



MESO SCALE DISCOVERY®

www.mesoscale.com/Assays

High Performance Biomarker Assays and Services Singleplex and Multiplex Assay List 2018 Issue 1

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R-PLEX™

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

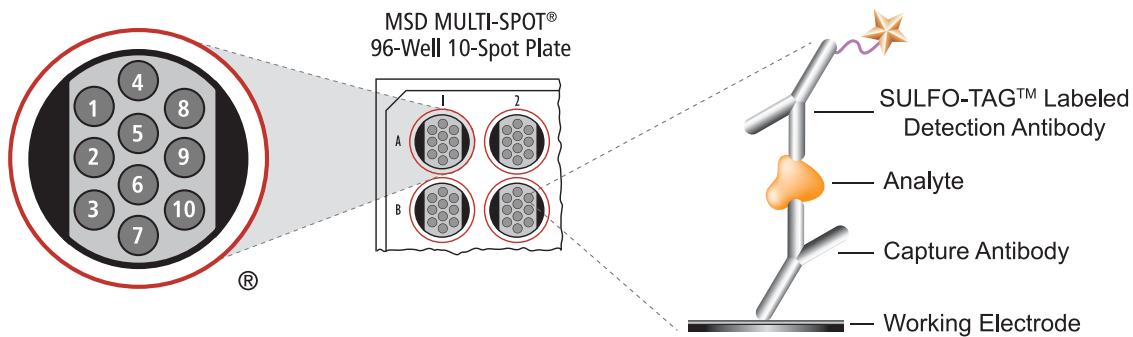
The MSD Advantage

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

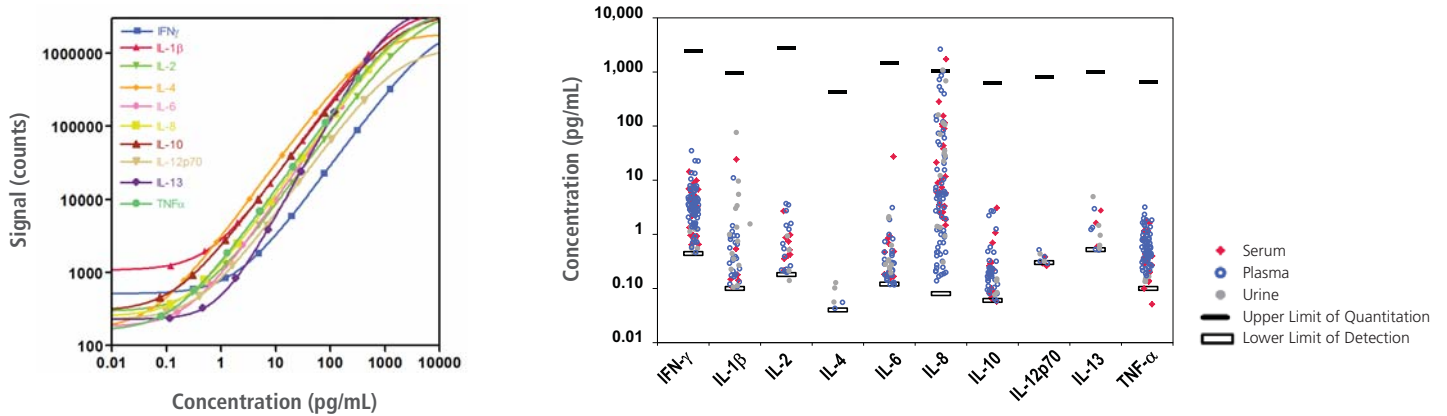
MULTI-ARRAY Technology

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 is illustrated above, which 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

Meso Scale Discovery biomarker assays provide a rapid and convenient method for measuring the levels of single or multiple targets within a single, small-volume sample. 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®

STANDARD

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 | Validated single and multiplex assay kits | Validated ultrasensitive singleplex assay services |
| 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. Built-in selectivity for rigorous results |
| Analyte menu | ••••• | ••••• | ••••• | •••• | •• |
| Format | Antibody set and calibrator | Component-based assays | Kits | Lot-matched kits | Available as sample-testing service |
| 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, plasma, cell culture supernatants, urine; CSF for neurobiology products |
| Pre-coated plate | | | • | • | NA |
| Validation | | Components | | Complete kit | NA |
| Component level QC | • | • | | • | NA |
| Final kit QC | | | • | • | NA |
| COA available | | • (for components) | | • (for components and kits) | NA |

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 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. Analytically validated 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. |

R-PLEX

NEW 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.

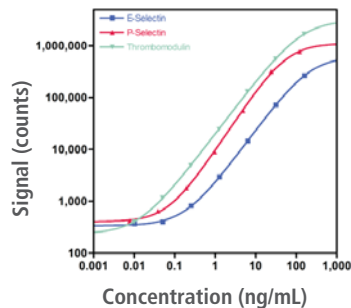
R-PLEX Antibody Set Components

- 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.

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



Human

| Analyte | UniProt ID | Common Applications |
|-----------------|------------|------------------------------------------------|
| A2M | P01023 | inflammation |
| Adiponectin | Q15848 | metabolism/obesity |
| AGP | P02763 | aging, inflammation, metabolism |
| Alpha-amylase 1 | P04745 | metabolism |
| Ang-1 | Q15389 | angiogenesis, cardiovascular disorders, cancer |
| Ang-2 | O15123 | cardiovascular disorders |
| Annexin A1 | P04083 | inflammation |
| ApoA1 | P02647 | atherosclerosis, metabolism/obesity |
| ApoC3 | P02656 | atherosclerosis, metabolism/obesity |
| ApoE | P02649 | cardiovascular disorders, metabolism |
| B2M | P61769 | immunology |
| BAFF | Q9Y275 | immunology, inflammation, metabolism |
| BAFF-R | Q96RJ3 | immunology, inflammation |
| BCMA | Q02223 | immunology |
| BDNF | P23560 | learning, memory |
| CA1 | P00915 | hypoxia, metabolism |
| CA125 | Q8WX17 | cancer |
| CA15-3 | P15941 | cancer |
| CA50 | N/A | cancer |
| Calbindin | P05937 | metabolism, neurobiology |
| Calprotectin | P05109 | immunity, inflammation |

