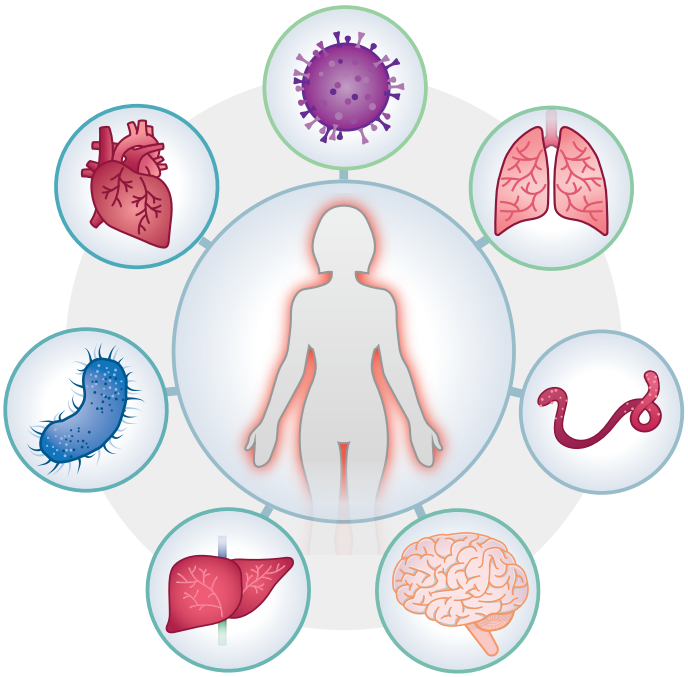
Immune Checkpoint Coverage

Take advantage of comprehensive coverage of the most relevant immune checkpoints to study modulation of the host immune response and subsequent inflammatory cascade.

ADORA2A (A2aR)	CD70	HAVCR2 (TIM3)	CD274 (PD-L1)	TNFRSF9 (4-1BB)
CD27	CD80	ICOS	PDCD1LG2 (PD-L2)	TNFSF9 (4-1BBL)
CD28	CD86	ICOSLG (B7-H2)	TIGIT	TNFRSF18 (GITR)
CD40	CD276 (B7-H3)	LAG3	TNFRSF4 (OX40)	TNFSF18 (GITRL)
CD40LG	CTLA-4	PDCD1 (PD-1)	TNFSF4 (OX40L)	VSIR (VISTA)

Customization with Panel Plus

Customize your research project by adding tissue- or pathogen-specific probes to the Host Response Panel with a 55-gene Panel Plus. Add the off-the-shelf 20-gene Coronavirus Panel Plus to study SARS-CoV-2 and other coronaviruses or build your own Panel Plus gene list with transcripts specific for different tissue types. Mix and match transcripts from the pathogen of your choice and additional host tissue markers to add a Panel Plus to the Host Response Panel for studying the pathogenesis of various infectious diseases.



NHP Compatibility

Probes included in the Host Response Panel have high homology to non-human primates, allowing for seamless comparative infectious disease research as well as preclinical studies. Percent identity is used to estimate likelihood of the probe functioning on non-human primate targets. Additional comparisons with other NHP species are available upon request.

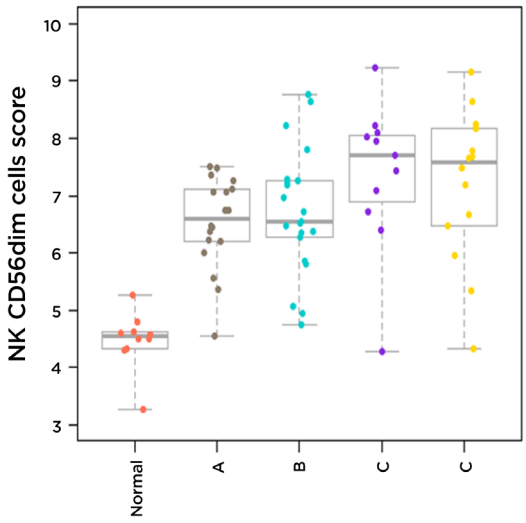
	Number of Genes	
% Identity	Cynomologus Macaque	Rhesus Macaque
≥ 95	695	696
≥ 90	758	751
≥ 85	772	772

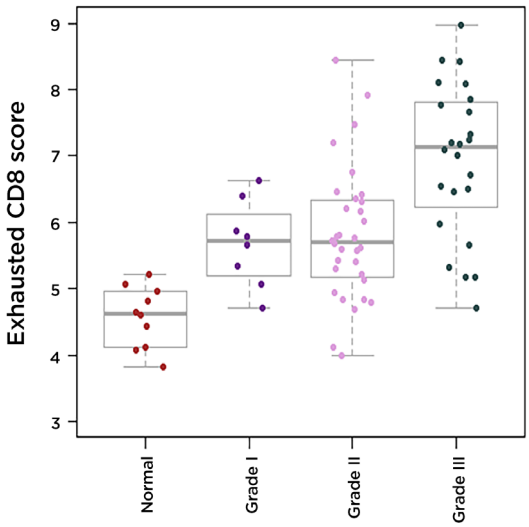
Immune Cell Profiling Feature

Genes included in the Host Response Panel provide unique cell profiling data to measure the relative abundance of 14 different immune cell types. The table below summarizes the genes included in each cell type signature, as qualified through biostatistical approaches and selected literature in the field of immunology.

