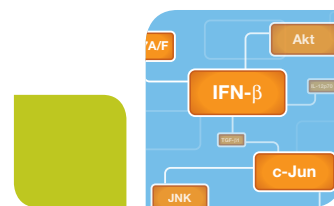










Bio-Plex Pro™ Assay Reference Guide



Bio-Plex® Multiplex System Bulletin 5297











Sample Type Key

-  Bronchoalveolar Lavage Fluid (BALF)
-  Cell Culture Supernatants
-  Cell Lysates
-  Cerebrospinal Fluid
-  Eye Fluids/Tears
-  Peripheral Blood Mononuclear Cells (PBMC)
-  Serum/Plasma
-  Tissue Lysates



Human Samples

Bio-Plex Pro Assays and Panels Autoimmune Disease

Cytokine Group I 17-Plex		<p>Abiko Y et al. (2014). Serial changes of serum cytokines in Crohn's disease following treatment with adalimumab. Hepatology 61, 357–362.</p>	
Cytokine Group I 27-Plex		<p>Hodkinson B et al. (2012). Exaggerated circulating Th-1 cytokine response in early rheumatoid arthritis patients with nodules. Cytokine 60, 561–564.</p>	
Cytokine Group I 27-Plex		<p>Huang X et al. (2011). Multidimensional single cell based STAT phosphorylation profiling identifies a novel biosignature for evaluation of systemic lupus erythematosus activity. PLoS One 6, e21671.</p>	
Cancer Cell Lines (colon and hepatic)			
Cytokine Group I 27-Plex Panel		<p>Guerriero E et al. (2013). Dissimilar cytokine patterns in different human liver and colon cancer cell lines. Cytokine 64, 584–589.</p>	
Cancer (colon)			
Cytokine Group I 27-Plex and Group II 21-Plex Panels		<p>Boissière-Michot F et al. (2014). Characterization of an adaptive immune response in microsatellite-unstable colorectal cancer. Oncoimmunology 3, e29256.</p>	





Bio-Plex Pro Assays and Panels

Cancer (hepatic)

Cytokine Group I 27-Plex and Group II 21-Plex Panels and Cell Signaling 17-Plex Assay

Alexopoulos LG et al. (2010).

Networks inferred from biochemical data reveal profound differences in toll-like receptor and inflammatory signaling between normal and transformed hepatocytes.

Mol Cell Proteomics 9, 1,849–1,865.



Cytokine Group I 27-Plex Panel

Capone F et al. (2014).

Synergistic antitumor effect of doxorubicin and tacrolimus (FK506) on hepatocellular carcinoma cell lines.

Scientific World Journal 2014, article ID 450390.



Cancer Panel II 18-Plex

Costantini S et al. (2013).

Cancer biomarker profiling in patients with chronic hepatitis C virus, liver cirrhosis and hepatocellular carcinoma.

Oncol Rep 29, 2,163–2,168.

**Cancer Immunotherapy**

Cytokine Group I 27-Plex Panel

Deniger DC et al. (2013).

Bispecific T-cells expressing polyclonal repertoire of endogenous $\gamma\delta$ T-cell receptors and introduced CD19-specific chimeric antigen receptor.

Mol Ther 21, 638–647.

**Cancer (lung)**

Cytokine Group I 10-Plex Panel

Almatroodi SA et al. (2016).

Characterization of M1/M2 tumour-associated macrophages (TAMs) and Th1/Th2 cytokine profiles in patients with NSCLC.

Cancer Microenviron 9, 1–11.

**Cancer (ovarian)**

Cell Signaling Assay 5-Plex Panel

Zhang B et al. (2013).

Antitumor properties of salinomycin on cisplatin-resistant human ovarian cancer cells in vitro and in vivo: Involvement of p38 MAPK activation.

Oncol Rep 29, 1,371–1,378.

**Cancer (prostate)**

Cancer Panel I 16-Plex

Li D et al. (2012).

Validation of a multiplex immunoassay for serum angiogenic factors as biomarkers for aggressive prostate cancer.

Clin Chim Acta 413, 1,506–1,511.

**Cardiovascular Disease**

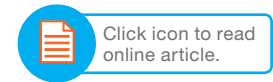
Cytokine Groups I and II (custom)

Ormstad H et al. (2011).

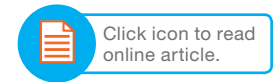
Serum cytokine and glucose levels as predictors of poststroke fatigue in acute ischemic stroke patients.

J Neurol 258, 670–676.