Human

| Analyte | UniProt ID | Common Applications |
|---------------------|------------|--------------------------------------------------------------|
| Cathepsin D | P07339 | cancer, neurobiology |
| CD5 | P06127 | immunology, oncology |
| CD27 | P26842 | immunology, immuno-oncology |
| CD31/PECAM-1 | P16284 | angiogenesis, cell adhesion |
| CEA | P06731 | cancer |
| Clusterin | P10909 | apoptosis, cell signaling, toxicology |
| Complement C3 | P01024 | cardiovascular disorders, immunity, inflammation |
| Complement C9 | P02748 | cardiovascular disorders, immunity, inflammation |
| Complement factor D | P00746 | metabolism, immunology |
| Corin/ATC2 | Q9Y5Q5 | cardiovascular disorders |
| C-Peptide | P01308 | metabolism |
| CTLA-4 | P16410 | immuno-oncology |
| Cystatin C | P01034 | atherosclerosis, neurobiology, neurodegeneration, toxicology |
| Cytokeratin-8 | P05787 | cancer, cell signaling |
| DPPIV | P27487 | metabolism |
| E-Cadherin | P12830 | cancer |
| Endoglin | P17813 | angiogenesis, cancer, cardiovascular disorders |
| Enolase 2 | P09104 | neurobiology |
| E-Selectin | P16581 | cell adhesion, cell signaling |
| FAP- α /SEPR | Q12884 | angiogenesis, apoptosis, cell adhesion |

Human

| Analyte | UniProt ID | Common Applications |
|------------------|------------|--------------------------------------------------------------|
| Fas (soluble) | P25445 | apoptosis |
| FasL | P48023 | apoptosis, immunology |
| FGF (basic) | P09038 | angiogenesis, cancer |
| FGF-21 | Q9NSA1 | metabolism |
| FGF-23 | Q9GZV9 | metabolism |
| FSH | P01215 | fertility |
| Galectin-3 | P17931 | cardiovascular disorders, oncology |
| GDF-15 | Q99988 | cell signaling |
| Gelsolin | P06396 | cell signaling |
| GFAP | P14136 | neurobiology |
| GIP (active) | P09681 | metabolism |
| GIP (inactive) | P09681 | metabolism |
| GIP (total) | P09681 | metabolism |
| GITR | Q9Y5U5 | autoimmune disorders, cancer, infectious disease |
| GITRL | Q9UNG2 | autoimmune disorders, cancer, infectious disease |
| GLP-1 (active) | P01275 | metabolism/obesity |
| GLP-1 (inactive) | P01275 | metabolism/obesity |
| GLP-1 (total) | P01275 | metabolism/obesity |
| gp130 (soluble) | P40189 | cell signaling |
| Granzyme A | P12544 | immuno-oncology |
| Granzyme B | P10144 | immuno-oncology |
| Haptoglobin | P00738 | cardiovascular disorders, immunity |
| ICAM-3 | P32942 | adhesion, immunology |
| IL-6R | P08887 | immunity, immunology |
| Insulin | P01308 | metabolism |
| LAG3 | P18627 | immuno-oncology |
| Leptin | P41159 | metabolism |
| LH | P01229 | fertility |
| LRRK2 | Q55007 | neurobiology, neurodegeneration |
| LRRK2 (pS935) | Q55007 | neurobiology, neurodegeneration |
| 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-3 | P08254 | angiogenesis, cancer, cardiovascular disorders |
| MMP-7 | P09237 | angiogenesis, cancer, cardiovascular disorders |
| MMP-9 | P14780 | angiogenesis, cancer, cardiovascular disorders |
| MPO | P05164 | cardiovascular disorders, inflammation |
| Nectin-4 | Q96NY8 | cancer, infectious disease |
| β -NGF | P01138 | metabolism |
| 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, infectious disease |
| OX40L | Q6FGS4 | autoimmune disorders, cancer, immunology, infectious disease |
| P-Cadherin | P22223 | cell adhesion, cell signaling |

Human

| Analyte | UniProt ID | Common Applications |
|-----------------------|------------|------------------------------------------------|
| PD1 | Q8IX89 | immuno-oncology |
| PD-L2 | Q9BQ51 | immuno-oncology |
| Pentraxin 3 | P26022 | immunity, infection, inflammation |
| PIGF | P49763 | angiogenesis, cancer |
| PRDX-1 | Q06830 | oxidative stress, redox homeostasis |
| PRDX6 | P30041 | oxidative stress, redox homeostasis |
| Prolactin | P01236 | fertility |
| P-Selectin | P16109 | cardiovascular disorders, cell adhesion |
| PSGL-1 | Q14242 | cell adhesion |
| PYY (total) | P10082 | metabolism/obesity |
| PYY (active) | P10082 | metabolism |
| RANTES | P13501 | immunology, inflammation |
| RBP4 | P04916 | cardiovascular disorders, metabolic |
| Resistin | Q9HD89 | metabolism/obesity |
| S100A8/MRP8 | P80511 | immunity, inflammation |
| S100A12 | P05109 | immunity, inflammation |
| SCF | P21583 | cell signaling, immunology |
| Serpin A1 | P01009 | cardiovascular disorders, immunology |
| Serpin A12/ Vaspin | Q8IW75 | metabolism/obesity |
| 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 |
| TNF-RI | P19438 | apoptosis, immunity, inflammation |
| TNF-RII | P20333 | apoptosis, immunity, inflammation |
| TNFRSF10C | O14798 | cancer, cell signaling |
| VEGF-D | O43915 | angiogenesis, cancer, cell differentiation |
| VILIP-1 | P62760 | cell signaling |
| vWF | PO4275 | cardiovascular disorders, coagulation |

