MESO SCALE DISCOVERY®

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High Performance Biomarker Assays and Services
Singleplex and Multiplex Assay List
2020, Issue No. 1

S-PLEX®

NEW Ultra-Sensitive Assay Platform
TrueSensitivity™, Simple Execution

Spot the Difference®

www.mesoscale.com

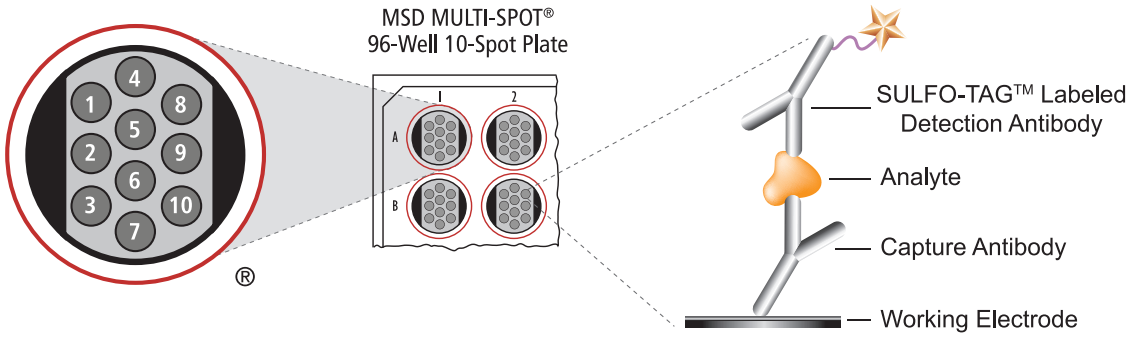
The MSD Advantage

MSD biomarker assays provide a rapid and convenient method for measuring the levels of individual or multiple targets within a single, small-volume sample. With a diverse menu of assay types well-suited to a broad range of applications, these highly-sensitive, easy-to-use assays enable researchers to:

- Measure multiple targets in a single sample,
- Measure high and low abundance targets in the same sample, with no extra dilutions necessary, and
- Read plates quickly, in as little as 90 seconds.

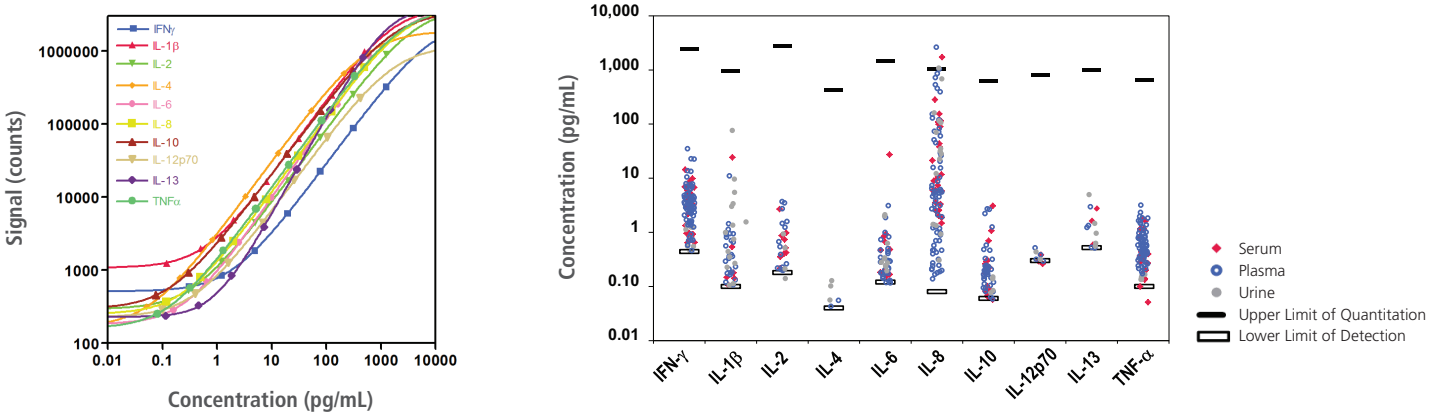
MULTI-ARRAY® Technology

MSD's products are based on MULTI-ARRAY technology, a unique combination of electrochemiluminescence (ECL) detection and patterned arrays. MSD MULTI-ARRAY technology offers exceptional sensitivity, dynamic range, and convenience. Background signals are minimal because the stimulation mechanism (electricity) is decoupled from the signal (light). Arrays bring speed and high information density to discovery through miniaturization, organization, and parallel processing of biological assays.



MULTI-SPOT technology enables multiplexing up to ten analytes per well and supports different assay formats, including sandwich immunoassays.

MSD Assays Offer a Broad Linear Range and High Degree of Matrix Tolerance



The wide linear dynamic range offered by MSD MULTI-ARRAY technology, illustrated above, enables the measurement of both normal and elevated analyte levels at a single dilution point. Quantification of multiple sample types is also shown, highlighting the assay's sensitivity, versatility, and matrix tolerance.

Discover the Right Immunoassay for You

From easy-to-build personalized multiplex assays to high-performance, validated assays, MSD has the right immunoassay product or service to meet all your immunoassay needs.

	R-PLEX®	U-PLEX®	T-PLEX™	V-PLEX®	S-PLEX®
Description	Matched antibody sets for building your own single or multiplex assay	Flexible, customized multiplex assays	Ready-to-use single and multiplex assay kits that replace traditional methods like ELISA	Analytically validated single and multiplex assay kits	Ultra-sensitive singleplex assays
Benefits	Provides an expanding menu of emerging biomarkers with MSD MULTI-ARRAY performance	Easily creates customized multiplex panels. Use MSD reagents or bring your own	Analyzes protein levels from many sample types with a single assay. Improved performance	Provides confidence and reliability. Analytically validated with guaranteed performance specifications	Measures proteins that are otherwise unmeasurable.
Analyte Menu	• • • • •	• • • •	• • • •	• • •	• •
Format	Antibody set and calibrator	Component-based assays	Kits	Lot-matched kits	Lot-matched kits
Multiplex	General recommendations	Optimized groups	Compatible panels	Fixed validated panels	Singleplex assays
Sample Compatibility	Tested with serum and plasma	Serum, EDTA plasma, cell culture supernatants	Secreted biomarker assays tested with serum, plasma, and cell culture supernatants; Intracellular assays tested with cell lysates	Serum, plasma, cell culture supernatants, urine; CSF for neurobiology products	Serum, EDTA Plasma, citrate plasma, heparin plasma, cell culture supernatants
Pre-coated Plate			•	•	
Validation		Components		Complete kit	Components
Component Level QC	•	•		•	•
Final Kit QC			•	•	•
COA Available		• (for components)		• (for components and kits)	• (for kits)

Discover the Right Assay Development Solution for You

MSD provides a suite of assay development tools to rapidly generate an assay to measure the levels of single or multiple targets within a single, small-volume sample. From easy-to-build U-PLEX multiplex assay development to high-performance MSD GOLD plates and custom services, MSD has the right assay development product or service to meet all your assay development needs.

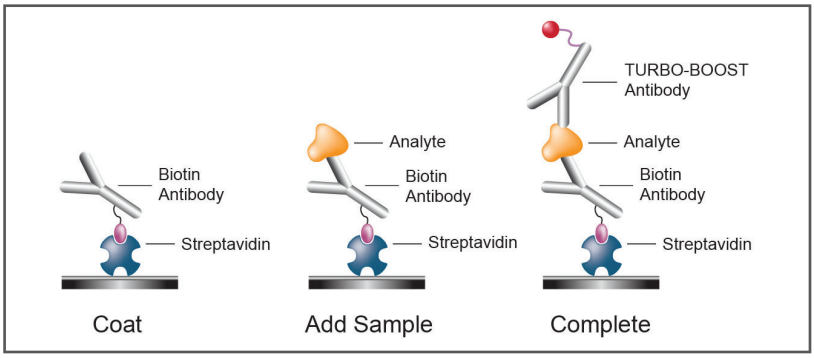
	MSD GOLD Plates and Reagents	**U-PLEX Assay Development**	**Assay Development Services**
	Most validated	Most flexible	Personalized development and support
Recommended Applications	When lot-to-lot reproducibility and consistency of results are critical.	When flexibility and variety in multiplex matters.	Assays manufactured to specific requirements.
Advantages	Provides confidence and reliability. Made under stringent quality control procedures with guaranteed specifications.	Easily creates custom multiplex panels. Use MSD reagents or bring your own.	Provides MSD products for your specific application that are otherwise unavailable.

S-PLEX TrueSensitivity, Simple Execution

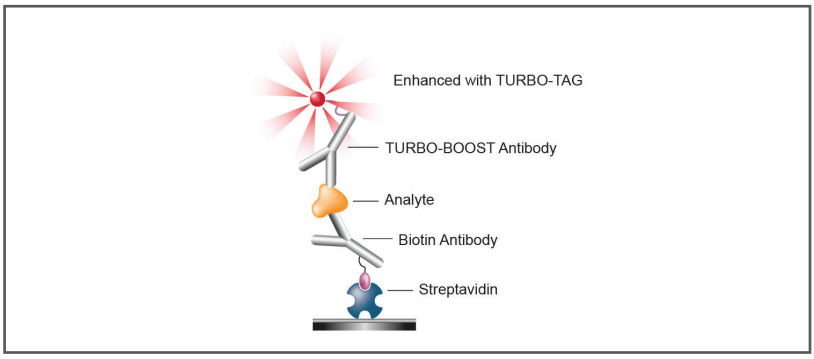
S-PLEX is MSD's ultra-sensitive assay platform. It can dramatically improve the sensitivity of immunoassays, reducing the lower limit of detection (LLOD) by 10- to 1000-fold over other assay methods. Detection limits in the low femtogram/mL range are common. These low detection limits enable the measurement of analytes at lower concentrations, reduce sample volume required, and reduce the amounts of critical reagents used. Now you can detect and measure very low abundance proteins in your samples with the confidence that you are specifically identifying your target of interest.

The S-PLEX assay format builds on MSD consumables and instruments and leverages MSD's assay development expertise. The S-PLEX procedure is similar to other MSD assay methods. It is comprised of three simple steps. The first step of an S-PLEX assay — ASSEMBLE — is to assemble the immunoassay in an MSD plate. The second step — ENHANCE — involves adding S-PLEX reagents that aid in the enhancement and generation of signal. The third step — READ — is simply the addition of MSD GOLD Read Buffer and measurement of the assay signals on an MSD instrument:

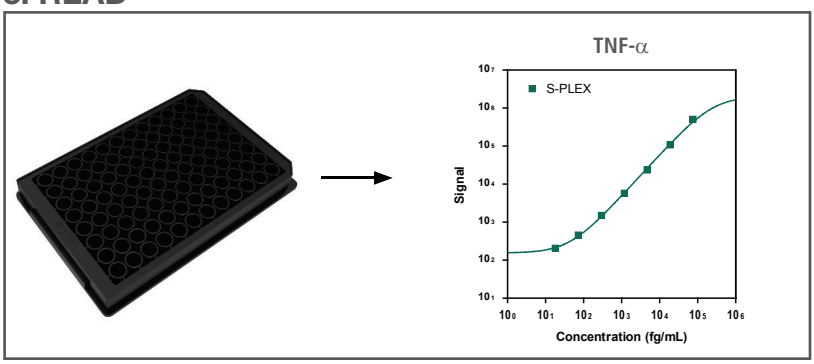
1. ASSEMBLE



2. ENHANCE



3. READ



NEW S-PLEX Assay Kits

S-PLEX Assay Kits have all the essential components for an ultra-sensitive assay that measures biomarkers in a single-analyte format. S-PLEX Assays offer low femtogram level limits of detection and are available in 1, 5, and 25-plate sizes.

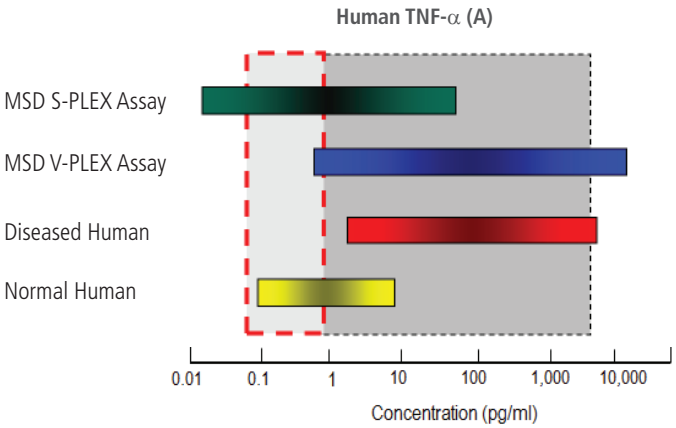
Highest Sensitivity

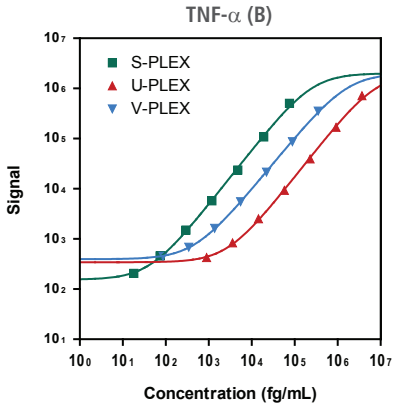
S-PLEX uses ECL technology, and retains its well-known advantages and superior analytical performance. The improved sensitivity of S-PLEX is due, in part, to the new TURBO-BOOST® and TURBO-TAG® reagents. When TURBO-TAG is combined with an antibody labeled with TURBO-BOOST, more signal is generated when compared to other ECL formats that use SULFO-TAG™ as the detection label.

