IOTEST MYELOID ACTIVATION

VISUALIZING IMMUNE RESPONSE DURING INFECTIONS

VISUALIZE
the possibilities.

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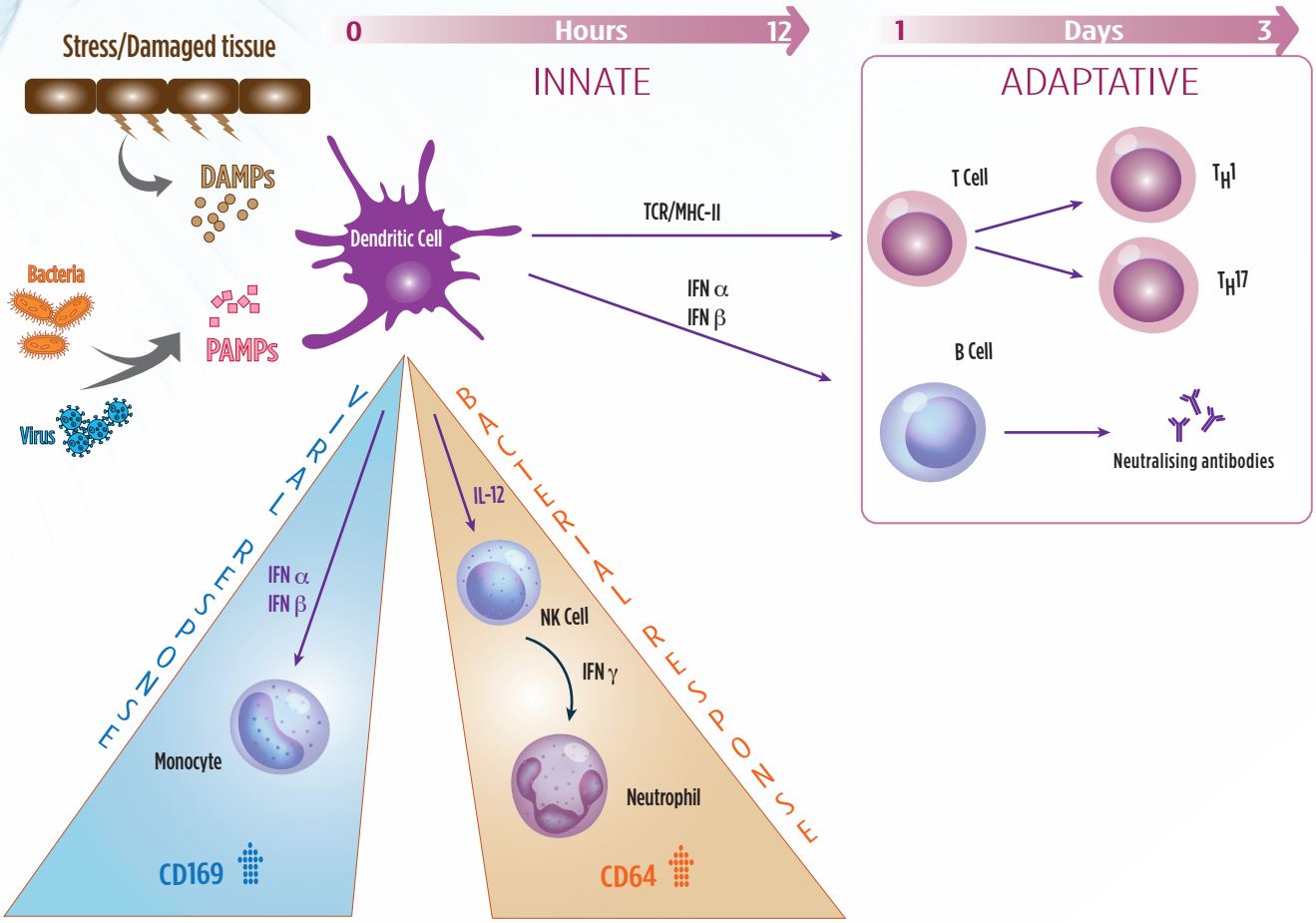
BECKMAN COULTER
Life Sciences

IMMUNE IMPRINT OF INFECTION

Early response of the innate immunity to infections



Interferon response specific for viral and bacterial infection

IFN Type I (IFNα, IFNβ): Viral infections

IFN Type II (IFNγ): Bacterial infections

Interferons also act as a key link between the innate immune response and activation of the adaptive immune response

Early indicator and differentiator of Infection

Myeloid cells of the innate immune system respond differently when challenged with bacteria or viruses[1]. Activation of myeloid cells is an early response to infection.

Bacterial stimuli: CD64 overexpression on neutrophils (nCD64).

Viral stimuli: CD169 overexpression on monocytes (mCD169).

Immune status: Recent stimuli: increased HLA-DR, Overstimulation/Immune exhaustion: decreased HLA-DR.

This simple three marker combination gives an excellent overview of the entire innate immune response by analyzing peripheral blood.