NHP

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

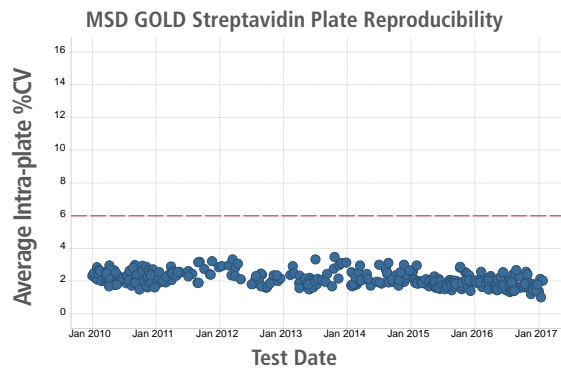
Rat analytes for immunological research

| Analyte | UniProt ID | Analyte | UniProt ID |
|---------------|------------|----------------|------------|
| EPO | P29676 | IL-13 | P42203 |
| GM-CSF | P48750 | KC/GRO | P14095 |
| IL-1 α | P16598 | MCP-1 | P14844 |
| IL-1 β | Q63264 | MIP-3 α | P97884 |
| IL-2 | P17108 | TNF- α | P16599 |
| IL-6 | P20607 | VEGF-A | P16612 |
| IL-10 | P29456 | | |

MSD GOLD for Assay Development: Quality and Reliability

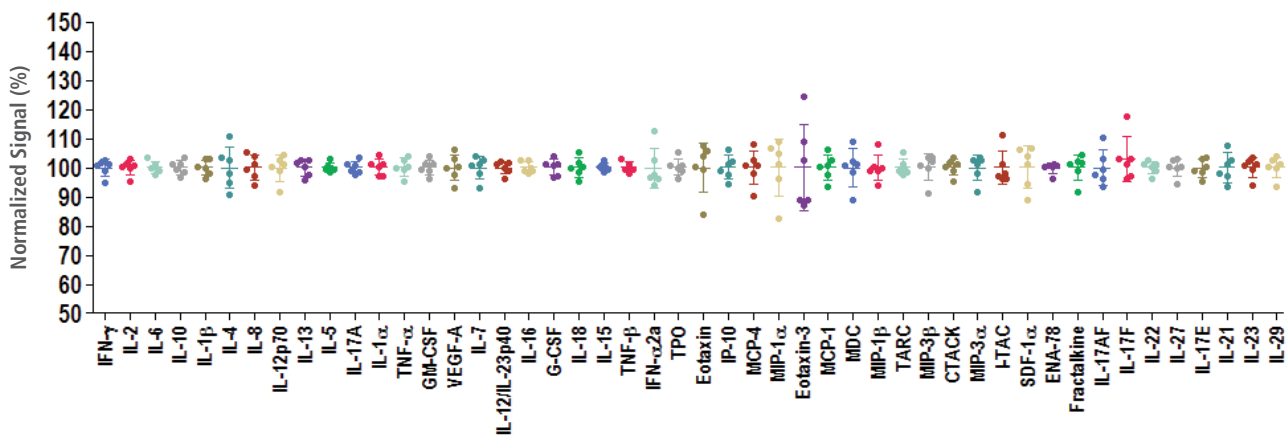
MSD GOLD products are a signature of our commitment to quality, consistency, and high performance in assay development. MSD GOLD plates and reagents are suitable for a wide range of research applications from biomarker discovery to personalized medicine.

- 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 | R91A0 |
| 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 NEW | 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.





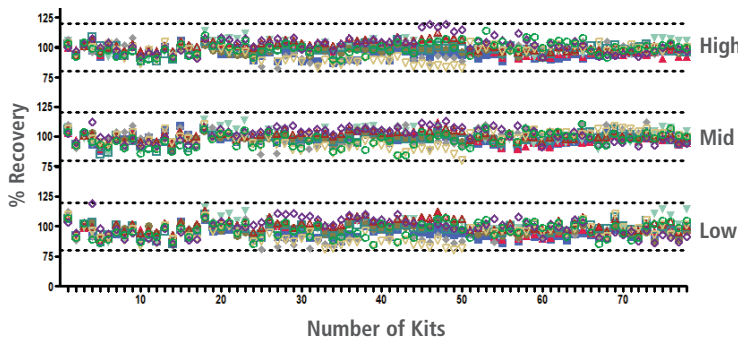
V-PLEX Validated Immunoassays for Unsurpassed Performance and Quality

V-PLEX assays are designed to maximize consistency in results and confidence in data. Developed under design control and according to the FDA's analytical validation guidelines, 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-1 β | 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-1 β | 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-1 α | 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-1 α | 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

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.

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 | 0.14 | 1.9 – 750 |
| ICAM-1 | 1.03 | 6.40 – 32,700 |
| IFN-γ | 0.20 | 7.47 – 938 |
| IL-1α | 0.09 | 2.85 – 278 |
| IL-1β | 0.04 | 2.14 – 375 |
| IL-1RA NEW | 1.12 | 9.19 – 650 |
| IL-2 | 0.09 | 0.89 – 938 |
| IL-3 NEW | 2.37 | 12.6 – 1,950 |
| IL-4 | 0.02 | 0.45 – 158 |
| IL-5 | 0.22 | 6.28 – 562 |
| IL-6 | 0.06 | 1.58 – 488 |
| IL-7 | 0.16 | 1.37 – 563 |
| IL-8 | 0.04 | 1.13 – 375 |
| IL-8 (HA*) | 95.6 | 713 – 43,400 |
| IL-9 NEW | 0.311 | 2.23 – 975 |
| IL-10 | 0.03 | 0.68 – 233 |
| IL-12/IL-23p40 | 0.39 | 5.68 – 2,250 |
| IL-12p70 | 0.11 | 1.22 – 315 |
| IL-13 | 0.24 | 4.21 – 353 |
| IL-15 | 0.17 | 1.4 – 525 |
| IL-16 | 2.83 | 19.1 – 1,870 |
| IL-17A | 0.74 | 9.32 – 3,650 |
| IL-17A (Gen. B) | 0.413 | 5.86 – 1,950 |
| IL-17A/F NEW | 0.930 | 7.57 – 3,900 |
| IL-17B NEW | 0.185 | 1.12 – 1,040 |
| IL-17C NEW | 0.682 | 3.84 – 1,620 |
| IL-17D NEW | 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 |