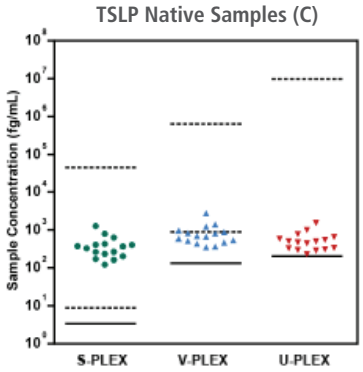
Analyte (Human)	Catalog No.	LLOD (fg/mL)	LLOQ (fg/mL)	ULOQ (fg/mL)
G-CSF	K151K3S	44	120	410,000
GM-CSF	K151F3S	1.9	4.4	21,000
IFN-α2a	K151P3S	4.9	29	52,000
IL-10	K151Y2S	1.4	9.8	12,000
IL-12p70	K151G3S	2.3	6.2	18,000
IL-17A	K151C3S	13	60	140,000
IL-2	K151Z2S	7.3	21	30,000
IL-22	K151H3S	2.2	7.6	24,000
IL-4	K151A3S	0.54	4.9	3,300
IL-5	K151J3S	2.02	5.9	19,000
IL-6	K151B3S	1.1	1.3	4,400
IL-9	K151R3S	8.6	39	68,000
TNF-α	K151E3S	6.8	12	42,000
TSLP	K151D3S	9.1	34	49,000

Sensitivity You Can Trust

The increased sensitivity of S-PLEX assays has important implications. S-PLEX shifts the dynamic range of assays, resulting in low detection limits. S-PLEX assays can measure new analytes that were previously below the detectable range of any existing assays, enabling the discovery and use of new biomarkers. S-PLEX assays have been tested with serum, plasma and cell culture supernatants. For more information about exact sample types tested for each assay, consult the product insert or visit our website.







Representative data are presented above and right. (A) Comparison of sensitivity ranges for different human TNF-α assay types show the unique sensitivity of the S-PLEX assay format. Increasingly, studies have shown that many biomarker levels are actually lower than previously thought (red dotted box). (B) Calibration curves for multiple TNF-α assay formats compare sensitivity. (C) Data from TSLP measured in native samples using three assay platforms reveal how samples on the S-PLEX format fall easily within detection limits. Each sample tested is represented by a closed circle, upward triangle, or downward triangle. The solid line indicates the LLOD. Dashed lines indicate the estimated lower limit of quantitation (LLOQ) and upper limit of quantitation (ULOQ) for each assay format.

S-PLEX Sample Testing Services

MSD offers S-PLEX sample-testing services with femtogram/mL sensitivity. Choose from our current offering of S-PLEX assays for sample testing or contact our experts who will work with you to understand your sample-testing needs and develop a plan that is right for you. For more information, contact MSD services at **https://www.mesoscale.com/en/products_and_services/services/s-plex**

R-PLEX

Matched Antibody Sets for Singleplex and Multiplex Assays with the Performance Benefits of MSD MULTI-ARRAY Technology

R-PLEX Antibody Sets are a fast, easy way to design a high-performance singleplex or multiplex immunoassay that delivers all of the advantages of MSD MULTI-ARRAY technology.

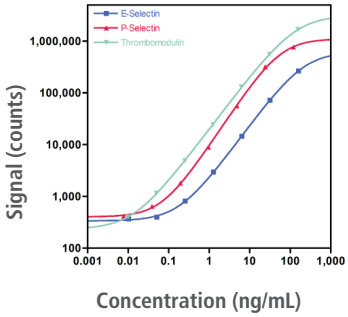
R-PLEX Antibody Set Components

- Biotinylated Capture Antibody
- SULFO-TAG labeled Detection Antibody
- Calibrator

Versatile

Choose the plate type depending on the specific application – singleplex assays are created on MSD GOLD Small Spot Streptavidin plates, while multiplex assays are designed by combining R-PLEX Antibody Sets on U-PLEX plates. Need more assay options? R-PLEX assays can be multiplexed with our extensive selection of U-PLEX Antibody Sets.

Representative Calibration Curves and Sensitivity



Representative data from three R-PLEX Antibody Sets multiplexed on U-PLEX plates. The data represent the superior performance of MSD's MULTI-ARRAY technology with high sensitivity and large dynamic range.

The R-PLEX portfolio is well-suited to measure biomarkers in a wide range of research areas including cancer, inflammation, immunology, metabolism, obesity, cell signaling, and neurodegeneration. R-PLEX Antibody Sets are screened with relevant sample types including serum and plasma.

Human

Analyte	UniProt ID	Common Applications
4-1BB/TNFRSF9	Q07011	immunology, immuno-oncology
6CKine/CCL21	O00585	Cytokines & Chemokines
A2M	P01023	inflammation
Aβ (total)	P05067	neurodegeneration
Aβ38 (4G8)	P05067	neurodegeneration
Aβ38 (6E10)	P05067	neurodegeneration
Aβ40 (4G8)	P05067	neurodegeneration
Aβ40 (6E10)	P05067	neurodegeneration
Aβ42 (4G8)	P05067	neurodegeneration
Aβ42 (6E10)	P05067	neurodegeneration
Adiponectin	Q15848	metabolism/obesity
AGP	P02763	aging, inflammation, metabolism
Aiolos	Q9UKT9	intracellular signaling, cardiac biomarkers
Albumin	P02768	infectious disease, toxicology
Alpha-amylase 1	P04745	metabolism
Ang-1	Q15389	angiogenesis, cancer, cardiovascular disorders
Ang-2	O15123	cardiovascular disorders

Human

Analyte	UniProt ID	Common Applications
Annexin A1	P04083	inflammation
ApoA1	P02647	artherosclerosis, metabolism/obesity
ApoC3	P02656	artherosclerosis, metabolism/obesity
ApoE	P02649	metabolism
APRIL/TNFSF13	O75888	immunology, immuno-oncology
Arginase-1	P05089	liver injury
B2M	P61769	immunology
B7-H2/ICOS-L	O75144	immunology, immuno-oncology
B7-H6	Q68D85	cytokines & chemokines, oncology & cancer
BAFF-R	Q96RJ3	immunology, inflammation
BCA-1/BLC	O43927	immuno-oncology, inflammation
Bcl-2	P10415	intracellular signaling
Bcl-X/Bcl2-L-1	Q07817	intracellular signaling
BCMA	Q02223	immunology
BIM/Bcl2-L-11	O43521	intracellular signaling
BMP-2	P12643	bone disorders
BMP-4	P12644	bone disorders

Human

Analyte	UniProt ID	Common Applications
BMP-7	P18075	bone disorders
BMP-9/GDF-2	Q9UK05	bone disorders
CA1	P00915	hypoxia, metabolism
CA15-3	P15941	cancer
CA50	NA	cancer
CA125	Q8WXI7	cancer
Calbindin	P05937	metabolism, neurobiology
Calprotectin	P05109	immunity, inflammation
Cathespsin D	P07339	cancer, neurobiology
CD5	P06127	immunology, oncology
CD5L	O43866	cytokines & chemokines
CD20	P11836	cancer
CD27	P26842	cancer, immunology, immuno-oncology
CD28	P10747	immunology, immuno-oncology
CD31/PECAM-1	P16284	angiogenesis, cell adhesion
CD40/TNFRSF5	P25942	immuno-oncology
CD40L (soluble)	P29965	immuno-oncology
CD80/B7-1	P33681	immuno-oncology, inflammation
CD276/B7-H3	Q5ZPR3	inflammation, immuno-oncology
CEA	P06731	cancer
cIAP1	Q13490	cancer, cardiovascular disorders, oncology
cIAP2	Q13489	cancer, cardiovascular disorders, oncology
CK Beta 8-1/ CCL23	P55773	cytokines & chemokines
CKBB	P12277	immunology, neurodegeneration
Clusterin	P10909	apoptosis, cell signaling, toxicology
Complement C3	P01024	immunology, inflammation
Complement C3a	P01024	immunology, inflammation
Complement C9	P02748	immunology, inflammation
Complement factor D	P00746	metabolism
Corin/ATC	Q9Y5Q5	cardiovascular disorders
CRP	P02741	autoimmune disorders, inflammation
CTLA-4	P16410	immuno-oncology
Cystatin C	P01034	toxicology
Cytokeratin-8	P05787	cancer, cell signaling
DPPIV	P27487	metabolism
E-Cadherin	P12830	cancer
EGF	P01133	cardiovascular disorders, toxicology
Endoglin	P17813	angiogenesis, cancer, cardiovascular disorders
Enolase 2	P09104	neurobiology
E-Selectin	P16581	cell adhesion, cell signaling
FABP3/H-FABP	P05413	cardiovascular disorders, toxicology
Factor VII	P08709	vascular immunoassays, cardiac biomarkers
FAP-α/SEPR	Q12884	angoigenesis, apoptosis, cell adhesion
Fas (soluble)	P25445	apoptosis
FasL	P48023	apoptosis, immunology

Human

Analyte	UniProt ID	Common Applications
FGF (acidic)	P05230	angiogenesis and vascular, oncology & cancer
FGF (basic)	P09038	angiogenesis, cancer
Fibronectin	Q9Y2H6	bone disorders
Galectin-3	P17931	cardiovascular disorders, oncology
GDF-15	Q99988	cell signaling
Gelsolin	P06396	cell signaling
GFAP	P14136	neurobiology
GITR	Q9Y5U5	cancer, infectious disease
GITRL	Q9UNG2	cancer, infectious disease
Glicentin	P01275	metabolism
gp130 (soluble)	P40189	cell signaling
Granzyme A	P12544	immuno-oncology
Granzyme B	P10144	immuno-oncology
Haptoglobin	P00738	cardiovascular disorders, immunity
HAVCR1/KIM-1	Q96D42	infectious disease, toxicology
HAVCR2/TIM-3	Q8TDQ0	immuno-oncology, inflammation
Hemoglobin alpha	P69905	angiogenesis, cardiovascular disorders
Hemopexin	P02790	angiogenesis, cardiovascular disorders
Hepcidin	P81172	growth factors
HGF	P14210	cardiovascular disorders, oncology
HSP70	P0DMV8	cell signaling
ICAM-1	P05362	immunology
ICAM-3	P32942	adhesion, immunology
ICOS	Q9Y6W8	immunology, immuno-oncology
IgE	NA	immunology, inflammation
IGF-1	P05019	metabolism
IGFBP-4	P22692	metabolism, growth factors
Ikaros	Q13422	intracellular signaling
IL1RL1/ST2	Q01638	cardiovascular disorders
IL-6R	P08887	immunity, immunology
Influenza A NP	B6A6U5	virology
Influenza B NP	Q596H1	virology
IR (soluble)	P06213	metabolism
IRS-1	P35568	metabolism
Lactotransferrin	P02788	immunology
LAG3	P18627	immuno-oncology
LIGHT/TNFSF14	O43557	immunology, inflammation
LRRK2	Q5S007	neurobiology, neurodegeneration
LRRK2 (pS935)	Q5S007	neurobiology, neurodegeneration
Mcl-1/BAK Complex	Q07820/ Q16611	intracellular signaling
Mcl-1/Bcl2-L-3	Q07820	intracellular signaling
Mcl-1/BIM Complex	Q07820/ Q43521	intracellular signaling
Mesothelin	Q13421	cancer
Met (soluble)	P08581	cancer, cell signaling
MIG	P49682	immunity, immunology
MIP-4	P55774	cell signaling, immunity, inflammation
MMP-1	P03956	cancer, inflammation
MMP-2	P08253	immunology, inflammation

Human

Analyte	UniProt ID	Common Applications
MMP-3	P08254	angiogenesis, cancer, cardiovascular disorders
MMP-7	P09237	angiogenesis, cancer, cardiovascular disorders
MMP-8	P22894	immunology, inflammation
MMP-9	P14780	angiogenesis, cancer, cardiovascular disorders
MMP-9 (total)	P14780	cancer, inflammation
MMP-10	P09238	immunology, inflammation
MPIF-1/CCL23	P55773	cytokines & chemokines
MPO	P05164	cardiovascular disorders, inflammation
NCAM-1	P13591	neurobiology, neurodegeneration
Nectin-4	Q96NY8	cancer, infectious disease
Neurofilament H	P12036	neurobiology, neurodegeneration
Neurofilament L	P07196	neurobiology, neurodegeneration
Neurotrophin-3	P20783	neurobiology, neurodegeneration
NGAL/LCN2	P80188	immunology, inflammation, toxicology
NT-ProBNP	P16860	cardiovascular disorders, toxicology
NPY	P49146	neurobiology, neurodegeneration
Osteoactivin	Q14956	bone disorders, cancer
Osteocalcin	P02818	bone disorders
Osteonectin	P09486	bone disorders
Osteopontin	P10451	bone disorders, cancer, inflammation
Osteoprotegerin	O00300	bone disorders
OX40	P43489	autoimmune disorders, cancer, immunology
OX40L	Q6FGS4	autoimmune disorders, cancer, immunology
P-Cadherin	P22223	cell adhesion, cell signaling
PDGF-A	P04085	growth factors
PDGF-B	P01127	growth factors
PD1	Q8IX89	immuno-oncology
PD-L1	Q9NZQ7	immuno-oncology
PD-L2	Q9BQ51	immuno-oncology
Pentraxin 3	P26022	immunity, infection, inflammation
Perforin	P14222	immuno-oncology
Periostin/OSF-2	Q15063	inflammation, oncology
PlGF	P49763	angiogenesis, cancer
PRDX-1	Q06830	oxidative stress, redox homeostatsis
PRDX6	P30041	oxidative stress, redox homeostatsis
Prolactin	P01236	fertility
proMMP-9	P14780	cardiovascular disorders, immuno-oncology
P-Selectin	P16109	cardiovascular disorders, cell adhesion
PSGL-1	Q14242	cell adhesion
PYY (active)	P10082	metabolism
RAGE (soluble)	Q15109	immunology, inflammation
RANTES	P13501	immunology, inflammation
RBP4	P04916	cardiovascular disorders, metabolism
Resistin	Q9HD89	metabolism/obesity
S100A8/MRP8	P05109	immunity, inflammation