CD64, CD169 and HLA-DR are activation markers expressed by myeloid cells, such as neutrophils, monocytes and dendritic cells. The markers are induced in response to inflammatory conditions such as autoimmune diseases, interferon (type I and II) signaling in response to bacterial and viral infection.

IOTest Myeloid Activation : CD169-PE/HLA-DR-APC/CD64-PB Antibody Cocktail

PART # (SIZE - STATUS)	PB	KrO	FITC	PE	ECD	PC5.5	PC7	APC	APC-A700	APC-A750
C63854 (200 tests - RUO*)	CD64	-	-	CD169	-	-	-	HLA-DR	-	-

CD64 (FCγ-RI)

Provides a first line of recognition and defense against infections
Bacterial infections lead to release of type II IFN (IFNγ), which strongly induces the expression of CD64 on neutrophils.

CD169 (Siglec-1)

Adhesion receptor, recognizing sialylated glycoproteins and glycolipids of viral membranes.
Viral infections lead to release of type I IFNs (IFNα,β), which strongly induces expression of CD169 on monocytes.

HLA-DR

MHC-Class II receptor mainly involved in viral antigen presentation to T cells.
HLA-DR levels on monocytes are induced immediately after infection, slowly declines with exhaustion.

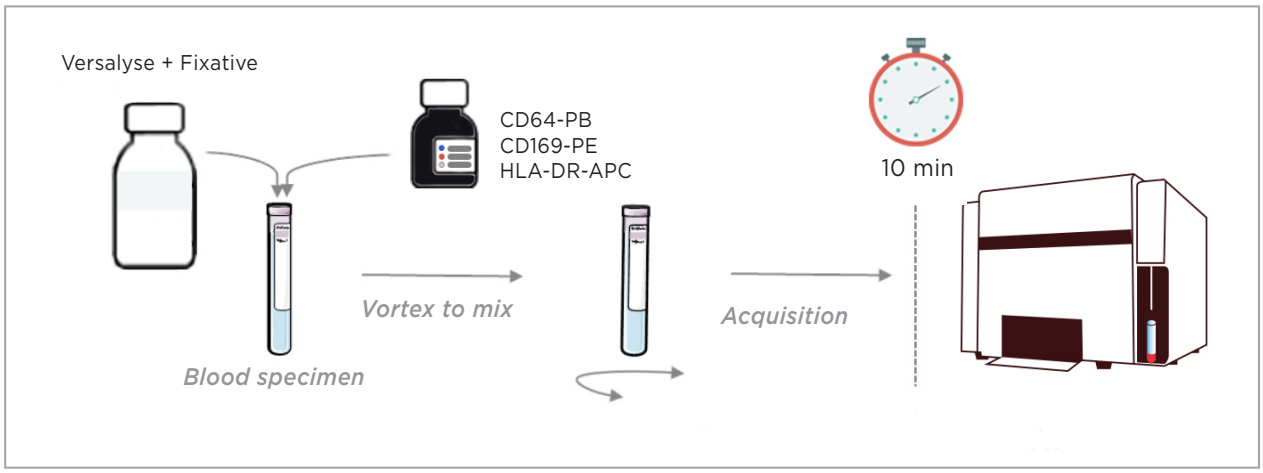
PB: Pacific Blue*
KrO: Krome Orange

AF647: Alexa Fluor* 647
AF700: Alexa Fluor* 700
AF750: Alexa Fluor* 750

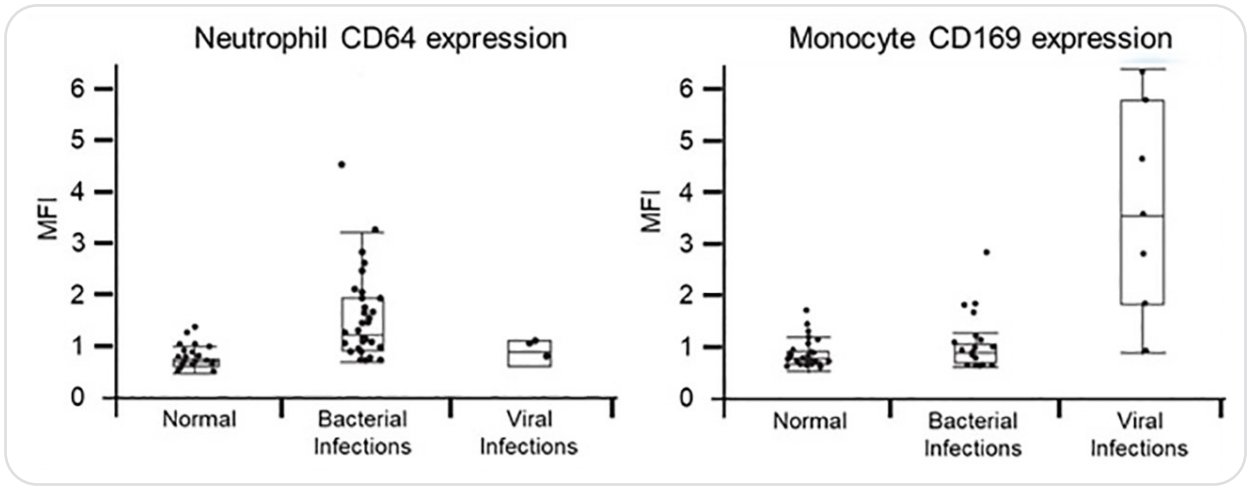
APC-A700: APC-Alexa Fluor* 700
APC-A750: APC-Alexa Fluor* 750

DIFFERENTIATING VIRAL, BACTERIAL IMMUNE RESPONSE

One step, no wash, no compensation



Discriminate bacterial/viral immune response[2]



Flow cytometric evaluation of nCD64 and mCD169 in cases of patients entering hospital with bacterial and viral infections[2].