*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.

| Human | | |
|-----------------|--------------|-------------------|
| Analyte | LLOD (pg/mL) | LLOQ-ULOQ (pg/mL) |
| MIP-1β | 0.37 | 2.27 – 750 |
| MIP-3α | 0.05 | 0.588 – 325 |
| PIGF | 0.21 | 1.5 – 800 |
| SAA | 10.9 | 54.0 – 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 | 0.69 – 248 |
| TNF-β | 0.05 | 1.15 – 458 |
| TSLP NEW | 0.063 | 0.460 – 325 |
| VCAM-1 | 6.00 | 37.6 – 32,000 |
| VEGF-A | 1.12 | 7.7 – 784 |
| 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 | 0.14 | 1.9 – 750 |
| IFN-γ | 0.20 | 7.47 – 938 |
| IL-1β | 0.04 | 2.14 – 375 |
| IL-2 | 0.09 | 0.89 – 938 |
| IL-5 | 0.22 | 6.28 – 562 |
| IL-6 | 0.06 | 1.58 – 488 |
| IL-7 | 0.16 | 1.37 – 563 |
| IL-8 | 0.04 | 1.13 – 375 |
| IL-8 (HA) | 95.6 | 713 – 43,400 |
| IL-10 | 0.03 | 0.68 – 233 |
| IL-12/IL-23p40 | 0.39 | 5.68 – 2,250 |
| IL-15 | 0.17 | 1.4 – 525 |
| IL-16 | 2.83 | 19.1 – 1,870 |
| IL-17A | 0.74 | 9.32 – 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 | 0.37 | 2.27 – 750 |
| TARC | 0.22 | 3.32 – 1,120 |
| TNF-β | 0.05 | 1.15 – 458 |
| VEGF-A | 1.12 | 7.7 – 784 |

| 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 | 0.14 | 2.58 – 1,060 |
| IL-5 | 0.07 | 1.6 – 590 |
| IL-6 | 0.61 | 7.61 – 3,140 |
| IL-9 NEW | 3.84 | 21.9 – 2,600 |
| IL-10 | 0.95 | 19.8 – 2,030 |
| IL-12p70 | 9.95 | 179 – 20,600 |
| IL-15 NEW | 16 | 43.2 – 26,000 |
| IL-16 NEW | 4.65 | 15.0 – 1,800 |
| IL-17A NEW | 0.056 | 0.255 – 360 |
| IL-17A/F NEW | 0.23 | 1.39 – 1,620 |
| IL-17C NEW | 0.313 | 0.971 – 1,200 |
| IL-17E/IL-25 NEW | 0.630 | 4.54 – 3,300 |
| IL-17F NEW | 51.4 | 320 – 52,000 |
| IL-21 NEW | 1.74 | 12.1 – 9,300 |
| IL-22 NEW | 0.136 | 1.58 – 380 |
| IL-23 NEW | 0.899 | 4.19 – 7,600 |
| IL-27p28/IL-30 NEW | 1.39 | 5.91 – 6,500 |
| IL-31 NEW | 8.57 | 22.6 – 21,000 |
| IL-33 NEW | 0.36 | 1.85 – 1,950 |
| IP-10 NEW | 0.32 | 2.15 – 650 |
| KC/GRO | 0.24 | 3.29 – 1,230 |
| MCP-1 NEW | 0.672 | 4.42 – 325 |
| MIP-1α NEW | 0.081 | 0.380 – 390 |
| MIP-2 NEW | 0.053 | 0.580 – 423 |
| MIP-3α NEW | 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 NEW | 0.02 | 0.30 – 120 |

This assay is 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 pack sizes.

| Species | Name (Cat. No.) | Analytes |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Human | Biomarker 54-Plex Kit (K15248G) NEW | CRP, Eotaxin, Eotaxin-3, FGF (basic), Flt-1, GM-CSF, ICAM-1, IFN- γ , IL-1 α , IL-1 β , 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-1 α , MIP-1 β , MIP-3 α , 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-1 α , IL-1 β , 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-1 α , MIP-1 β , MIP-3 α , 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-1 α , IL-1 β , 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-1 α , MIP-1 β , PIGF, SAA, TARC, Tie-2, TNF- α , TNF- β , VCAM-1, VEGF-A, VEGF-C, VEGF-D |
| | Cytokine 44-Plex Kit (K15249G) NEW | Eotaxin, Eotaxin-3, GM-CSF, IFN- γ , IL-1 α , IL-1 β , 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-1 α , MIP-1 β , MIP-3 α , TARC, TNF- α , TNF- β , TSLP, VEGF-A |
| | Cytokine 30-Plex Kit (K15054G) | Eotaxin, Eotaxin-3, GM-CSF, IFN- γ , IL-1 α , IL-1 β , 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-1 α , MIP-1 β , TARC, TNF- α , TNF- β , VEGF-A |
| | Proinflammatory Panel 1 (K15049G) | IFN- γ , IL-1 β , IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-13, TNF- α |
| | TH17 Panel 1 (K15301G) | IL-17A (Version B), IL-21, IL-22, IL-23, IL-27, IL-31, MIP-3 α |
| | Cytokine Panel 1 (K15050G) | GM-CSF, IL-1 α , IL-5, IL-7, IL-12/IL-23p40, IL-15, IL-16, IL-17A, TNF- β , VEGF-A |
| | Cytokine Panel 2 (K15084G) NEW | 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-1 α , MIP-1 β , 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-1 α , IL-1 β , 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-1 α , MIP-1 β , PIGF, SAA, TARC, Tie-2, TNF- α , TNF- β , VCAM-1, VEGF-A, VEGF-C, VEGF-D |
| | A β Peptide Panel 1 (6E10) (K15200G) | A β 38 (6E10), A β 40 (6E10), A β 42 (6E10) |
| A β Peptide Panel 1 (4G8) (K15199G) | A β 38 (4G8), A β 40 (4G8), A β 42 (4G8) This product is suitable for human, mouse, and rat samples. | |
| NHP | Cytokine 24-Plex Kit (K15058G) | Eotaxin-3, GM-CSF, IFN- γ , IL-1 β , 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-1 α , MIP-1 β , 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-1 β , 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-1 α , MIP-1 β , TARC |
| Mouse | Proinflammatory Panel 1 (K15048G) | IFN- γ , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-10, IL-12p70, KC/GRO, TNF- α |
| | Cytokine Panel 1 (K15245G) NEW | IL-9, IL-15, IL-17A/F, IL-27p28/IL-30, IL-33, IP-10, MIP-1 α , MIP-2, MCP-1 |
| | TH17 Panel 1 (K15246G) NEW | IL-16, IL-17A, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, IL-23, IL-31, MIP-3 α |
| | Cytokine 29-Plex Kit (K15267G) NEW | IFN- γ , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12p70, 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/GRO, MCP-1, MIP-1 α , MIP-2, MIP-3 α , TNF- α |
| Rat | Proinflammatory Panel 2 (K15059G) | IFN- γ , IL-1 β , IL-4, IL-5, IL-6, IL-10, IL-13, KC/GRO, TNF- α |