Human

Analyte	UniProt ID	Common Applications
S100A12	P80511	immunity, inflammation
SAA	P0DJ18	inflammation, cardiovascular
SCF	P21583	cell signaling, immunology
SCFR/Kit	P10721	cardiovascular disorders, oncology
Serpin A1	P01009	cardiovascular disorders, immunology
Serpin A12/ Vaspin	Q8IW75	metabolism/obesity
Serpin E1 (active)	P05121	cardiovascular disorders
Serpin E1 (inactive)	P05121	cardiovascular disorders
Serpin E1 (total)	P05121	cardiovascular disorders
Serpin F2	P08697	angiogenesis, cardiovascular disorders
SHBG	P04278	reproductive biology
SPINK-1	P00995	metabolic, oncology & cancer
Spk1	Q9NYA1	vascular immunoassays
TACI/TNFRSF13	O14836	immuno-oncology
Tau (total)	P10636	neurobiology, neurodegeneration
TECH/CCL25	O15444	cytokines & chemokines
Tenascin C	P24821	cancer, wound healing
TFF3	Q07654	inflammation, wound healing
TfR-1 (soluble)	P02786	iron uptake, metabolism
Thrombomodulin	P07204	cardiovascular disorders, hemostasis
Tie-2	Q02763	angiogenesis, cell signaling
TIMP-1	P01033	angiogenesis, cancer, cardiovascular disorders
TLR1	Q15399	immunity, immuno-oncology
TNFAIP6/TSG-6	P98066	inflammation
TNF-RI	P19438	apoptosis, immunity, inflammation
TNF-RII	P20333	apoptosis, immunity, inflammation
TNFRSF10C	O14798	cancer, cell signaling
Troponin I (cardiac)	P19429	cardiovascular disorders, toxicology
Troponin T (cardiac)	P45379	cardiovascular disorders, toxicology
U-PAR	Q03405	cancer, oncology
Uromodulin	P07911	inflammation, toxicology
VCAM-1	P19320	angiogenesis
VEGF-D	O43915	angiogenesis, cancer, cell differentiation
VEGFR-2/KDR	P35968	angiogenesis
VILIP-1	P62760	cell signaling
Vit D Binding Protein	P02774	metabolism
vWF	P04275	cardiovascular disorders, coagulation

NHP

Analyte	UniProt ID	Common Applications
Alpha-amylase 2A	P04746	metabolism

Mouse

Analyte	UniProt ID	Common Applications
Adiponectin	Q60994	metabolism
C1q receptor	O89103	cytokines & chemokines
CD14	P10810	cytokines & chemokines
Clusterin	Q06890	apoptosis, cell signalling, toxicology
C-Peptide	P01325	metabolism
Cystatin C	P21460	toxicology
Fractalkine	O35188	cytokines & chemokines
Glucagon	P01275	metabolism
Granzyme B	Q3TZH4	immuno-oncology
Leptin	P41160	metabolism
MIG	P18340	cytokines & chemokines
MMP-3 (total)	P28862	Angiogenesis and Vascular, Oncology & Cancer
PF-4/Cxcl4	Q9Z126	cytokines & chemokines
PYY (total)	Q9EPS2	metabolism
RBP4	Q00724	cardiovascular disorders, metabolism
Resistin	Q99P87	inflammation, metabolism
Tau (total)	P10637	neurodegeneration
TNF-RII	P25119	apoptosis, immunity, inflammation
TREM-1	Q9JKE2	cytokines & chemokines

Mouse C-Peptide and PYY (total) antibody sets also detect rat C-Peptide and PYY (total).

Rat

Analyte	UniProt ID	Common Applications
A2M	P06238	cardiovascular disorders, toxicology
Adiponectin	Q8K3R4	inflammation, metabolism/obesity
AGP	P02764	immunology, inflammation
C-Peptide	P01322	metabolism
EPO	P29676	autoimmune disorders, toxicology
Glucagon	P01275	metabolism
GM-CSF	P48750	immunity, inflammation, oncology
IFN-γ	P01581	inflammation, neurodegeneration, toxicology
IL-1α	P16598	inflammation, neurodegeneration
IL-1β	Q63264	inflammation, neurodegeneration
IL-2	P17108	infectious disease, inflammation
IL-4	P20096	immunology, inflammation
IL-5	Q08125	immunology, inflammation
IL-6	P20607	cardiovascular disorders, inflammation
IL-10	P29456	infectious disease, inflammation
IL-13	P42203	infectious disease, inflammation
KC/GRO	P14095	cardiovascular disorders, inflammation
KIM-1	O54947	infectious disease, toxicology
Leptin	P50596	metabolism
MCP-1	P14844	cardiovascular disorders, neurodegeneration
MIP-3α	P97884	immunology, inflammation
NGAL/LCN2	P30152	oncology, toxicology
Osteopontin	P08721	bone disorders, cancer, inflammation
PYY (total)	P10631	metabolism
TIMP-1	P30120	oncology
TNF-α	P16599	inflammation
TREM-1	D4ABU7	cytokines & chemokines
VEGF-A	P16612	cardiovascular disorders

Rat C-Peptide and PYY (total) antibody sets also detect mouse C-Peptide and PYY (total).

Design Your Assay Using R-PLEX Antibody Sets

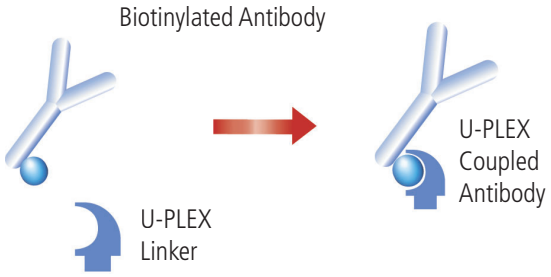
Visit **www.mesoscale.com/r-plex** to view the following resources, which will assist in building an assay using R-PLEX Antibody Sets:

- R-PLEX Assay Diluent Volume Calculation
- R-PLEX Assay/Antibody Diluent Combinations
- R-PLEX Datasheets
- R-PLEX Product Inserts

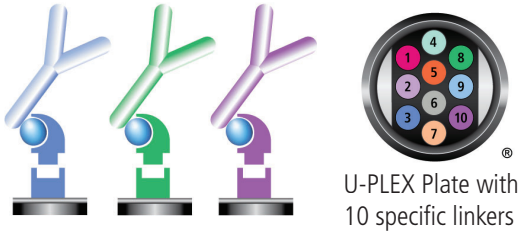
U-PLEX Assays and Assay Development Tools Deliver Maximum Flexibility

Design and run a personalized multiplex in your own lab without any additional equipment or time-consuming assay development. The flexibility of the U-PLEX platform empowers you to make personalized multiplex assay combinations quickly and easily. Select your U-PLEX assays from Groups, Custom Assays, Development Packs, or individual assays. All U-PLEX assays are demonstrated to work with serum, plasma, and cell culture samples.

1. COUPLE

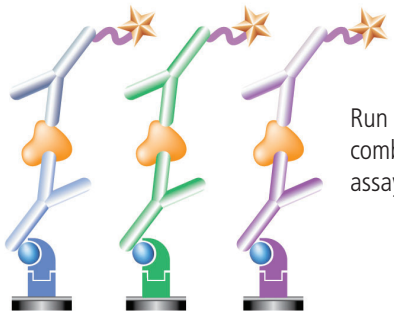


2. COAT



U-PLEX Plate with 10 specific linkers

3. COMPLETE



Run personalized combinations of assays

The U-PLEX assay development workflow is a simple three-step process.

U-PLEX Groups

U-PLEX groups represent a comprehensive menu of analytes assembled by species, abundance in matrices tested, analytical compatibility, clinical range, and expected use. Any number of assays may be selected from within a group to create personalized multiplex combinations. Up to 10 U-PLEX assays may be multiplexed on each plate for simultaneous measurement.

Species	Name	Cat. No.
Human	Biomarker Group 1 Assays	K15067L
NHP	Biomarker Group 1 Assays	K15068L
Mouse	Biomarker Group 1 Assays	K15069L
Human	Metabolic Group 1 Assays	K151ACL

U-PLEX Custom Assays

U-PLEX custom assays enable creation of custom multiplexes with a combination of MSD U-PLEX assays and your own analytes, using activated spots.

Species	Name	Cat. No.
Human	Custom Biomarker Assays	K15067M
NHP	Custom Biomarker Assays	K15068M
Mouse	Custom Biomarker Assays	K15069M
Human	Custom Metabolic Assays	K151ACM

U-PLEX Development Packs

Perform custom multiplexing with your own analytes, with 2 to 10 activated spots per well.

Name	Cat. No. (SECTOR Plate)
Development Pack, 2-Assay	K15227N
Development Pack, 3-Assay	K15228N
Development Pack, 4-Assay	K15229N
Development Pack, 5-Assay	K15230N
Development Pack, 6-Assay	K15231N
Development Pack, 7-Assay	K15232N
Development Pack, 8-Assay	K15233N
Development Pack, 9-Assay	K15234N
Development Pack, 10-Assay	K15235N

Customize Your Assay with the U-PLEX Assay Designer

The U-PLEX platform allows you to create custom multiplex assays from a selection of MSD assays, your own analytes, or a combination of both. Explore your options at **www.mesoscale.com/U-PLEX**.

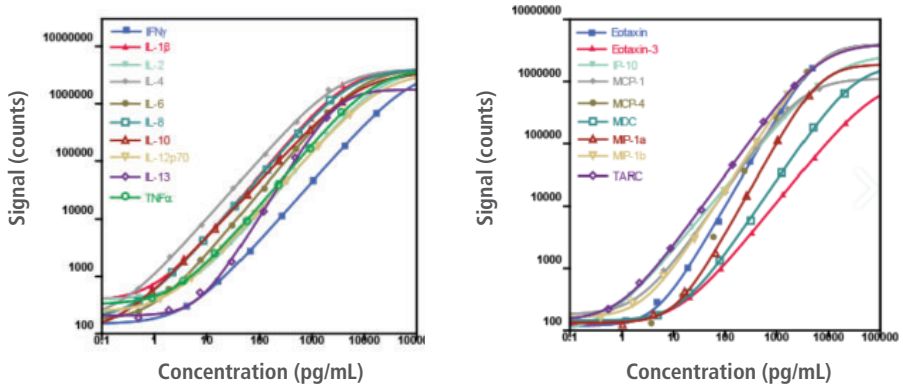
U-PLEX Assays: Built on Quality Components

The U-PLEX technology is an open and highly flexible platform that delivers the quality for which MSD is known. Every order is filled with proven, high-quality components that have been thoroughly characterized. U-PLEX assays are designed, developed, and manufactured under MSD's Quality Management System.

Rigorous quality standards are applied and a wide range of performance measurements are taken during the development of every U-PLEX assay. Representative data for three performance measurements are presented below. In addition, precision, spike recovery, cross reactivity, and dilution linearity are also characterized.

Biomarker Titration

Standard curves and LLODs are generated from at least three experimental runs. U-PLEX curves typically show a 3-4 log dynamic range, allowing quantification in both normal and diseased/stimulated samples with minimal sample dilution.



Typical calibration curves for U-PLEX biomarkers are shown at left.

Lower Limit of Detection

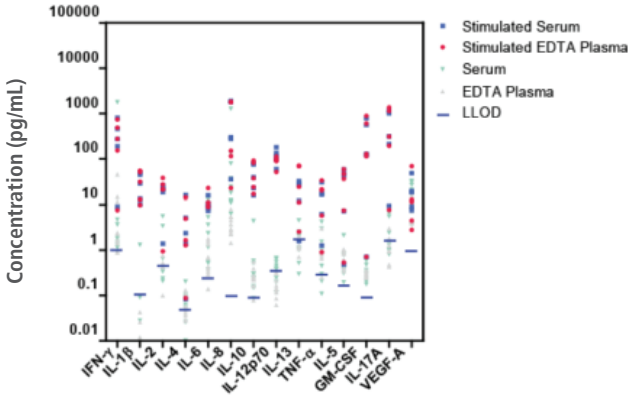
LLODs for U-PLEX assays range from pg/mL to sub pg/mL levels.