1. CD64 expression on normal blood sample

2. Increased neutrophil expression of CD64 in the patient with bacterial infection

3. CD169 expression on normal blood sample

4. Increased monocyte expression of CD169 in the patient with viral infection

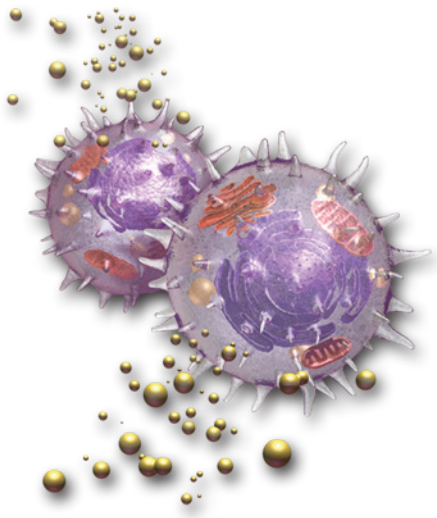
Research Areas

Antibiotic resistance: Erroneous identification of source and nature of infection is a major challenge, leading to antibiotic misuse and resistance[3]. Rapid identification of bacterial infections, using nCD64, will aid research into biomarkers and development of new antibiotics[4].

Viral disease progression: Myeloid activation markers (CD169) have been used in monitoring progression and clearance of viral disease, such as HIV and pulmonary viral infections, including COVID-19[5,6,7].

Interferon signaling: The interferons are a family of cytokine mediators critically involved in alerting the cellular immune system to infections. Type I and II interferons exert differential effect on myeloid cells depending upon the stimuli[7,8].

Autoimmune inflammatory diseases: Interferon signaling has been shown to play an important role in the chronic inflammation observed in systemic autoimmune diseases such as RA, SLE, Sjögren's syndrome[9].



Publications

1. Bourgoin P, Biéchelé G, Ait Belkacem I, Morange PE, Malergue F. Role of the interferons in CD64 and CD169 expressions in whole blood: Relevance in the balance between viral- or bacterial-oriented immune responses. Immun Inflamm Dis. 2020;8(1):106-123.
2. Bourgoin P, Soliveres T, Ahriz D, et al. Clinical research assessment by flow cytometry of biomarkers for infectious stratification in an Emergency Department. Biomark Med. 2019;13(16):1373-1386.
3. Shallcross LJ, Davies DS. Antibiotic overuse: a key driver of antimicrobial resistance. Br J Gen Pract. 2014 Dec;64(629):604-5.
4. Ajmani S, Agarwal V, Gurjar M. State of Globe: Neutrophil CD64: Is It a Reliable Biomarker for Sepsis? J Glob Infect Dis. 2018 Apr-Jun;10(2):33-34.
5. Akiyama H, Ramirez NP, Gibson G, et al. Interferon-Inducible CD169/Siglec1 Attenuates Anti-HIV-1 Effects of Alpha Interferon. J Virol. 2017;91(21):e00972-17.
6. Stegelmeier AA, van Vloten JP, Mould RC, Klafuric EM, Minott JA, Wootton SK, Bridle BW, Karimi K. Myeloid Cells during Viral Infections and Inflammation. Viruses. 2019 Feb 19;11(2):168.
7. Park MD. Macrophages: a Trojan horse in COVID-19? Nat Rev Immunol. 2020 Jun;20(6):351.
8. Hadjadj J, Yatim N, Barnabei L, et al. Impaired type I interferon activity and inflammatory responses in severe COVID-19 patients. Science. 2020;369(6504):718-724.
9. Rose T, Szelinski F, Lisney A, et al. SIGLEC1 is a biomarker of disease activity and indicates extraglandular manifestation in primary Sjögren's syndrome. RMD Open. 2016;2(2):e000292.

IOTest Myeloid Activation

A cocktail of CD169-PE/HLA-DR-APC/CD64-PB antibodies, combined with a rapid, no wash protocol to study activation of myeloid cells.

Ordering information

Part Number	Reagent	Packaging
C63854	IOTest Myeloid Activation CD169-PE/HLA-DR-APC/CD64-PB Antibody Cocktail	200 tests (10 µL/test) RUO**

Material not provided, to purchase separately.

Part Number	Reagent	Packaging
IM3648	VersaLyse Lysing solution	100 tests, RUO**
IM3515	IOTest3 fixative solution	100-200 tests, RUO**

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