*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.

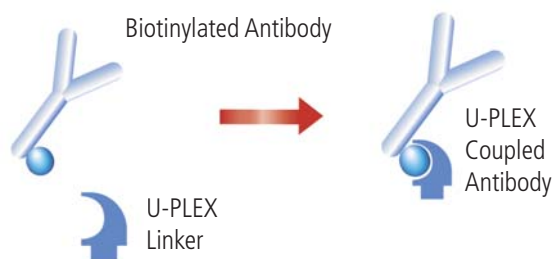
***NHP assays recognize analytes from Cynomolgus and Rhesus monkeys.



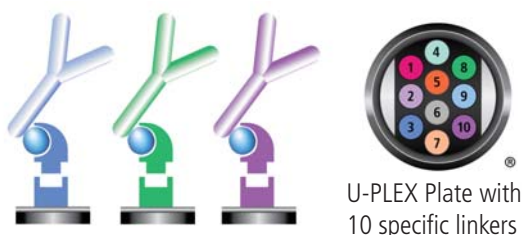
U-PLEX Assays and Assay Development Tools Deliver Maximum Flexibility

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.

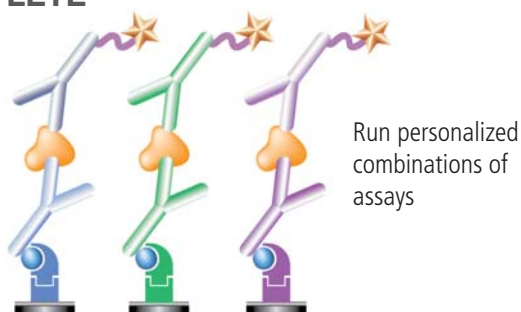
1. COUPLE



2. COAT



3. COMPLETE



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 quantitation.

| Species | Name | Cat. No. |
|---------|--------------------------|----------|
| Human | Biomarker Group 1 Assays | K15067L |
| NHP | Biomarker Group 1 Assays | K15068L |
| Mouse | Biomarker Group 1 Assays | K15069L |

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 |

U-PLEX Development Packs

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

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

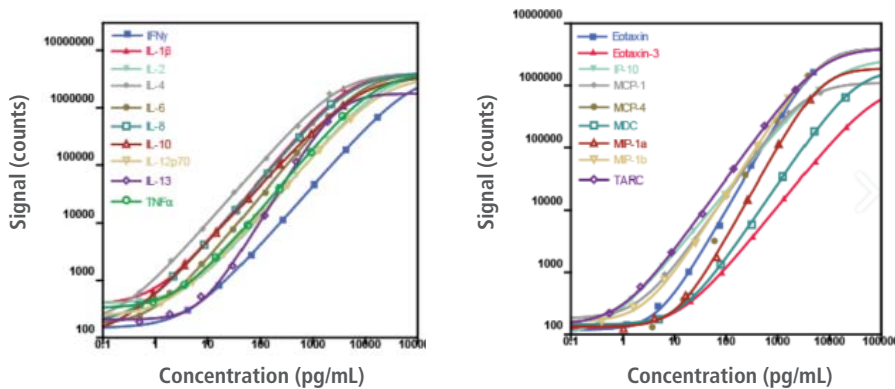
U-PLEX Assays: Built on Quality Components

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

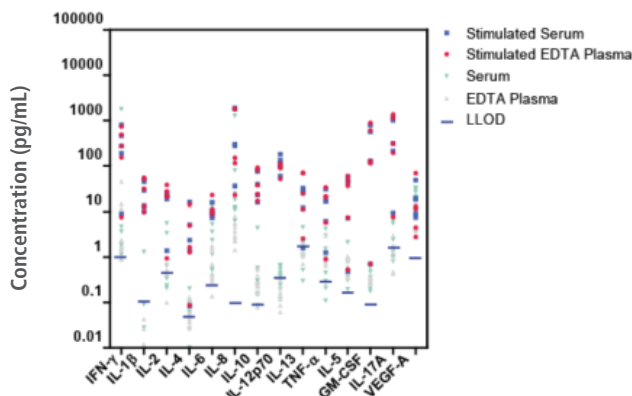
LLODs for U-PLEX assays range from pg/mL to sub pg/mL levels.

| | | LLOD (pg/mL) | | | | | | | | | |
|--------|---------------|--------------|------|------|------|-------|-------|----------|-------|---------------|--|
| Assays | IFN- γ | IL-1 β | 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-1 α | MIP-1 β | 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.

The flexibility of the U-PLEX platform empowers you to make personalized multiplex assay combinations of your choice. All U-PLEX assays are demonstrated to work with serum, plasma, and cell culture samples.