	LLOD (pg/mL)									
Assays	IFN-γ	IL-1β	IL-2	IL-4	IL-6	IL-8	IL-10	IL-12p70	IL-13	TNF-α
U-PLEX	1.7	0.15	0.7	0.08	0.33	0.150	0.14	0.69	3.1	0.51

	LLOD (pg/mL)							
Assays	Eotaxin	IP-10	MCP-1	MCP-4	MDC	MIP-1α	MIP-1β	TARC
U-PLEX	3.2	0.49	0.74	7.5	8.4	7.7	1.5	0.51

Native Sample Testing

Testing of normal and diseased serum and plasma samples (n>3 of each) is part of every assay development. If an analyte is not detected, then samples are spiked with supernatants from cultured PBMCs that have been stimulated to secrete a wide array of biomarkers. Analyte concentrations from each sample are determined and plotted along with the LLOD for each standard.



Native analytes are detectable in normal serum and EDTA plasma, as well as in serum and EDTA plasma that are spiked with culture supernatants obtained from stimulated PBMCs.

Human Biomarkers

Analyte	LLOD - ULOD, pg/mL
CTACK	1.8 – 4,200
ENA-78	0.53 – 3,900
Eotaxin	3.2 – 4,800
Eotaxin-2	3.1 – 6,000
Eotaxin-3	7.3 – 21,400
EPO	1.8 – 20,000
FLT3L	0.49 – 6,000
Fractalkine	102 – 180,800
G-CSF	1.6 – 20,400
GM-CSF	0.12 – 9,400
GRO-α	0.25 – 2,500
I-309	6.8 – 3,000
IFN-α2a	4.0 – 42,400
IFN-β	3.1 – 100,000
IFN-γ	1.7 – 17,000
IL-1α	0.98 – 5,100
IL-1β	0.15 – 3,800
IL-1RA	1.7 – 5,000
IL-2	0.70 – 1,900
IL-2Rα	10 – 55,000
IL-3	11 – 16,000
IL-4	0.08 – 2,100
IL-5	0.24 – 4,000
IL-6	0.33 – 2,000
IL-7	1.5 – 7,000
IL-8	0.15 – 2,200
IL-9	0.14 – 1,500
IL-10	0.14 – 3,700
IL-12/IL-23p40	2.8 – 21,000
IL-12p70	0.69 – 5,300
IL-13	3.1 – 1,900
IL-15	0.82 – 3,000
IL-16	6.6 – 21,500
IL-17A	2.6 – 23,400
IL-17A/F	1.8 – 18,400
IL-17B	0.79 – 4,000
IL-17C	2.2 – 20,000
IL-17D	4.8 – 40,000
IL-17E/IL-25	0.58 – 9,200
IL-17F	155 – 112,000
IL-18	2.5 – 42,000
IL-21	1.2 – 12,600
IL-22	0.13 – 3,400
IL-23	1.4 – 21,600
IL-27	9.6 – 50,600
IL-29/IFN-λ1	1.2 – 11,800
IL-31	7.3 – 11,100
IL-33	0.59 – 10,300
IP-10	0.49 – 6,000
I-TAC	1.5 – 5,100
MCP-1	0.74 – 6,600
MCP-2	0.11 – 2,000

Human Biomarkers

Analyte	LLOD - ULOD, pg/mL
MCP-3	0.79 – 5,000
MCP-4	7.5 – 3,800
M-CSF	0.29 – 2,000
MDC	8.4 – 20,100
MIF	4.3 – 27,000
MIP-1α	7.7 – 4,200
MIP-1β	1.5 – 1,600
MIP-3α	1.8 – 20,800
MIP-3β	0.67 – 2,000
MIP-5	0.34 – 30,000
SDF-1α	278 – 103,200
TARC	0.51 – 2,200
TGF-β1	9.1 – 37,000
TGF-β2	2.5 – 38,900
TGF-β3	1.4 – 38,600
TNF-α	0.54 – 3,700
TNF-β	0.47 – 4,300
TPO	19 – 40,400
TRAIL	0.66 – 10,000
TSLP	0.20 – 10,100
VEGF-A	2.0 – 4,900
YKL-40	0.39 – 5,000

NHP Biomarkers

Analyte	LLOD - ULOD, pg/mL
CTACK	1.8 – 4,200
ENA-78	0.36 – 3,900
Eotaxin	0.30 – 4,800
Eotaxin-2	3.1 – 6,000
Eotaxin-3	7.3 – 21,400
FLT3L	0.49 – 6,000
Fractalkine	102 – 180,800
G-CSF	1.5 – 20,400
GM-CSF	0.12 – 9,400
GRO-α	0.25 – 2,500
I-309	6.8 – 3,000
IFN-α2a	1.7 – 40,800
IFN-γ	1.7 – 17,000
IL-1α	0.60 – 5,100
IL-1β	0.15 – 3,800
IL-1RA	1.7 – 5,000
IL-2	0.70 – 1,900
IL-4	0.06 – 2,100
IL-5	0.24 – 4,000
IL-6	0.33 – 2,000
IL-7	1.5 – 7,000
IL-8	0.15 – 2,200
IL-9	0.14 – 1,500
IL-10	0.14 – 3,700
IL-12/IL-23p40	2.8 – 21,000
IL-12p70	0.54 – 5,300

NHP Biomarkers

Analyte	LLOD - ULOD, pg/mL
IL-13	1.2 – 1,900
IL-15	0.82 – 3,000
IL-16	6.6 – 21,500
IL-17A	2.3 – 23,400
IL-17A/F	1.8 – 18,400
IL-17B	0.79 – 4,000
IL-17C	2.2 – 20,000
IL-17D	4.8 – 40,000
IL-17F	155 – 112,000
IL-18	2.5 – 42,000
IL-22	0.13 – 3,400
IL-23	1.4 – 21,600
IP-10	0.49 – 6,000
I-TAC	1.5 – 2,000
MCP-1	0.74 – 6,600
MCP-2	0.11 – 2,000
MCP-3	0.79 – 5,000
MCP-4	7.5 – 3,800
M-CSF	0.29 – 2,000
MDC	8.4 – 20,100
MIF	4.3 – 27,000
MIP-1α	7.7 – 4,200
MIP-1β	1.5 – 1,600
MIP-3α	0.27 – 20,800
MIP-3β	0.67 – 2,000
MIP-5	0.34 – 30,000
SDF-1α	18 – 103,200
TARC	0.51 – 2,200
TGF-β1	9.1 – 37,000
TGF-β2	2.5 – 38,900
TGF-β3	1.4 – 38,600
TNF-α	0.54 – 3,700
TNF-β	0.47 – 4,300
TPO	19 – 40,400
TRAIL	0.66 – 10,000
VEGF-A	2.0 – 4,900
YKL-40	0.39 – 5,000

Mouse Biomarkers

Analyte	LLOD - ULOD, pg/mL
6CKine/CCL21	1.5 – 4,000
BAFF	0.51 – 4,000
BCA-1/BLC	21 – 32,000
CD40	2.6 – 8,000
Eotaxin	4.6 – 15,000
EPO	4.5 – 12,500
GM-CSF	0.16 – 1,000
IFN-α	139 – 100,000
IFN-β	5.2 – 6,000

Mouse Biomarkers

Analyte	LLOD - ULOD, pg/mL
IFN-γ	0.16 – 2,900
IL-1β	3.1 – 13,000
IL-2	1.1 – 10,900
IL-4	0.56 – 10,000
IL-5	0.63 – 2,800
IL-6	4.8 – 16,000
IL-9	1.4 – 8,900
IL-10	3.8 – 22,800
IL-12/IL-23p40	1.4 – 20,400
IL-12p70	48 – 89,000
IL-13	2.7 – 22,800
IL-15	24 – 131,400
IL-16	3.6 – 6,300
IL-17A	0.3 – 2,100
IL-17A/F	0.61 – 10,600
IL-17C	2.3 – 45,600
IL-17E/IL-25	1.6 –18,900
IL-17F	24 – 52,600
IL-21	6.5 – 40,600
IL-22	1.2 – 1,800
IL-23	4.9 – 20,400
IL-27p28/IL-30	8.7 – 73,300
IL-31	45 – 66,300
IL-33	2.2 – 36,000
IP-10	0.51 – 4,900
KC/GRO	4.8 – 16,000
MCP-1	1.4 – 1,400
MCP-5/CCL12	0.14 – 1,500
MDC	13 – 10,000
MIP-1α	0.21 – 2,100
MIP-1β	13 – 30,800
MIP-2	0.30 – 2,000
MIP-3α	0.10 – 2,500
MMP-9 (total)	49 – 80,000
NGAL/LCN2	24 – 50,000
RANTES	0.72 – 2,000
SDF-1α	8.1 – 50,000
TARC	0.32 – 1,200
TGF-β1	37 – 38,900
TGF-β2	2.5 – 39,300
TGF-β3	2.5 – 40,000
TNF-α	1.3 – 6,200
TNF-RI	0.46 – 2,000
VEGF-A	0.77 – 12,100

U-PLEX Biomarker Combinations

U-PLEX Combinations represent popular combinations of analytes, grouped into separate catalog numbers for ordering convenience.

U-PLEX Biomarker Human Combinations

Name (Cat. No.)	Analytes
Biomarker Group 1 71-Plex (K15081K)	CTACK, ENA-78, Eotaxin, Eotaxin-2, Eotaxin-3, EPO, FLT3L, Fractalkine, G-CSF, GM-CSF, GRO-α, I-309, IFN-α2a, IFN-β, IFN-γ, IL-1α, IL-1β, IL-1RA, IL-2, IL-2Rα, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12/IL-23p40, IL-12p70, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL-17B, IL-17C, IL-17D, IL-17E/IL-25, IL-17F, IL-18, IL-21, IL-22, IL-23, IL-27, IL-29/IFN-λ1, IL-31, IL-33, IP-10, I-TAC, MCP-1, MCP-2, MCP-3, MCP-4, M-CSF, MDC, MIF, MIP-1α, MIP-1β, MIP-3α, MIP-3β, MIP-5, SDF-1α, TARC, TNF-α, TNF-β, TPO, TRAIL, TSLP, VEGF-A, YKL-40
Chemokine Combo 1 (K15047K)	Eotaxin, Eotaxin-2, Eotaxin-3, IL-8, IP-10, MCP-1, MCP-2, MCP-3, MCP-4, MDC, MIP-1α, MIP-1β, TARC
Chemokine Combo 2 (K15046K)	CTACK, ENA-78, Fractalkine, GRO-α, I-309, I-TAC, MIF, MIP-3α, MIP-3β, MIP-5, SDF-1α
Cytokine Combo 1 (K15045K)	GM-CSF, IL-1α, IL-5, IL-7, IL-12/IL-23p40, IL-15, IL-16, IL-17A, TNF-β, VEGF-A
Interferon Combo (K15094K)	IFN-α, IFN-β, IFN-γ, IL-29/IFN-λ1
Proinflammatory Combo 1 (K15049K)	IFN-γ, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-13, TNF-α
Proinflammatory Combo 2 (K15066K)	GM-CSF, IFN-γ, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70
Proinflammatory Combo 3 (K15052K)	IFN-γ, IL-1β, IL-6, TNF-α
Proinflammatory Combo 4 (K15053K)	IL-1β, IL-6, IL-8, TNF-α
T-Cell Combo (K15093K)	GM-CSF, IFN-γ, IL-2, IL-4, IL-9, IL-10, IL-13, IL-17A, IL-17E/IL-25, IL-17F, IL-21, IL-22, MIP-3α, TNF-α
TGF-β Combo (K15241K)	TGF-β1, TGF-β2, TGF-β3
TH1/TH2 Combo 1 (K15010K)	IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-8, IL-10, IL-12p70, IL-13, TNF-α
TH17 Combo 1 (K15075K)	IL-17A, IL-17E/IL-25, IL-17F, IL-21, IL-22, IL-23, IL-27, IL-31, IL-33
TH17 Combo 2 (K15076K)	IFN-γ, IL-1β, IL-6, IL-10, IL-17A, IL-17E/IL-25, IL-17F, IL-21, IL-22, TNF-α

U-PLEX Biomarker NHP* Combinations

Name (Cat. No.)	Analytes
Biomarker Group 1 60-Plex (K15082K)	CTACK, ENA-78, Eotaxin, Eotaxin-2, Eotaxin-3, FLT3L, Fractalkine, G-CSF, GM-CSF, GRO-α, I-309, IFN-α2a, IFN-γ, IL-1α, IL-1β, IL-1RA, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12/IL-23p40, IL-12p70, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL-17B, IL-17C, IL-17D, IL-17F, IL-18, IL-22, IL-23, IP-10, I-TAC, MCP-1, MCP-2, MCP-3, MCP-4, M-CSF, MDC, MIF, MIP-1α, MIP-1β, MIP-3α, MIP-3β, MIP-5, SDF-1α, TARC, TNF-α, TNF-β, TPO, TRAIL,VEGF-A, YKL-40
Chemokine Combo 1 (K15055K)	Eotaxin, Eotaxin-3, IL-8, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, TARC
Cytokine Combo 1 (K15057K)	GM-CSF, IL-1α, IL-5, IL-7, IL-12/IL-23p40, IL-15, IL-16, IL-17A, TNF-β, VEGF-A
Proinflammatory Combo 1 (K15070K)	IFN-γ, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, TNF-α
T-Cell Combo (K15095K)	GM-CSF, IFN-γ, IL-2, IL-4, IL-9, IL-10, IL-13, IL-17A, IL-17F, IL-22, MIP-3α, TNF-α
TGF-β Combo (K15243K)	TGF-β1, TGF-β2, TGF-β3
TH1/TH2 Combo (K15080K)	IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-8, IL-10, IL-12p70, TNF-α
TH17 Combo 1 (K15079K)	IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-17A, TNF-α