Bio-Plex Pro Assays and Panels	Chronic Obstructive Pulmonary Disease (COPD)
Cytokine Group I 27-Plex and Group II 21-Plex	<p> Bade G et al. (2014). Serum cytokine profiling and enrichment analysis reveal the involvement of immunological and inflammatory pathways in stable patients with chronic obstructive pulmonary disease. Int J Chron Obstruct Pulmon Dis 9, 759–773.</p> <p>Click icon to read online article.</p>
	Diabetes and Metabolism
Cytokine Group II 21-Plex and Diabetes 2- and 10-Plex	<p> Costantini S et al. (2012). Cytokine profile of patients with type 2 diabetes and/or chronic hepatitis C infection. PLoS One 7, e39486.</p> <p>Click icon to read online article.</p>
Cytokine Assays	<p> Suzuki Y et al. (2011). Expression profiles of cytokines and chemokines in vitreous fluid in diabetic retinopathy and central retinal vein occlusion. Jpn J Ophthalmol 55, 256–263.</p> <p>Click icon to read online article.</p>
	Infectious Disease (protozoan)
Cytokine Group I 27-Plex	<p> Moncunill G et al. (2013). Performance of multiplex commercial kits to quantify cytokine and chemokine responses in culture supernatants from <i>Plasmodium falciparum</i> stimulations. PLoS One 8, e52587.</p> <p>Click icon to read online article.</p>
	Infectious Disease (viral)
Cytokine Group I 27-Plex and Group II 21-Plex	<p> Gupta M et al. (2012). Serology and cytokine profiles in patients infected with the newly discovered Bundibugyo ebolavirus. Virology 423, 119–124.</p> <p>Click icon to read online article.</p>
Cytokine 27-Plex	<p> Kumar SB et al. (2012). Elevated cytokine and chemokine levels in the placenta are associated with in-utero HIV-1 mother-to-child transmission. AIDS 26, 685-694.</p> <p>Click icon to read online article.</p>
Cytokine Group 1 27-Plex	<p> Kumar Y et al. (2012). Serum proteome and cytokine analysis in a longitudinal cohort of adults with primary dengue infection reveals predictive markers of DHF. PLoS Negl Trop Dis 6, e1887.</p> <p>Click icon to read online article.</p>
Group I and Chemokine	<p> Malherbe G et al. (2014). Circulating biomarkers of immune activation distinguish viral suppression from nonsuppression in HAART-treated patients with advanced HIV-1 subtype C infection. Mediators Inflamm 2014, article ID 198413.</p> <p>Click icon to read online article.</p>
Cytokine 21- and 27-Plex	<p> Wranke A et al. (2014). Anti-HDV IgM as a marker of disease activity in hepatitis delta. PLoS One 9, e101002.</p> <p>Click icon to read online article.</p>



Bio-Plex Pro Assays and Panels

InflammationCytokine Group I
17-Plex

Andaluz-Ojeda D et al. (2012).

A combined score of pro- and anti-inflammatory interleukins improves mortality prediction in severe sepsis.

Cytokine 57, 332–336.

Cytokine Group I
4-Plex

Olsen I and Sollid LM (2013).

Pitfalls in determining the cytokine profile of human T cells.

J Immunol Methods 390, 106–112.

Cytokine Group I
13-Plex

Ribelles A et al. (2015).

Ocular surface and tear film changes in older women working with computers.

Biomed Res Int 2015, article ID 467039.

**Inflammation (airway)**Cytokine Group I
27-Plex

Cervellati F et al. (2014).

Comparative effects between electronic and cigarette smoke in human keratinocytes and epithelial lung cells.

Toxicol In Vitro 28, 999–1,005.

**Inflammation (cancer and diabetes)**Cytokine Group II
21-Plex, Cancer Panel I
16-Plex, Diabetes 2- and
10-Plex

Capone F et al. (2015).

The cytokinome profile in patients with hepatocellular carcinoma and type 2 diabetes.

PLoS One 10, e0134594.

**Inflammation (cardiovascular)**Cytokine Group I
3-Plex

Müller II et al. (2012).

Macrophage migration inhibitory factor is enhanced in acute coronary syndromes and is associated with the inflammatory response.

PLoS One 7, e38376.

**Inflammation (liver injury)**Cytokine Group I
27-Plex

Steuerwald NM et al. (2013).

Profiles of serum cytokines in acute drug-induced liver injury and their prognostic significance.

PLoS One 8, e81974.

**Inflammation (neurocognitive disorder)**Group II 21-Plex and
Chemokine 40-Plex

Cassol E et al. (2014).

Cerebrospinal fluid metabolomics reveals altered waste clearance and accelerated aging in HIV patients with neurocognitive impairment.

AIDS 28, 1,579–1,591.





Bio-Plex Pro Assays and Panels

Inflammation (preterm labor)

Chemokine 40-Plex

Hamilton SA et al. (2013).

Identification of chemokines associated with the recruitment of decidual leukocytes in human labour: Potential novel targets for preterm labour.
PLoS One 8, e56946.



Inflammation (psoriatic arthritis correlated more so in tender joint)

Cytokine Groups I and II (custom)

Hansson C et al. (2014).

S-calprotectin (S100A8/S100A9): A potential marker of inflammation in patients with psoriatic arthritis.
J Immunol Res 2014, article ID 696415.