U-PLEX Analytes

U-PLEX analytes are available as individual assays or as part of multiplex combinations.

| Human | | Human | | NHP | | NHP | |
|----------------|--------------------|--------------|--------------------|----------------|--------------------|---------------|--------------------|
| Analyte (hu) | LLOD - ULOD, pg/mL | Analyte (hu) | LLOD - ULOD, pg/mL | Analyte (NHP) | LLOD - ULOD, pg/mL | Analyte (NHP) | LLOD - ULOD, pg/mL |
| CTACK | 1.8 – 4,200 | IL-33 | 0.59 – 10,300 | IL-1β | 0.15 – 3,800 | TRAIL | 0.66 – 10,000 |
| ENA-78 | 0.53 – 3,900 | IP-10 | 0.49 – 6,000 | IL-1RA | 1.7 – 5,000 | VEGF-A | 2.0 – 4,900 |
| Eotaxin | 3.2 – 4,800 | I-TAC | 1.5 – 5,100 | IL-2 | 0.70 – 1,900 | YKL-40 | 0.39 – 5,000 |
| Eotaxin-2 | 3.1 – 6,000 | MCP-1 | 0.74 – 6,600 | IL-2Rα | 10 – 55,000 | | |
| Eotaxin-3 | 7.3 – 21,400 | MCP-2 | 0.11 – 2,000 | IL-4 | 0.06 – 2,100 | | |
| EPO | 1.8 – 20,000 | MCP-3 | 0.79 – 5,000 | IL-5 | 0.24 – 4,000 | | |
| FLT3L | 0.49 – 6,000 | MCP-4 | 7.5 – 3,800 | IL-6 | 0.33 – 2,000 | | |
| Fractalkine | 102 – 180,800 | M-CSF | 0.29 – 2,000 | IL-7 | 1.5 – 7,000 | | |
| G-CSF | 1.6 – 20,400 | MDC | 8.4 – 20,100 | IL-8 | 0.15 – 2,200 | | |
| GM-CSF | 0.12 – 9,400 | MIF | 4.3 – 27,000 | IL-9 | 0.14 – 1,500 | | |
| GRO-α | 0.25 – 2,500 | MIP-1α | 7.7 – 4,200 | IL-10 | 0.14 – 3,700 | | |
| I-309 | 6.8 – 3,000 | MIP-1β | 1.5 – 1,600 | IL-12/IL-23p40 | 2.8 – 21,000 | | |
| IFN-α2a | 4.0 – 42,400 | MIP-3α | 1.8 – 20,800 | IL-12p70 | 0.54 – 5,300 | | |
| IFN-β | 3.1 – 100,000 | MIP-3β | 0.67 – 2,000 | IL-13 | 1.2 – 1,900 | | |
| IFN-γ | 1.7 – 17,000 | MIP-5 | 0.34 – 30,000 | IL-15 | 0.82 – 3,000 | | |
| IL-1α | 0.98 – 5,100 | SDF-1α | 278 – 103,200 | IL-16 | 6.6 – 21,500 | | |
| IL-1β | 0.15 – 3,800 | α-Synuclein | 8.0 – 6,800 | IL-17A | 2.3 – 23,400 | | |
| IL-1RA | 1.7 – 5,000 | TARC | 0.51 – 2,200 | IL-17A/F | 1.8 – 18,400 | | |
| IL-2 | 0.70 – 1,900 | TGF-β1** | 9.1 – 37,000 | IL-17B | 0.79 – 4,000 | | |
| IL-2Rα | 10 – 55,000 | TGF-β2** | 2.5 – 38,900 | IL-17C | 2.2 – 20,000 | | |
| IL-3 | 11 – 16,000 | TGF-β3** | 1.4 – 38,600 | IL-17D | 4.8 – 40,000 | | |
| IL-4 | 0.08 – 2,100 | TNF-α | 0.54 – 3,700 | IL-17F | 155 – 112,000 | | |
| IL-5 | 0.24 – 4,000 | TNF-β | 0.47 – 4,300 | IL-18 | 2.5 – 42,000 | | |
| IL-6 | 0.33 – 2,000 | TPO | 19 – 40,400 | IL-22 | 0.13 – 3,400 | | |
| IL-7 | 1.5 – 7,000 | TRAIL | 0.66 – 10,000 | IL-23 | 1.4 – 21,600 | | |
| IL-8 | 0.15 – 2,200 | TSLP | 0.20 – 10,100 | IP-10 | 0.49 – 6,000 | | |
| IL-9 | 0.14 – 1,500 | VEGF-A | 2.0 – 4,900 | I-TAC | 1.5 – 2,000 | | |
| IL-10 | 0.14 – 3,700 | YKL-40 | 0.39 – 5,000 | MCP-1 | 0.74 – 6,600 | | |
| IL-12/IL-23p40 | 2.8 – 21,000 | | | MCP-2 | 0.11 – 2,000 | | |
| IL-12p70 | 0.69 – 5,300 | | | MCP-3 | 0.79 – 5,000 | | |
| IL-13 | 3.1 – 1,900 | | | MCP-4 | 7.5 – 3,800 | | |
| IL-15 | 0.82 – 3,000 | | | M-CSF | 0.29 – 2,000 | | |
| IL-16 | 6.6 – 21,500 | | | MDC | 8.4 – 20,100 | | |
| IL-17A | 2.6 – 23,400 | | | MIF | 4.3 – 27,000 | | |
| IL-17A/F | 1.84 – 18,400 | | | MIP-1α | 7.7 – 4,200 | | |
| IL-17B | 0.79 – 4,000 | | | MIP-1β | 1.5 – 1,600 | | |
| IL-17C | 2.2 – 20,000 | | | MIP-3α | 0.27 – 20,800 | | |
| IL-17D | 4.8 – 40,000 | | | MIP-3β | 0.67 – 2,000 | | |
| IL-17E/IL-25 | 0.58 – 9,200 | | | MIP-5 | 0.34 – 30,000 | | |
| IL-17F | 155 – 112,000 | | | SDF-1α | 17.8 – 103,200 | | |
| IL-18 | 2.5 – 42,000 | | | TARC | 0.51 – 2,200 | | |
| IL-21 | 1.2 – 12,600 | | | TGF-β1** | 9.1 – 37,000 | | |
| IL-22 | 0.13 – 3,400 | | | TGF-β2** | 2.5 – 38,900 | | |
| IL-23 | 1.4 – 21,600 | | | TGF-β3** | 1.4 – 38,600 | | |
| IL-27 | 9.6 – 50,600 | | | TNF-α | 0.54 – 3,700 | | |
| IL-29/IFN-λ1 | 1.2 – 11,800 | | | TNF-β | 0.47 – 4,300 | | |
| IL-31 | 7.3 – 11,100 | | | TPO | 19 – 40,400 | | |