** NHP assays recognize analytes from Cynomolgus and Rhesus monkeys.*

U-PLEX Biomarker Mouse Combinations

Name (Cat. No.)	Analytes
Biomarker Group 1 50-Plex (K15322K)	6CKine/CCL21, BAFF, BCA-1/BLC, CD40, Eotaxin, EPO, GM-CSF, IFN-α, IFN-β, IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12/IL-23p40, IL-12p70, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, IL-23, IL-27p28/IL-30, IL-31, IL-33, IP-10, KC, MCP-1, MCP-5/CCL12, MDC, MIP-1α, MIP-1β, MIP-2, MIP-3α, MMP-9 (total), NGAL/LCN2, RANTES, SDF-1α, TARC, TNF-RI, TNF-α, VEGF-A
Chemokine Combo 1 (K15321K) **NEW**	IP-10, KC/GRO, MCP-1, MIP-1α, MIP-1β, MIP-2, MIP-3α, MDC
Chemokine Combo 2 (K15319K) **NEW**	6CKine/CCL21, BCA-1/BLC, MCP-5/CCL12, RANTES, SDF-1α, TARC
Interferon Combo (K15320K) **NEW**	IFN-α, IFN-β, IFN-γ
T-Cell Combo (K15098K)	GM-CSF, IFN-γ, IL-2, IL-4, IL-9, IL-10, IL-13, IL-17A, IL-17E/IL-25, IL-17F, IL-21, IL-22, MIP-3α, TNF-α
TGF-β Combo (K15242K)	TGF-β1, TGF-β2, TGF-β3
TH1/TH2 Combo 1 (K15072K)	IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-10, IL-12p70, IL-13, KC/GRO, TNF-α
TH17 Combo 1 (K15077K)	IL-17A, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, IL-23, IL-31, IL-33
TH17 Combo 2 (K15078K)	IFN-γ, IL-1β, IL-6, IL-17A, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, TNF-α

U-PLEX Metabolic Group 1 Assays **NEW**

The complex pathologies of diabetes, cardiovascular disease, and metabolic syndrome have driven an increased demand for quantitative measurement of biomarkers associated with these disease states. Obesity is directly related to increased risk for diabetes, hypertension, atherosclerosis, and metabolic syndrome. Novel proteomic technologies have helped define key serum biomarkers produced in the gut and adipose tissue and altered in abundance in disease states.

MSD provides solutions to support and simplify your metabolic research needs. Assays for Metabolic Human, Mouse, and Rat analytes are available individually or in multiplexes.

Assays that are anchored to NIBSC/WHO International Standards are indicated in the tables below. Additional information on the NIBSC/WHO International Standards is provided in the U-PLEX metabolic product inserts available on the website.

U-PLEX Metabolic Human Biomarkers

Analyte	LLOD - ULOD	Units
BAFF	0.05 – 500	pg/mL
BDNF*	0.72 – 2,000	pg/mL
β-NGF*	0.05 – 498	pg/mL
C-Peptide*	14 – 7,610	pg/mL
FGF-21	2.8 – 8,230	pg/mL
FGF-23	0.75 – 3,000	pg/mL
FSH	9.0 – 75,000	µIU/mL
Ghrelin (active)	13 – 7,160	pg/mL
Ghrelin (total)	1.7 – 2,710	pg/mL
GIP (active)	1.3 – 1,920	pg/mL
GIP (inactive)	27 – 12,500	pg/mL

Analyte	LLOD - ULOD	Units
GIP (total)	3.7 – 12,500	pg/mL
GLP-1 (active)	0.01 – 57	pM
GLP-1 (inactive)	1.5 – 576	pM
GLP-1 (total)	0.59 – 576	pM
Glucagon*	0.13 – 156	pM
Insulin*	0.32 – 736	µIU/mL
Leptin*	14 – 47,500	pg/mL
LH*	1.6 – 27,700	µIU/mL
PP	0.19 – 1,830	pg/mL
Proinsulin*	0.05 – 130	pM
PYY (total)	2.7 – 2,260	pg/mL

**Assays are anchored to NIBSC/WHO International Standards.*

U-PLEX Metabolic Mouse Biomarkers

Analyte	LLOD - ULOD	Units
BDNF*	0.72 – 2,000	pg/mL
C-Peptide	223 – 125,000	pg/mL
FGF-21	2.8 – 8,230	pg/mL
Ghrelin (active)	13 – 7,160	pg/mL
Ghrelin (total)	1.7 – 2,710	pg/mL
GLP-1 (active)	0.14 – 57.0	pM
GLP-1 (inactive)	1.5 – 576	pM
GLP-1 (total)	0.59 – 576	pM
Glucagon*	0.13 – 156	pM
Insulin	3.0 – 5,504	µIU/mL
Leptin	11 – 50,000	pg/mL
PYY (total)	1.1 – 4,000	pg/mL

**Assays are anchored to NIBSC/WHO International Standards.*

U-PLEX Metabolic Rat Biomarkers

Analyte	LLOD - ULOD	Units
BDNF*	0.72 – 2,000	pg/mL
C-Peptide	223 – 125,000	pg/mL
FGF-21	2.8 – 8,230	pg/mL
Ghrelin (active)	13 – 7,160	pg/mL
Ghrelin (total)	1.7 – 2,710	pg/mL
GLP-1 (active)	0.14 – 57.0	pM
GLP-1 (inactive)	1.5 – 576	pM
GLP-1 (total)	0.59 – 576	pM
Glucagon*	0.13 – 156	pM
Insulin	3.0 – 5,504	µIU/mL
Leptin	11 – 50,000	pg/mL
PYY (total)	1.1 – 4,000	pg/mL

**Assays are anchored to NIBSC/WHO International Standards.*

Individual assays can be configured into customized multiplex combinations of your choice.

Additional assays that are compatible with the above assays are available on the U-PLEX platform. View our complete portfolio and customize your U-PLEX Assay with the Assay Designer at www.mesoscale.com/U-PLEX.

U-PLEX Metabolic Combinations **NEW**

U-PLEX Metabolic Human Combinations

Name (Cat. No.)	Analytes
Metabolic Group 1 87-Plex (K15280K)	BAFF, BDNF, β-NGF, C-Peptide, CTACK (CCL27), ENA-78 (CXCL5), Eotaxin (CCL11), Eotaxin-2 (CCL24), Eotaxin-3 (CCL26), EPO, FGF-21, FGF-23, FLT3L, FSH, Fractalkine (CX3CL1), G-CSF, Ghrelin (active), Ghrelin (total), GIP (active), GIP (inactive), GIP (total), GLP-1 (active), GLP-1 (inactive), GLP-1 (total), Glucagon, GM-CSF, GRO-α (CXCL1), I-309 (CCL1), IFN-α2a, IFN-β, IFNγ, IL1α, IL-1β, IL-1RA, IL-2, IL-2Rα, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8 (CXCL8), IL9, IL-10, IL12/IL-23p40, IL-12p70, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL17C, IL-17D, IL-17E/IL-25, IL17F, IL-18, IL-21, IL-22, IL-23, IL-27, IL29/IFN-λ1, IL-31, IL-33, Insulin, IP-10 (CXCL10), Leptin, LH, MCP-1 (CCL2), MCP-2 (CCL8), MCP-4 (CCL13), M-CSF, MDC (CCL22), MIF, MIP-1α (CCL3), MIP-5, PP, Proinsulin, PYY (total), SDF-1α (CXCL12), TARC (CCL17), TNF-α, TNF-β, TPO, TRAIL, TSLP, VEGFA, YKL-40
Adipokine Combo 1 (K15276K)	BDNF, β-NGF, IL-1β, IL-6, IL-8, IL-10, Insulin, Leptin, MCP-1, TNF-α
Diabetes Combo 1 (K15274K)	C-Peptide, GIP (total), GLP-1 (total), Glucagon, Insulin, Leptin, PYY (total)
Diabetes Combo 2 (K15275K)	C-Peptide, GIP (total), GLP-1 (active), Glucagon, Insulin, Leptin, PYY (total)
Metabolic Combo 1 (K15281K)	BAFF, BDNF, β-NGF, C-Peptide, FGF-21, FGF-23, FSH, Ghrelin (active), Ghrelin (total), GIP (active), GIP (inactive), GIP (total), GLP-1 (active), GLP-1 (inactive), GLP-1 (total), Glucagon, Insulin, Leptin, LH, PP, Proinsulin, PYY (total)
Metabolic 2-Plex Combo 1 (K15282K)	Insulin, Leptin
Metabolic 3-Plex Combo 1 (K15283K)	GLP-1 (active), Glucagon, Insulin
Metabolic 4-Plex Combo 1 (K15284K)	GLP-1 (active), Glucagon, Insulin, Leptin
Obesity Combo 1 (K15277K)	BDNF, FGF-21, Ghrelin (total), Glucagon, Leptin
Obesity Combo 2 (K15278K)	C-Peptide, FGF-23, Ghrelin (total), GLP-1 (total), Insulin, Leptin, PYY (total)

U-PLEX Metabolic Mouse Combinations

Name (Cat. No.)	Analytes
Metabolic Group 1 58-Plex (K15317K)	BAFF, BCA-1/BLC, BDNF, CD40, C-Peptide, Eotaxin, EPO, FGF-21, Ghrelin (active), Ghrelin (total), GLP-1 (active), GLP-1 (inactive), GLP-1 (total), Glucagon, GM-CSF, IFN-α, IFN-β, IFN-γ, IL-10, IL-12/IL-23p40, IL-12p70, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL-17C, IL-17E/IL-25, IL-17F, IL-1β, IL-2, IL-21, IL-22, IL-23, IL-27p28/IL-30, IL-31, IL-33, IL-4, IL-5, IL-6, IL-9, Insulin, IP-10, KC, Leptin, MCP-1, MCP-5/CCL12, MDC, MIP-1α, MIP-1β, MIP-2, MIP-3α, MMP-9 (total), PYY (total), RANTES, TARC, TNF-α, VEGF-A
Adipokine Combo 1 (K15299K)	BDNF, IL-1β, IL-6, IL-10, Insulin, Leptin, MCP-1, TNF-α
Diabetes Combo 1 (K15298K)	C-Peptide, GLP-1 (total), Glucagon, Insulin, Leptin, PYY (total)
Gut Hormone Combo 1 (K15307K)	Ghrelin (active), GLP-1 (active), Glucagon, Insulin, Leptin, PYY (total)
Metabolic Combo 1 (K15297K)	BAFF, BDNF, C-Peptide, FGF-21, Ghrelin (active), Ghrelin (total), GLP-1 (active), GLP-1 (inactive), GLP-1 (total), Glucagon, Insulin, Leptin, PYY (total)
Metabolic 2-Plex Combo 1 (K15302K)	Insulin, Leptin
Metabolic 2-Plex Combo 2 (K15303K)	Glucagon, Insulin
Metabolic 3-Plex Combo 1 (K15304K)	GLP-1 (total), Glucagon, Insulin
Metabolic 3-Plex Combo 2 (K15305K)	GLP-1 (active), Glucagon, Insulin
Metabolic Hormones Combo 1 (K15306K)	C-Peptide, Ghrelin (active), GLP-1 (active), Glucagon, IL-6, Insulin, Leptin, MCP-1, PYY (total), TNF-α
Obesity Combo 1 (K15300K)	BDNF, FGF-21, Ghrelin (total), Glucagon, Leptin
Obesity Combo 2 (K15301K)	C-Peptide, Ghrelin (total), GLP-1 (total), Insulin, Leptin, PYY (total)

U-PLEX Metabolic Rat Combinations

Name (Cat. No.)	Analytes
Metabolic Combo 1 (K15308K)	BDNF, C-Peptide, FGF-21, Ghrelin (active), Ghrelin (total), GLP-1 (active), GLP1 (inactive), GLP-1 (total), Glucagon, Insulin, Leptin, PYY (total)
Diabetes Combo 1 (K15309K)	C-Peptide, GLP-1 (total), Glucagon, Insulin, Leptin, PYY (total)
Metabolic 2-Plex Combo 1 (K15312K)	Insulin, Leptin
Metabolic 2-Plex Combo 2 (K15313K)	Glucagon, Insulin
Metabolic 3-Plex Combo 1 (K15314K)	GLP-1 (total), Glucagon, Insulin
Metabolic 3-Plex Combo 2 (K15315K)	GLP-1 (active), Glucagon, Insulin
Metabolic Hormones Combo 1 (K15316K)	C-Peptide, Ghrelin (active), GLP-1 (active), Glucagon, Insulin, Leptin, PYY (total)
Obesity Combo 1 (K15310K)	BDNF, FGF-21, Ghrelin (total), Glucagon, Leptin
Obesity Combo 2 (K15311K)	C-Peptide, Ghrelin (total), GLP-1 (total), Insulin, Leptin, PYY (total)

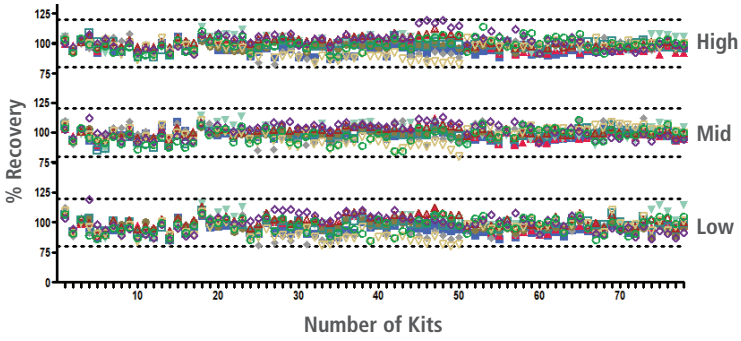
V-PLEX Validated Immunoassays for Unsurpassed Performance and Quality

V-PLEX assays are designed to maximize consistency in results and confidence in data. Developed under design control and according to fit-for-purpose principles, the final product represents the highest quality assay available from MSD. Comprehensive testing of all raw materials and kit components combined with rigorous manufacturing and QC specifications ensure reproducible results time after time.

