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

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Human Samples

Bio-Plex Pro Assays and Panels	Autoimmune Disease
Cytokine Group I 17-Plex	Abiko Y et al. (2014). **Serial changes of serum cytokines in Crohn's disease following treatment with adalimumab.** Hepatogastroenterology 61, 357–362.
Cytokine Group I 27-Plex	Hodkinson B et al. (2012). **Exaggerated circulating Th-1 cytokine response in early rheumatoid arthritis patients with nodules.** Cytokine 60, 561–564.
Cytokine Group I 27-Plex	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.
	Cancer Cell Lines (colon and hepatic)
Cytokine Group I 27-Plex Panel	Guerriero E et al. (2013). **Dissimilar cytokine patterns in different human liver and colon cancer cell lines.** Cytokine 64, 584–589.
	Cancer (colon)
Cytokine Group I 27-Plex and Group II 21-Plex Panels	Boissière-Michot F et al. (2014). **Characterization of an adaptive immune response in microsatellite-instable colorectal cancer.** Oncoimmunology 3, e29256.

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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 γδ 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.

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Bio-Plex Pro Assays and Panels	Chronic Obstructive Pulmonary Disease (COPD)
Cytokine Group I 27-Plex and Group II 21-Plex	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.
	Diabetes and Metabolism
Cytokine Group II 21-Plex and Diabetes 2- and 10-Plex	Costantini S et al. (2012). **Cytokinome profile of patients with type 2 diabetes and/or chronic hepatitis C infection.** PLoS One 7, e39486.
Cytokine Assays	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.
	Infectious Disease (protozoan)
Cytokine Group I 27-Plex	Moncunill G et al. (2013). **Performance of multiplex commercial kits to quantify cytokine and chemokine responses in culture supernatants from *Plasmodium falciparum* stimulations.** PLoS One 8, e52587.
	Infectious Disease (viral)
Cytokine Group I 27-Plex and Group II 21-Plex	Gupta M et al. (2012). **Serology and cytokine profiles in patients infected with the newly discovered Bundibugyo ebolavirus.** Virology 423, 119–124.
Cytokine 27-Plex	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.
Cytokine Group 1 27-Plex	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.
Group I and Chemokine	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.
Cytokine 21- and 27-Plex	Wranke A et al. (2014). **Anti-HDV IgM as a marker of disease activity in hepatitis delta.** PLoS One 9, e101002.

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Bio-Plex Pro Assays and Panels	Inflammation
Cytokine 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.

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	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.

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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 GSK3β-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.

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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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