| Mouse | |
|----------------|--------------------|
| Analyte (ms) | LLOD - ULOD, pg/mL |
| EPO | 4.5 – 12,500 |
| GM-CSF | 0.16 – 1,000 |
| 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 | 0.43 – 2,400 |
| MCP-1 | 1.4 – 1,400 |
| MIP-1α | 0.21 – 2,100 |
| MIP-1β | 13 – 30,800 |
| MIP-2 | 0.30 – 2,000 |
| MIP-3α | 0.10 – 2,500 |
| TGF-β1** | 37 – 38,900 |
| TGF-β2** | 2.5 – 39,300 |
| TGF-β3** | 2.5 – 40,000 |
| TNF-α | 1.3 – 6,200 |
| VEGF-A | 0.77 – 12,100 |

| NHP* | |
|---------------|--------------------|
| Analyte (NHP) | 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 |

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

**See page 13 for additional notes about TGF-β analytes.

For Research Use Only. Not for use in diagnostic procedures.

U-PLEX Combinations

U-PLEX Combinations represent popular combinations of analytes, grouped into separate catalog numbers for ordering convenience. All Combinations are available in 1, 5, and 25-plate pack sizes.

| Species | Name (Cat. No.) | Analytes |
|------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Human | 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- α 2a, IFN- β , IFN- γ , IL-1 α , IL-1 β , IL-1RA, IL-2, IL-2R α , 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- λ 1, IL-31, IL-33, IP-10, I-TAC, MCP-1, MCP-2, MCP-3, MCP-4, M-CSF, MDC, MIF, MIP-1 α , MIP-1 β , MIP-3 α , MIP-3 β , MIP-5, SDF-1 α , 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-1 α , MIP-1 β , TARC |
| | Chemokine Combo 2 (K15046K) | CTACK, ENA-78, Fractalkine, GRO- α , I-309, I-TAC, MIF, MIP-3 α , MIP-3 β , MIP-5, SDF-1 α |
| | Cytokine Combo 1 (K15045K) | GM-CSF, IL-1 α , IL-5, IL-7, IL-12/p40, IL-15, IL-16, IL-17A, TNF- β , VEGF-A |
| | Interferon Combo (K15094K) | IFN- α 2a, IFN- β , IFN- γ , IL-29/IFN- λ 1 |
| | Proinflammatory Combo 1 (K15049K) | IFN- γ , IL-1 β , 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-1 β , IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70 |
| | Proinflammatory Combo 3 (K15052K) | IFN- γ , IL-1 β , IL-6, TNF- α |
| | Proinflammatory Combo 4 (K15053K) | IL-1 β , 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-3 α , TNF- α |
| | TGF- β Combo (K15241K)** | TGF- β 1, TGF- β 2, TGF- β 3 |
| | TH1/TH2 Combo (K15010K) | IFN- γ , IL-1 β , 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-1 β , IL-6, IL-10, IL-17A, IL-17E/IL-25, IL-17F, IL-21, IL-22, TNF- α |
| NHP* | Biomarker Group 1 61-Plex (K15082K) | CTACK, Eotaxin, Eotaxin-2, Eotaxin-3, ENA-78, FLT3L, Fractalkine, G-CSF, GM-CSF, GRO- α , I-309, IFN- α 2a, IFN- γ , IL-1 α , IL-1 β , IL-1RA, IL-2, IL-2R α , 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-18, IL-22, IL-23, IP-10, I-TAC, MCP-1, MCP-2, MCP-3, MCP-4, M-CSF, MDC, MIF, MIP-1 α , MIP-1 β , MIP-3 α , MIP-3 β , MIP-5, SDF-1 α , 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-1 α , MIP-1 β , TARC |
| | Cytokine Combo 1 (K15057K) | GM-CSF, IL-1 α , 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-1 β , IL-2, IL-4, IL-6, IL-8, IL-10, IL-12/IL-23p40, TNF- α |
| | T-Cell Combo (K15095K) | GM-CSF, IFN- γ , IL-2, IL-4, IL-9, IL-10, IL-13, IL-17A, IL-17E, IL-22, MIP-3 α , TNF- α |
| | TGF- β Combo (K15243K)** | TGF- β 1, TGF- β 2, TGF- β 3 |
| | TH1/TH2 Combo (K15080K) | IFN- γ , IL-1 β , IL-2, IL-4, IL-5, IL-8, IL-10, IL-12p70, TNF- α |
| TH17 Combo 1 (K15079K) | IFN- γ , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-10, IL-17A, TNF- α | |
| Mouse | Biomarker Group 1 35-Plex (K15083K) | EPO, GM-CSF, IFN- γ , IL-1 β , 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/GRO, MCP-1, MIP-1 α , MIP-1 β , MIP-2, MIP-3 α , TNF- α , VEGF-A |
| | Chemokine Combo (K15099K) | KC/GRO, IP-10, MCP-1, MIP-1 α , MIP-1 β , MIP-2, MIP-3 α |
| | 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-3 α , TNF- α |
| | TGF- β Combo (K15242K)** | TGF- β 1, TGF- β 2, TGF- β 3 |
| | TH1/TH2 Combo (K15071K) | IFN- γ , IL-1 β , 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-17F, IL-21, IL-22, IL-23, IL-31, IL-33 |
| | TH17 Combo 2 (K15078K) | IFN- γ , IL-1 β , IL-6, IL-17A, IL-17C, IL-17E/IL-25, IL-17F, IL-21, IL-22, TNF- α |

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

**Analysis of total (complexed plus free) TGF- β 1, TGF- β 2, or TGF- β 3 involves special procedures that may adversely affect the analysis of other proteins. For this reason, MSD recommends testing for TGF- β s separately.