Offering exceptional dynamic range, high sensitivity, accurate results, and lot-to-lot consistency, V-PLEX kits are available as individual analyte kits, preconfigured multiplex panels, and custom multiplex panels.

All cytokine V-PLEX assays have been validated with serum, plasma, urine, and cell culture supernatant samples. Neuroinflammation and neurodegeneration assays have also been validated with CSF. For supplementary sample type information, including additional validated sample types, consult the product insert or visit our website.

V-PLEX Assays Demonstrate a High Degree of Lot-to-Lot Reproducibility



Control samples, spanning the quantifiable range of the assay, are used to confirm absolute quantification across runs and lots. Over 400 lots of V-PLEX kits have been manufactured by MSD. The data below illustrate their exceptional reproducibility, showing the % recovery measurements for High, Mid, and Low control samples and average intra-plate concentration %CVs across 78 kit lots of the V-PLEX Proinflammatory Panel 1 (human), 23 lots of V-PLEX Chemokine Panel 1 (human), and 25 lots of V-PLEX Cytokine Panel 1 (human) manufactured over three years. The data for the V-PLEX Proinflammatory Panel 1 (human) for the High, Mid, and Low control samples are plotted to the left.

V-PLEX Proinflammatory Panel 1 (human)

	Average % Recovery			Average Intra-plate Conc. %CV		
	High	Mid	Low	High	Mid	Low
hIFN-γ	94.9	97.9	93.9	3.1	2.1	2.1
hIL-1β	99.4	99.8	98.6	3.2	2.5	3.1
hIL-2	100.3	100.1	99.6	3.0	2.6	3.0
hIL-4	97.6	100.2	94.4	3.3	3.2	3.2
hIL-6	97.6	98.7	96.9	2.5	2.4	2.4
hIL-8	98.7	98.2	97.9	2.4	2.4	2.5
hIL-10	101.8	101.0	101.3	1.9	1.7	2.3
hIL-12p70	94.8	97.2	92.9	4.7	4.5	5.0
hIL-13	102.2	101.4	99.3	2.2	2.3	2.4
hTNF-α	99.6	96.9	96.7	2.8	2.7	4.0

78 Lots

V-PLEX Chemokine Panel 1 (human)

	Average % Recovery			Average Intra-plate Conc. %CV		
	High	Mid	Low	High	Mid	Low
hEotaxin	99.0	101.9	98.4	2.2	1.7	2.4
hMIP-1β	97.1	96.1	93.0	2.6	2.1	2.3
hEotaxin-3	102.2	101.4	100.4	3.8	3.5	4.4
hTARC	93.4	97.6	92.6	3.8	3.0	3.4
hIP-10	93.3	93.3	91.9	5.2	3.8	3.7
hMIP-1α	99.2	98.3	96.2	1.6	1.5	2.7
hIL-8	97.5	91.6	87.3	2.6	2.1	2.5
hMPC-1	96.0	96.6	92.3	4.7	4.3	5.0
hMDC	95.4	97.8	97.5	4.2	3.6	3.2
hMCP-4	98.2	97.9	97.5	2.0	2.1	2.9

23 Lots

V-PLEX Cytokine Panel 1 (human)

	Average % Recovery			Average Intra-plate Conc. %CV		
	High	Mid	Low	High	Mid	Low
hGM-CSF	97.8	99.7	93.9	3.8	2.7	3.1
hIL-1α	100.1	99.7	97.1	4.8	4.1	5.1
hIL-5	100.8	101.4	99.1	3.3	3.1	3.3
hIL-7	96.7	98.5	95.4	3.3	2.8	3.2
hIL-12p40	96.2	97.8	93.3	2.7	2.5	2.8
hIL-15	95.4	97.3	96.7	3.6	2.7	3.1
hIL-16	93.6	94.4	95.0	3.3	3.1	3.6
hIL-17A	98.4	99.7	96.7	3.2	3.0	3.2
hTNF-β	98.4	97.7	94.7	2.4	2.5	2.7
hVEGF-A	95.4	94.7	95.9	2.0	2.1	2.4

25 Lots

V-PLEX Analytes

V-PLEX analytes are available as validated individual assays or as part of a validated multiplex panel.

Human

Analyte	LLOD (pg/mL)	LLOQ-ULOQ (pg/mL)
Aβ38 (6E10)	16.7	60 – 8,480
Aβ40 (6E10)	9.97	50 – 7,000
Aβ42 (6E10)	0.368	3.13 – 1,270
Aβ38 (4G8)	22.2	60 – 7,500
Aβ40 (4G8)	5.41	20 – 6,000
Aβ42 (4G8)	0.516	2.5 – 1,270
Aβ42	0.33	3.0 – 8,000
CRP	1.33	27.6 – 49,600
Eotaxin	3.26	12.3 – 1,120
Eotaxin-3	1.77	10.2 – 3,750
FGF (basic)	0.09	2.6 – 1,780
Flt-1/VEGFR-1	0.90	10 – 6,410
GM-CSF	0.16	0.842 – 750
ICAM-1	1.94	15.0 – 32,700
IFN-γ	0.37	1.76 – 938
IL-1α	0.09	2.85 – 278
IL-1β	0.05	0.646 – 375
IL-1RA	1.12	9.19 – 650
IL-2	0.09	0.890 – 938
IL-3	2.37	12.6 – 1,950
IL-4	0.02	0.218 – 158
IL-5	0.14	4.41 – 562
IL-6	0.06	0.633 – 488
IL-7	0.12	0.546 – 563
IL-8	0.07	0.591 – 375
IL-8 (HA*)	95.6	713 – 43,400
IL-9	0.311	2.23 – 975
IL-10	0.04	0.298 – 233
IL-12/IL-23p40	0.33	1.32 – 2,250
IL-12p70	0.11	1.22 – 315
IL-13	0.24	4.21 – 353
IL-15	0.15	0.774 – 525
IL-16	2.83	19.1 – 1,870
IL-17A	0.31	3.19 – 3,650
IL-17A (Gen. B)	0.413	5.86 – 1,950
IL-17A/F	0.930	7.57 – 3,900
IL-17B	0.185	1.12 – 1,040
IL-17C	0.682	3.84 – 1,620
IL-17D	3.87	11.2 – 5,200
IL-21	0.193	1.65 – 650
IL-22	0.27	2.78 – 325
IL-23	0.274	4.60 – 3,250
IL-27	4.2	38.7 – 13,000
IL-31	0.446	4.22 – 650
IP-10	0.37	1.37 – 500
MCP-1	0.090	1.09 – 375
MCP-4	1.69	5.13 – 469
MDC	1.22	88.3 – 7,500
MIP-1α	3.02	13.8 – 743

Human

Analyte	LLOD (pg/mL)	LLOQ-ULOQ (pg/mL)
MIP-1β	0.17	1.02 – 750
MIP-3α	0.05	0.588 - 325
PlGF	0.21	1.5 – 800
SAA	10.9	54.1 – 138,000
TARC	0.22	3.32 – 1,120
Tau	10.18	30 – 8,000
Tie-2	31.3	396 – 63,400
TNF-α	0.04	0.690 – 248
TNF-β	0.08	0.465 – 458
TSLP	0.063	0.460 – 325
VCAM-1	6.00	37.6 – 32,000
VEGF-A	1.12	7.70 – 562
VEGF-C	9.91	146 – 17,500
VEGF-D	4.36	67.1 – 18,800

Non-Human Primate (NHP)**

Analyte	LLOD (pg/mL)	LLOQ - ULOQ (pg/mL)
Eotaxin-3	1.77	10.2 – 3,750
GM-CSF	0.16	0.842 – 750
IFN-γ	0.37	1.76 – 938
IL-1β	0.05	0.646 – 375
IL-2	0.09	0.890 – 938
IL-5	0.14	4.41 – 562
IL-6	0.06	0.633 – 488
IL-7	0.12	0.546 – 563
IL-8	0.07	0.591 – 375
IL-8 (HA)	95.6	713 – 43,400
IL-10	0.04	0.298 – 233
IL-12/IL-23p40	0.33	1.32 – 2,250
IL-15	0.15	0.774 – 525
IL-16	2.83	19.1 – 1,870
IL-17A	0.31	3.19 – 3,650
IP-10	0.37	1.37 – 500
MCP-1	0.09	1.09 – 375
MCP-4	1.69	5.13 – 469
MDC	1.22	88.3 – 7,500
MIP-1α	3.02	13.8 – 743
MIP-1β	0.17	1.02 – 750
TARC	0.22	3.32 – 1,120
TNF-β	0.08	0.465 – 458
VEGF-A	1.12	7.70 – 562

Rat

Analyte	LLOD (pg/mL)	LLOQ - ULOQ (pg/mL)
Aβ38 (4G8)	22.2	60 – 7,500
Aβ40 (4G8)	5.41	20 – 6,000
Aβ42 (4G8)	0.516	2.5 – 1,270
IFN-γ	0.65	39.7 – 3,750

Rat

Analyte	LLOD (pg/mL)	LLOQ - ULOQ (pg/mL)
IL-1β	6.92	102 – 8,100
IL-4	0.69	8.0 – 723
IL-5	14.1	82 – 3,000
IL-6	13.8	96.9 – 8,550
IL-10	16.4	163 – 15,670
IL-13	1.97	12.5 – 1,080
KC/GRO	1.04	21.7 – 728
TNF-α	0.72	9.1 – 793

Mouse

Analyte	LLOD (pg/mL)	LLOQ - ULOQ (pg/mL)
Aβ38 (4G8)	22.2	60 – 7,500
Aβ40 (4G8)	5.41	20 – 6,000
Aβ42 (4G8)	0.516	2.5 – 1,270
IFN-γ	0.04	0.39 – 570
IL-1β	0.11	0.72 – 1,030
IL-2	0.22	1.03 – 1,570
IL-4	0.11	0.818 – 1,060
IL-5	0.06	0.302 – 590
IL-6	0.61	7.61 – 3,140
IL-9	3.84	21.9 – 2,600
IL-10	0.94	7.26 – 2,030
IL-12p70	9.95	179 – 20,600
IL-15	16	43.2 – 26,000
IL-16	4.65	15.0 – 1,800
IL-17A	0.056	0.255 – 360
IL-17A/F	0.23	1.39 – 1,620
IL-17C	0.313	0.971 – 1,200
IL-17E/IL-25	0.630	4.54 – 3,300
IL-17F	51.4	320 – 52,000
IL-21	1.74	12.1 – 9,300
IL-22	0.136	1.58 – 380
IL-23	0.899	4.19 – 7,600
IL-27p28/IL-30	1.39	5.91 – 6,500
IL-31	8.57	22.6 – 21,000
IL-33	0.36	1.85 – 1,950
IP-10	0.32	2.15 – 650
KC/GRO	0.24	3.29 – 1,230
MCP-1	0.672	4.42 – 325
MIP-1α	0.081	0.380 – 390
MIP-2	0.053	0.580 – 423
MIP-3α	0.389	3.42 – 530
TNF-α	0.13	0.97 – 403

Human/NHP/Mouse/Rat/Canine

Analyte	LLOD (pM)	LLOQ - ULOQ (pM)
GLP-1 Active***	0.02	0.30 – 120
GLP-1 Total***	0.017	0.18 – 120

**High-abundance (This assay quantitates high levels of IL-8.)*
***NHP assays recognize analytes from Cynomolgus and Rhesus monkeys*
The LLOQ and ULOQ represent the lower and upper limits of quantitation of the assay.
The LLOD represents the lower limit of detection of the assay.

****These assays are provided in singleplex format.*

Preconfigured V-PLEX Kits

Subsets of analytes, which meet the same specifications for quality and performance, can be ordered from a preconfigured panel. All panels are available in 1, 5, and 25-plate packs. Panels that contain more than ten analytes will be fulfilled on multiple plates, with a maximum of ten analytes per plate. Some plates may contain fewer than ten analytes.