Cell Type	Associated Human Genes
B Cells	BLK, CD19, FAM30A, FCRL2, MS4A1, PNOC, SPIB, TCL1A, TNFRSF17
CD45	PTPRC
CD8	CD8A, CD8B
Cytotoxic Cells	CTSW, GNLY, GZMA, GZMB, GZMH, KLRB1, KLRD1, KLRK1, NKG7, PRF1
Dendritic Cells	CCL13, CD209, HSD11B1
Exhausted CD8	CD244, EOMES, LAG3, PTGER4
Macrophages	CD163, CD68, CD84, MS4A4A

Cell Type	Associated Human Genes
Mast Cells	CPA3, HDC, MS4A2, TPSAB1/B2
Neutrophils	CEACAM3, CSF3R, FCAR, FCGR3A/B, FPR1, S100A12, SIGLEC5
NK Cells	NCR1, XCL1/2
NK CD56dim Cells	IL21R, KIR2DL3, KIR3DL1/2
T Cells	CD3D, CD3E, CD3G, CD6, SH2D1A, TRAT1
Th1 Cells	TBX21
Treg	FOXP3





nSolver™ Analysis Software

NanoString offers advanced software tools that address the continuous demands of data analysis and the need to get simple answers to specific biological questions easy. Genes included in the Host Response Panel are organized and linked to various advanced analysis modules to allow for efficient analysis of the five functions of the host response.

Advanced Analysis Modules available for Host Response:

- Normalization
- Quality Control
- Individual Pathway Analysis
- Cell Profiling
- Differential Expression
- Gene Set Analysis
- Built-in compatibility for Panel Plus and Protein analysis

Ordering Information

Gene Expression Panels arrive ready-to-use and generally ship within 24 hours following purchase. The Coronavirus Panel Plus is an off-the-shelf product. Custom Panel Plus spike-ins are built to order.

Product	Product Description	Quantity	Catalog Number
nCounter Human Host Response Panel	Includes 785 genes; 12 internal reference genes for data normalization	12 Reactions	XT-HHR-12
Coronavirus Panel Plus	20 Probe Panel Plus. Includes 9 probes targeting the SARS-CoV-2 virus, 1 probe for the human gene encoding the viral receptor ACE2, and 10 additional probes targeting SARS and other human coronaviruses	12 Reactions	CORONAPP-12
Low RNA Input Kit	Kit for use with all Low RNA Input Primer Pools	48 Reactions	LOW-RNA-48
Host Response Panel Primer Pools	Primer pools for the Host Response Panel (for use with the Low RNA Input Kit)	12 Reactions	LOW-HHR-12
nCounter Master Kit (Max or FLEX Systems) Reagents and Cartridges	Reagents, cartridges, and consumables necessary for sample processing on nCounter MAX and FLEX Systems	12 Reactions	NAA-AKIT-012
nCounter SPRINT Cartridge 1 Cartridge, 12 lanes	Sample Cartridge for nCounter SPRINT System	12 Reactions	SPRINT-CAR-1.0
nCounter SPRINT Reagent Pack	nCounter SPRINT Reagent Pack containing Reagents A, B, C, and Hybridization Buffer	192 Reactions	SPRINT-REAG-KIT

Selected Panel References

1. Altman, MC et al. Development and Characterization of a Fixed Repertoire of Blood Transcriptome Modules Based on Co-expression Patterns Across Immunological States. https://www.biorxiv.org/content/10.1101/525709v2 (2020) doi:10.1101/525709.
2. Borchers, AT et al. Respiratory Syncytial Virus—A Comprehensive Review. Clin Rev Allergy Immunol. 2013;45(3):331-79.
3. Dandekar, AA and Perlmam, S. Immunopathogenesis of coronavirus infections: implications for SARS. Nat Rev Immunol. 2005;5(12):917-27.
4. Kannan, M et al. Platelet activation markers in evaluation of thrombotic risk factors in various clinical settings. Blood Rev. 2019;37:100583.
5. Ong, EZ et al. A Dynamic Immune Response Shapes COVID-19 Progression. Cell Host & Microbe 2020;27(6):879-882.e2.
6. Razonable, RR. Antiviral Drugs for Viruses Other Than Human Immunodeficiency Virus. Mayo Clin Proc. 2011;86(10):1009-26.
7. Singhania, A et al. The value of transcriptomics in advancing knowledge of the immune response and diagnosis in tuberculosis. Nat Immunol. 2018;19(11):1159-1168.
8. Speranza, E et al. A conserved transcriptional response to intranasal Ebola virus exposure in nonhuman primates prior to onset of fever. Sci Transl Med. 2018;10(434):eaaq1016.
9. Zhai, Y et al. Host Transcriptional Response to Influenza and Other Acute Respiratory Viral Infections –A Prospective Cohort Study. PLoS Pathog. 2015;11(6):e1004869.

To view the annotated gene lists for the Host Response Panel, visit nanostring.com/host-response

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JUL 2020 MK2643