Inflammation (statistical model)

Cell Signaling 16-Plex Assay and Acute Phase 4-Plex

Clarke DC et al. (2013).

Normalization and statistical analysis of multiplexed bead-based immunoassay data using mixed-effects modeling.
Mol Cell Proteomics 12, 245–262.



Narcolepsy

Cytokine Group I 17-Plex

Tanaka S et al. (2014).

Increased plasma IL-6, IL-8, TNF-alpha, and G-CSF in Japanese narcolepsy.
Hum Immunol 75, 940–944.



Normal Cytokine Levels

Cytokine Group I 27-Plex

Biancotto A et al. (2013).

Baseline levels and temporal stability of 27 multiplexed serum cytokine concentrations in healthy subjects.
PLoS One 8, e76091.



Pressure Ulcers

Matrix Metalloproteinase (MMP) 9-Plex

Paunica-Panea G et al. (2015).

Circulatory matrix metalloproteinases as tissue destruction indicators for improving clinical management of pressure ulcers patients.
HVM Bioflux 7, 363–369.



Sample Collection/General Cytokine Screening

Acute Phase 4- and 5-Plex, Cytokine 21- and 27-Plex, and Diabetes 10-Plex

Biancotto A et al. (2012).

Effect of anticoagulants on multiplexed measurement of cytokine/chemokines in healthy subjects.
Cytokine 60, 438–446.





Bio-Plex Pro Assays and Panels

Vascular Research

Cell Signaling Assays
4-Plex (phosphoprotein
and total)

Bouvard C et al. (2015).

Low-molecular-weight fucoidan induces endothelial cell migration via the PI3K/AKT pathway and modulates the transcription of genes involved in angiogenesis.

Mar Drugs 13, 7,446–7,462.



Human and Mouse Samples

Inflammation

Human Cytokine 27-Plex
and Mouse Cytokine
23-Plex

Bates JM et al. (2015).

Dendritic cell CD83 homotypic interactions regulate inflammation and promote mucosal homeostasis.

Mucosal Immunol 8, 414–428.



Mouse Samples

Asthma

Cytokine Group I
23-Plex

Bergquist M et al. (2014).

Comprehensive multiplexed protein quantitation delineates eosinophilic and neutrophilic experimental asthma.

BMC Pulm Med 14, 110.



Cytokine Group I
23-Plex

Fu R et al. (2014).

Broncho-Vaxom attenuates allergic airway inflammation by restoring GSK3 β -related T regulatory cell insufficiency.

PLoS One 9, e92912.



Cytokine Group I
8-Plex

Toledo AC et al. (2013).

Flavonone treatment reverses airway inflammation and remodelling in an asthma murine model.

Br J Pharmacol 168, 1,736–1,749.



Cancer (pancreatic)

Cytokine Group I
23-Plex Panel

Yip-Schneider MT et al. (2013).

Dimethylaminoparthenolide and gemcitabine: A survival study using a genetically engineered mouse model of pancreatic cancer.

BMC Cancer 13, 194.



Cardiovascular Physiology

Cell Signaling Assays
2-Plex

Bhattacharya I et al. (2011).

Inhibition of activated ERK1/2 and JNKs improves vascular function in mouse aortae in the absence of nitric oxide.

Eur J Pharmacol 658, 22–27.






Bio-Plex Pro Assays and Panels

Hearing Loss/Nerve Damage

Cell Signaling Assays
5-Plex

 Maeda Y et al. (2013).
Time courses of changes in phospho- and total-MAP kinases in the cochlea after intense noise exposure.
PLoS One 8, e58775.



Infectious Disease (fungal)


Cytokine Group I
5-Plex

 Han KH et al. (2013).
Immunological features of macrophages induced by various morphological structures of *Candida albicans*.
J Microbiol Biotechnol 23, 1,031–1,040.



Inflammation


Mouse Group I
6-Plex

 Lichte P et al. (2014).
Dehydroepiandrosterone modulates the inflammatory response in a bilateral femoral shaft fracture model.
Eur J Med Res 19, 27.



Inflammation (cardiovascular)

Cytokine Group I
3-Plex

 Bhattacharya I et al. (2013).
Rictor in perivascular adipose tissue controls vascular function by regulating inflammatory molecule expression.
Arterioscler Thromb Vasc Biol 33, 2,105–2,111.



Rat Samples

Diabetes and Metabolism


Cytokine 24-Plex
and Cell Signaling
4-Plex Assay

  Karagiannides I et al. (2014).
Chronic unpredictable stress regulates visceral adipocyte-mediated glucose metabolism and inflammatory circuits in male rats.
Physiol Rep 2, e00284.



Inflammation (obesity)

Cytokine 4-Plex

 Ayepola OR et al. (2013).
Kolaviron, a *Garcinia* biflavonoid complex ameliorates hyperglycemia-mediated hepatic injury in rats via suppression of inflammatory responses.
BMC Complement Altern Med 13, 363.



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