Species	Name (Cat. No.)	Analytes
Human	Biomarker 54-Plex Kit (K15248G)	CRP, Eotaxin, Eotaxin-3, FGF (basic), Flt-1, GM-CSF, ICAM-1, IFN-γ, IL-1α, IL-1β, IL-1RA, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-8 (high abundance), IL-9, IL-10, IL-12p70, IL-12/IL-23p40, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL-17B, IL-17C, IL-17D, IL-21, IL-22, IL-23, IL-27, IL-31, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, MIP-3α, PIGF, SAA, TARC, Tie-2, TNF-α, TNF-β, TSLP, VCAM-1, VEGF-A, VEGF-C, VEGF-D
	Biomarker 46-Plex Kit (K15088G)	CRP, Eotaxin, Eotaxin-3, FGF (basic), Flt-1, GM-CSF, ICAM-1, IFN-γ, IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-8 (HA*), IL-10, IL-12p70, IL-12/IL-23p40, IL-13, IL-15, IL-16, IL-17A, IL-21, IL-22, IL-23, IL-27, IL-31, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, MIP-3α, PIGF, SAA, TARC, Tie-2, TNF-α, TNF-β, VCAM-1, VEGF-A, VEGF-C, VEGF-D
	Biomarker 40-Plex Kit (K15209G)	CRP, Eotaxin, Eotaxin-3, FGF (basic), Flt-1, GM-CSF, ICAM-1, IFN-γ, IL-1α, IL1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-8 (HA*), IL-10, IL-12p70, IL-12/IL-23p40, IL-13, IL-15, IL-16, IL-17A, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, PIGF, SAA, TARC, Tie-2, TNF-α, TNF-β, VCAM-1, VEGF-A, VEGF-C, VEGF-D
	Cytokine 44-Plex Kit (K15249G)	Eotaxin, Eotaxin-3, GM-CSF, IFN-γ, IL-1α, IL-1β, IL-1RA, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-8 (high abundance), IL-9, IL-10, IL-12p70, IL-12/IL-23p40, IL-13, IL-15, IL-16, IL-17A, IL-17A/F, IL-17B, IL-17C, IL-17D, IL-21, IL-22, IL-23, IL-27, IL-31, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, MIP-3α, TARC, TNF-α, TNF-β, TSLP, VEGF-A
	Cytokine 30-Plex Kit (K15054G)	Eotaxin, Eotaxin-3, GM-CSF, IFN-γ, IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-8 (HA*), IL-10, IL-12p70, IL-12/IL-23p40, IL-13, IL-15, IL-16, IL-17A, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, TARC, TNF-α, TNF-β, VEGF-A
	Proinflammatory Panel 1 (K15049G)	IFN-γ, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-13, TNF-α
	TH17 Panel 1 (K15085G)	IL-17A (Version B), IL-21, IL-22, IL-23, IL-27, IL-31, MIP-3α
	Cytokine Panel 1 (K15050G)	GM-CSF, IL-1α, IL-5, IL-7, IL-12/IL-23p40, IL-15, IL-16, IL-17A, TNF-β, VEGF-A
	Cytokine Panel 2 (K15084G)	IL-17A/F, IL-17B, IL-17C, IL-17D, IL-1RA, IL-3, IL-9, TSLP
	Chemokine Panel 1 (K15047G)	Eotaxin, Eotaxin-3, IL-8 (HA*), IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, TARC
	Angiogenesis Panel 1 (K15190G)	FGF (basic), Flt-1, PIGF, Tie-2, VEGF-A**, VEGF-C, VEGF-D
	Vascular Injury Panel 2 (K15198G)	CRP, ICAM-1, SAA, VCAM-1
	Neuroinflammation Panel 1 (K15210G)	CRP, Eotaxin, Eotaxin-3, Flt-1/VEGFR-1, ICAM-1, IFN-γ, IL-1α, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12/IL-23p40, IL-13, IL-15, IL-16, IL-17A, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, PIGF, SAA, TARC, Tie-2, TNF-α, TNF-β, VCAM-1, VEGF-A, VEGF-C, VEGF-D
	Aβ Peptide Panel 1 (6E10) (K15200G)	Aβ38 (6E10), Aβ40 (6E10), Aβ42 (6E10)
	Aβ Peptide Panel 1 (4G8) (K15199G)	Aβ38 (4G8), Aβ40 (4G8), Aβ42 (4G8) This product is suitable for human, mouse, and rat samples.

**High-abundance (This assay quantitates high levels of IL-8.)*
***This version of VEGF-A is unique to the Angiogenesis Panel; LLOQ = 5.00 pg/mL and ULOQ = 1,510 pg/mL.*

Species	Name (Cat. No.)	Analytes
NHP***	Cytokine 24-Plex Kit (K15058G)	Eotaxin-3, GM-CSF, IFN-γ, IL-1β, IL-2, IL-5, IL-6, IL-7, IL-8, IL-8 (HA*), IL-10, IL-12/IL-23p40, IL-15, IL-16, IL-17A, IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, TARC, TNF-β, VEGF-A
	Cytokine Panel 1 (K15057G)	GM-CSF, IL-5, IL-7, IL-12/IL-23p40, IL-15, IL-16, IL-17A, TNF-β, VEGF-A
	Proinflammatory Panel 1 (K15056G)	IFN-γ, IL-1β, IL-2, IL-6, IL-8, IL-10
	Chemokine Panel 1 (K15055G)	Eotaxin-3, IL-8 (HA*), IP-10, MCP-1, MCP-4, MDC, MIP-1α, MIP-1β, TARC
Mouse	Proinflammatory Panel 1 (K15048G)	IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12p70, KC/GRO, TNF-α
	Cytokine Panel 1 (K15245G)	IL-9, IL-15, IL-17A/F, IL-27p28/IL-30, IL-33, IP-10, MIP-1α, MIP-2, MCP-1
	TH17 Panel 1 (K15246G)	IL-16, IL-17A, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, IL-23, IL-31, MIP-3α
	Cytokine 29-Plex Kit (K15267G)	IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12p70, IL-15, IL-16, IL-17A, IL-17 A/F, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, IL-23, IL-27p28/IL-30, IL-31, IL-33, IP-10, KC/GRO, MCP-1, MIP-1α, MIP-2, MIP-3α, TNF-α
Rat	Proinflammatory Panel 2 (K15059G)	IFN-γ, IL-1β, IL-4, IL-5, IL-6, IL-10, IL-13, KC/GRO, TNF-α

**High-abundance (This assay quantitates high levels of IL-8.)*
****NHP assays recognize analytes from Cynomolgus and Rhesus monkeys.*

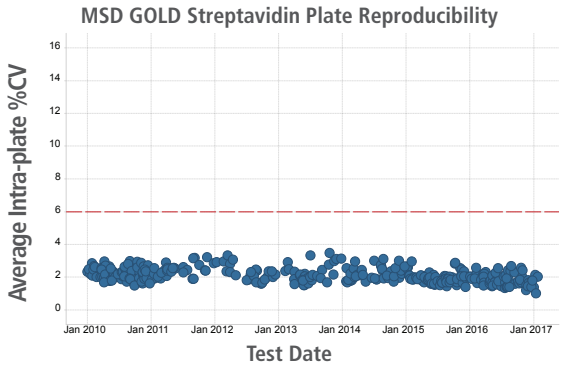
Build Your Assay with the V-PLEX Assay Designer

The V-PLEX product line provides validated assays in customizable formats. Configure a V-PLEX assay that meets your exact research needs. Explore your options at **www.mesoscale.com/V-PLEX**.

MSD GOLD for Assay Development: Quality and Reliability

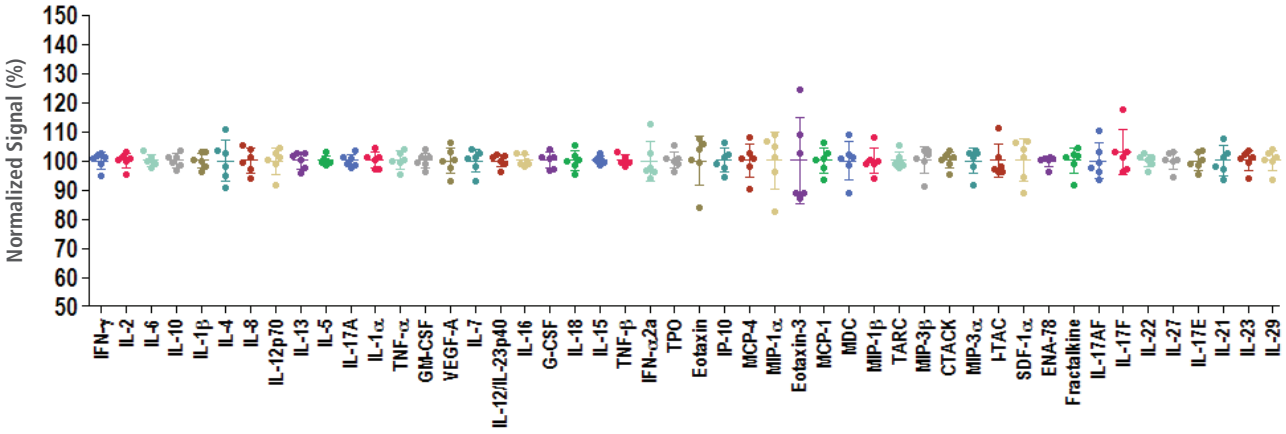
MSD GOLD products are a signature of our commitment to quality, consistency, and high performance in assay development. MSD GOLD plates and reagents are suitable for a wide range of research applications from biomarker discovery to personalized medicine.

- Best suited for long-term studies
- Long shelf life
- Detailed certificate of analysis
- Exceptional lot-to-lot reproducibility
- High precision
- Stringent quality control procedures



To date, over 300 lots of MSD GOLD Streptavidin plates have been analyzed, showing an average intra-plate %CV of less than 4%. QC specification is 6%, depicted by the red dashed line.

Inter-Lot Assay Reproducibility of MSD GOLD Streptavidin Plates



A total of 48 individual biomarker assays were developed on MSD GOLD Streptavidin plates. Calibrator signals (ranging from 200 to 22,000 ECL counts across all assays) were normalized to the average signal measured across six plate lots for each assay, and the normalized signal from each plate lot is shown above. Each data point represents the average of three replicates on a plate, with the error bars representing the inter-lot %CVs. All assays tested produced inter-lot %CVs of less than 10.0% with the exception of Eotaxin-3 (14.8%).

MSD GOLD Plates and Accessories

Plates (available in 1, 5, 30, 120, and 510 plate pack sizes)	Cat. No.
96-well High Bind Avidin SECTOR® Plates	L15AB
96-well High Bind Avidin QuickPlex® Plates	L55AB
96-well Streptavidin SECTOR Plates	L15SA
96-well Streptavidin QuickPlex Plates	L55SA
96-well Small Spot Streptavidin SECTOR Plates	L45SA
Labeling Reagent (available in 150 nmol and 2 µmol sizes)	
SULFO-TAG NHS-Ester	R91AO
Conjugation Packs (available in ≤200 µg and ≤1 mg sizes)	
MSD GOLD SULFO-TAG Conjugation Pack (5 reactions)	R31AA
Read Buffer	
MSD GOLD Read Buffer A	R92TG

Additional MSD GOLD products can be found at www.mesoscale.com.

NEW ready-to-use MSD GOLD Read Buffer: multi-lot reproducibility data demonstrate that this new read buffer reduces variability and ensures reproducibility of ECL signals across experiments.

MSD Services and Custom Assay Capabilities: Personalized Development and Support

With over 20 years of experience in developing immunoassays of unsurpassed quality and performance, MSD's personalized services provide you with the tools to precisely measure biomarkers and meet the requirements of each unique project.

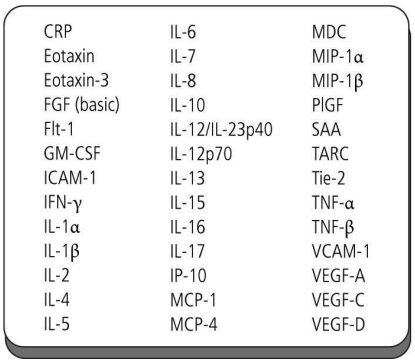
MSD specialists will work with you to provide customized solutions in the following areas:

- Biomarker screens with your samples from a selection of over 135 assays
- Development and validation of singleplex and multiplex assays
- Creation of custom configurations of MSD multiplexes
- Conjugation of antibodies, proteins, peptides, and oligonucleotides with biotin or SULFO-TAG
- Custom printing of MSD single-spot and multi-spot plates with your biomarkers of choice

Biomarker Screening and Assay Development

Whether you require a biomarker screen or the development of a validated kit for lead biomarkers, MSD will tailor a custom service package for you. With our knowledge in developing and multiplexing high-quality commercial immunoassays, MSD can accelerate your biomarker program from early stage discovery to the production of fully validated kits or components.

SCREEN

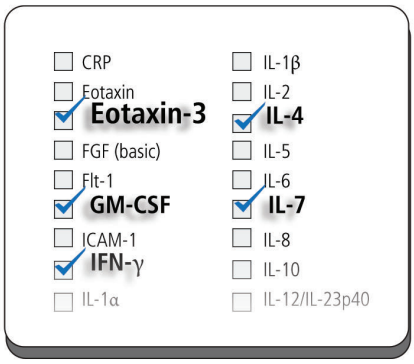


MSD screens your samples in multiplex to identify potential biomarkers

Over 135 high-impact analytes measured with a rapid turnaround time

Great for limited sample volumes

SELECT

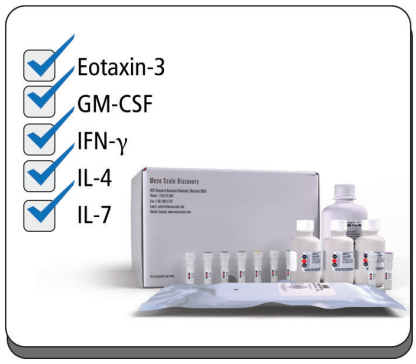


MSD develops customized assays for your lead biomarkers from a screen

Fit-for-purpose assays designed for optimal test development

Transition from identification of promising biomarkers to final panels

VALIDATE



MSD develops and validates your final biomarker panel

Manufactured under ISO 9001:2015 certified quality management system

Your validated biomarker test is available for order

For more information, contact us at assayservices@mesoscale.com.

T-PLEX

T-PLEX assays offer a broad menu and provide greater consistency, sensitivity, and dynamic range than western blots and traditional ELISAs. T-PLEX singleplex and multiplex assays are compatible with a wide range of sample matrices providing the ability to analyze protein levels from multiple sample types with a single assay.

For many analytes, we offer multiple assay formats, compatible with a wide variety of sample types and with varying levels of sensitivity, to fit diverse research needs. To facilitate targeted disease research, we have assembled a variety of disease-specific panels that include the most widely-studied analytes. Explore our website to find the right assays for you.

	Secreted Biomarker Assays	Intracellular Biomarker Assays
Description and common usage	Inflammation, Cytokine Research, Immunology	Cell Signaling Research, Phosphorylation States, Neurobiological Applications
Sample types*	Serum, Plasma, Urine, Cell Culture Supernatant	Cell Lysates, Cell Culture Supernatant, Cerebrospinal Fluid
Sample volume required*	As little as 25 µL per well	As little as 0.25 µg cell lysate per well
Calibrator Included	Yes	No
Format	Available in both singleplex and multiplex 96-well formats; 384-well custom formats available.	
Typical assay run time	T-PLEX assay workflow is approximately 3 hours. Plate read time is 90 seconds.	

**Please consult the product insert for specific information about each analyte of interest.*

T-PLEX Multiplex Panels

Cytokine/Inflammation Panels

Species	Name	Analytes
Mouse	TH1-TH2 9-Plex	IFN-γ, IL-1β, IL-2, IL-4, IL-5, KC/GRO, IL-10, IL12 total, TNF-α
Human	ProInflammatory 9-Plex	GM-CSF, IFN-γ, IL-1β, IL-2, IL-6, IL-8, IL-10, IL-12p70, TNF-α
Mouse	Proinflammatory 7-Plex	IFN-γ, IL-1β, IL-6, IL-10, IL-12p70, KC/GRO, TNF-α
Canine	Proinflammatory Panel 3	IL-2, IL-6, IL-8, TNF-α
Rat	Inflammation Panel 1	NGAL, TSP-1, TIMP-1, MCP-1
Cyno	Inflammation Panel 3	MCP-1, NGAL, TIMP-1
Human	MMP 2-Plex Kit	MMP-2, MMP-10
Human	MMP 3-Plex Kit	MMP-1, MMP-3, MMP-9

Metabolic Panels

Species	Analytes
Human, Rat	Leptin, Insulin

Neurodegeneration Panels

Species	Analytes
Human	sAPPα sAPPα, sAPPβ
Human, Mouse	Tau (pT231)/Total Tau

Isotyping Panels

Species	Name	Analytes
Human, NHP	Isotyping Panel 1	IgA, IgG, IgM
Mouse	Isotyping Panel 1	IgA, IgG1, IgG2a, IgG2b, IgG3, IgM

Toxicology/Injury Panels

Species	Name	Analytes
Rat	Acute Phase Protein Panel 1	A2M, AGP
Rat	Inflammation Panel 1	NGAL, TSP-1, TIMP-1, MCP-1
Cyno	Inflammation Panel 3	MCP-1, NGAL, TIMP-1
Rat	Cardiac Injury Panel 2	cTnI, cTnT, FABP3
Rat	Cardiac Injury Panel 3	cTnI, cTnT, FABP3, Myl3
Rat	Muscle Injury Panel 1	cTnI, cTnT, sTnI, FABP3, Myl3
Rat	Muscle Injury Panel 2	TIMP-1, CK
Mouse	Muscle Injury Panel 3	cTnI, FABP3, Myl3, sTnI
Rat	Liver Injury Panel 1	Arginase-1, αGST
Rat	Kidney Injury Panel 1	Albumin, TIM-1, N-GAL, Osteopontin
Human	Kidney Injury Panel 3	Calbindin, Clusterin, KIM-1, Osteoactivin, TFF3, VEGF-A
Human	Kidney Injury Panel 5	Albumin, B2M, Cystatin C, EGF, NGAL, Osteopontin, Uromodulin
Human	Vascular Injury Panel I	sICAM-3, E-Selectin, P-Selectin, Thrombomodulin
Mouse, Rat	Hypoxia Panel	EPO, VEGF-A
Human	Growth Factor Panel I	bFGF, VEGF-A, sFlt-1, PlGF
Human	Growth Factor Panel II	c-Kit, KDR
Human	Bone Panel I	ALP, Sclerostin, Osteoprotegrin
Human	Bone Panel II	Osteocalcin, Osteonectin, Osteopontin

Intracellular Signaling Panels

Species	Name	Analytes
Human, Mouse, Rat	Akt Signaling Panel (Phosphoprotein)	pAkt, p70S6K, pGSK-3β
Human, Mouse, Rat	Akt Signaling Panel (Total Protein)	Akt, p70S6K, GSK-3β
Human, Mouse, Rat	Akt Signaling Panel II (Phosphoprotein)	pAkt, p70S6K, pGSK-3β, pS6RP
Human	Apoptosis Panel	pp53, p53, Cl. Caspase-3, Cl. PARP
Human, Mouse, Rat	ERK-STAT3 Cascade Panel	pERK1/2, pMEK1/2, pSTAT3
Human	Insulin Signaling Panel (Phosphoprotein)	pIR, pIGF-1R, pIRS-1
Human	Insulin Signaling Panel (Total Protein)	IR, IGF-1R, IRS-1
Human, Mouse, Rat	MAP Kinase Panel (Phosphoprotein)	pERK1/2, pJNK, p38
Human	MAP Kinase Panel (Total Protein)	ERK1/2, JNK, p38
Human, Mouse, Rat	Phospho-STAT Panel	pSTAT3, pSTAT4, pSTAT5a,b

Activated/Total Panels

Species	Analytes
Human, Mouse, Rat	Akt pS473/Total
Human	Caspase-3 (Cl. p20/p17)/Total
Human	EGFR pY1173/Total
Human	ErbB2 pY1248/Total
Human, Mouse, Rat	ERK1/2 (pT202/pY204)/(pT185/pY187)/Total
Human, Mouse, Rat	GSK-3β pS9/Total
Human	JNK (pT183/pY185)/Total
Human, Mouse, Rat	MEK1/2 (pS217/221)/Total
Human, Mouse, Rat	p38 (pT180/pY182)/Total
Human, Mouse, Rat	p53 Ub/Total
Human, Mouse, Rat	p70S6K (pT421/pS424)/Total
Human, Mouse, Rat	STAT5a,b pY694/Total

Secreted Analytes

Analyte	Species
Adiponectin	H, M, R
sAPPα	H
sAPPβ (wild type)	H, M
sAPPβ (Swedish variant)	H
B2M	R
BNP	R
cAMP	H, M, R
CHO (HCP)	H
Clusterin	R
C-Peptide	M, R
DJ-1/PARK7	H
Eotaxin-3 (CCL26)	H
E-Selectin	H
FABP3	H, M, R
FSH	H
GIP	H
GM-CSF	H, M, R
HGF	H
IFN-β	H
IFN-γ	M
IgA	H, P
IgG	H, P
IgM	H, P
IL-1β	M
IL-2	M
IL-4	M
IL-5	M
IL-6	M
IL-10	M
IL-12	M
IL-12/IL-23p40	M
IL-12p70	M
IL-17A	H, M
IL-18	H
Insulin	H, M, R
KC/GRO (CXCL1)	M, R
KIM-1/TIM-1/HAVCR	H, R
LBP	H
Leptin	H, M, R
MCP-1 (CCL2)	M, R
M-CSF	H
MIP-4 (CCL18)	H
MMP-1	H
MMP-2	H
MMP-3	H
MMP-9	H
MMP-10	H

H=Human, M=Mouse, R=Rat

Analyte	Species
Myeloperoxidase (MPO)	H
NT-proANP	R
NT-proBNP	H, R
Osteocalcin	H
Osteonectin	H
Osteopontin	H, R
Osteoprotegerin	H
Protein A	H
E-Selectin	H
P-Selectin	H
PYY	H, M, R
RANTES (CCL5)	M
Resistin	M, R
Tau	B, H, M
Tau (pT231)	H, M
TGF-β1	H
Thrombomodulin	H
TIMP-1	H
TNF-α	M
TNF-RI	H
TNF-RII	H
sTroponin I (sTnI)	R
Troponin ITC Complex	R
VEGF-R2	H

H=Human, M=Mouse, R=Rat

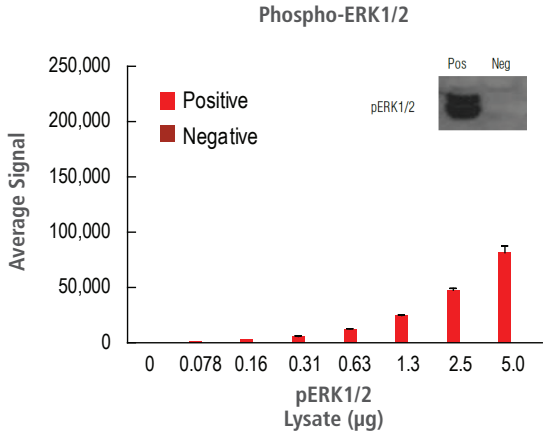
Intracellular Analytes

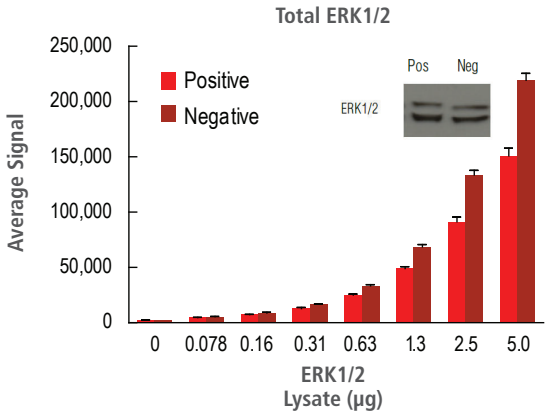
Analyte	Species
4E-BP1	H
4E-BP1 (pT37/46)	H, M
Akt (pT308)*	H, M
Caspase-3*	H
Caspase-3 (p20/p17) (cleaved)	H
CHOP	H, M, R
c-Kit	H, M, R
EGFR*	H
EGFR (pY1173)	H
eIF4E (pS209)	H
ErbB2*	H
ErbB2 (pY1248)*	H
ERK-1/2	H, M, R
ERK-1/2(pT202/ pY204) (pT185/pY187)	H, M, R
FOXO3a	H, M
FOXO3a (pT32)	H, M, R
FRS2 (pY196)	H, M
FRS2 (pY436)	H, M
GAPDH	H, P
GSK-3α (pS21)	H
GSK-3β (pS9)*	H, M, R
HIF-1α	H, M, R
Histone H3 (pS10)	H, M, R
HSP70	H
IGF-1R (pY)**	H
IRS-1 (S312)	H
P-JNK*	H
MEK 1/2 (pS217/ pS221)	H, M, R
NFκB (pS468)	H, M, R
NFκB (pS536)	H, M, R
p38 (pT180/pY182)*	H, M, R
p53*	H, M, R
p62 (SQSTM1)	H, M, R
p70S6K	H, M, R
p70S6K (pT389)	H, M, R
p70S6K (pT421/ pS424)	H, M, R
PARP	H
pDGFR-β (pY751)	H, M
PERK	H, M, R
PERK (pT980)	R
PRAS40	H
PRAS40 (pT246)	H, M, R
PSD-95	H, M, R
S6RP	H, M, P, R
Sclerostin	H
STAT3	H, M, R

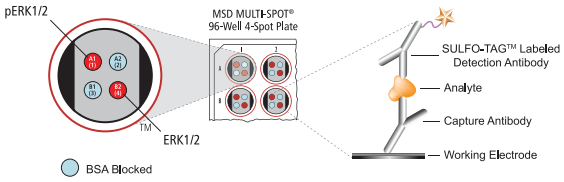
H=Human, M=Mouse, R=Rat

Analyte	Species
STAT3 (pY705)	H, M, R
STAT4	H, M, R
STAT4 (pY693)	H, M, R
STAT5a/b	H, M, R
STAT5a/b (pY694)	H, M, R
VASP	H
VASP (pS157)	H
VEGFR2/KDR	H
Wnt3a	H, M, R
XBP-1	H, M, R

H=Human, M=Mouse, R=Rat
**available in both singleplex and multiplex*
***available in multiplex only*







Sample data generated with MULTI-SPOT Phospho (Thr202/Tyr204; Thr185/Tyr187)/Total ERK1/2 Assay. Increased signal for phosphorylated ERK1/2 was observed with only pERK1/2-positive cell lysate. Total ERK1/2 signal increased throughout the titration of both pERK1/2 positive and negative cell lysates. Results correlate with Western blots (inset). The spot map for the assay is shown below the graphs.

Customer Support

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Fax: 1-301-990-2776
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18098-v11-2020Jan

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