Standard Assays: MSD's Broadest Menu

Standard assays offer a broad menu and provide greater consistency, sensitivity, and dynamic range than western blots and traditional ELISAs. Standard 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, Cerebral Spinal 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 | Standard assay workflow is approximately 3 hours. Plate read time is 90 seconds per plate. | |

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

Standard Multiplex Panels

Cytokine/Inflammation Panels

| Species | Name | Analytes |
|---------|--------------------------------|----------------------------------------------------------------------------------------------|
| Human | TH1-TH2 10-Plex | IFN- γ , IL-1 β , IL-2, IL-4, IL-5, IL-8, IL-10, IL-12p70, IL-13, TNF- α |
| Human | TH1-TH2 7-Plex | IFN- γ , IL-2, IL-4, IL-5, IL-10, IL-12p70, IL-13 |
| Mouse | TH1-TH2 9-Plex | IFN- γ , IL-1 β , IL-2, IL-4, IL-5, KC/GRO, IL-10, IL12 total, TNF- α |
| Human | ProInflammatory 9-Plex | GM-CSF, IFN- γ , IL-1 β , IL-2, IL-6, IL-8, IL-10, IL-12p70, TNF- α |
| Human | ProInflammatory 7-Plex | IFN- γ , IL-1 β , IL-6, IL-8, IL-10, IL-12p70, TNF- α |
| Human | ProInflammatory I 4-Plex | IFN- γ , IL-1 β , IL-6, TNF- α |
| Human | ProInflammatory II 4-Plex | IL-1 β , IL-6, IL-8, TNF- α |
| Mouse | Proinflammatory 7-Plex | IFN- γ , IL-1 β , 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 Ultra-Sensitive Kit | MMP-2, MMP-10 |
| Human | MMP 3-Plex Ultra-Sensitive Kit | MMP-1, MMP-3, MMP-9 |

Isotyping Panels

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

Metabolic Panels

| Species | Analytes |
|-------------------|------------------------------------------------------|
| Human, Rat | Leptin, Insulin |
| Mouse, Rat | Glucagon, Insulin |
| Mouse, Rat | Active GLP-1 (7-36) amide, Insulin, Glucagon |
| Mouse, Rat | Active GLP-1, Insulin, Glucagon |
| Human, Mouse, Rat | GLP-1 (7-36) amide, Insulin, Glucagon |
| Human | Active GLP-1, Insulin, Glucagon, Leptin |
| Human | Active GLP-1 (7-36) amide, Insulin, Glucagon, Leptin |

Neurodegeneration Panels

| Species | Analytes |
|--------------|-----------------------------------------------|
| Human | sAPP α sAPP α , sAPP β |
| Human, Mouse | Tau (pT231)/Total Tau |

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 | Argutus AKI Test™ | αGST, GSTYb1, RPA-1 |
| Rat | Cardiac Injury Panel 2 | cTnl, cTnT, FABP3 |
| Rat | Cardiac Injury Panel 3 | cTnl, cTnT, FABP3, Myl3 |
| Rat | Muscle Injury Panel 1 | cTnl, cTnT, sTnl, FABP3, Myl3 |
| Rat | Muscle Injury Panel 2 | TIMP-1, CK |
| Mouse | Muscle Injury Panel 3 | cTnl, FABP3, Myl3, sTnl |
| Rat | Liver Injury Panel 1 | Arginase-1, αGST |
| Rat | Kidney Injury Panel 1 | Albumin, TIM-1, N-GAL, Osteopontin |
| Human | Kidney Injury Panel 3 | αGST, 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 |
| Human | Hypoxia Panel | EPO, VEGF-A |
| 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 | EGFR Family | pEGFR, pErbB2, pIGF-1R |
| 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, NHP | BAD pS112/Total |
| Human | Caspase-3 (Cl. p20/p17)/Total |
| Human | c-Kit pY721/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 | HSP27 pS78/Total |
| Human | HSP27 pS82/Total |
| Human | JNK (pT183/pY185)/Total |
| Human, Mouse, Rat | MEK1/2 (pS217/221)/Total |
| Human | Met pY1349/Total |
| Human | MDM2 Ub/Total |
| Human, Mouse, Rat | mTOR pS2448/Total |
| Human, Mouse, Rat | p38 (pT180/pY182)/Total |
| Human | p53 pS15/Total |
| Human, Mouse, Rat | p53 Ub/Total |
| Human, Mouse, Rat | p70S6K (pT421/pS424)/Total |
| Human | Rb pS608/Total |
| Human | Rb pS780/Total |
| Human, Mouse, Rat | S6RP (pS240/244)/Total |
| Human, Mouse, Rat | STAT5a,b pY694/Total |

Secreted Analytes

| Analyte | Species |
|--------------------------|---------------|
| A2M* | H, R |
| Aβ (Total)** | H |
| Adiponectin | H, M, R |
| Angiopoietin 1 | H |
| Angiopoietin 2 | H |
| sAPPα | H |
| sAPPβ (wild type) | H, M |
| sAPPβ (Swedish variant)* | H |
| B2M* | H, R |
| BDNF** | H |
| BNP | R |
| cAMP | H, M, R |
| Cancer Antigen 125 | H |
| CHO (HCP) | H |
| Clusterin | H, R |
| c-Peptide | H, M, R |
| DJ-1/PARK7 | H |
| E-Cadherin | H |
| Eotaxin-3 (CCL26)* | H |
| EPO* | H, M, R |
| E-Selectin | H |
| FABP3 | H, M, R |
| Factor VII | H |
| Fas | H |
| FasL | H |
| Flt-1/VEGFR1 | H |
| FSH | H |
| G-CSF* | H |
| Ghrelin (active)** | H |
| GIP | H |
| GLP-1 (Active) | C, H, M, P, R |
| GLP-1 (Total) | C, H, M, P, R |
| GLP-1 (x-36) amide | H, M, R |
| Glucagon | H, M, R |
| GM-CSF | H, M, R |
| HGF | H |
| I-309 (CCL1) | H |
| IFN-α2a | H |
| IFN-β | H |
| IFN-γ | H, M, R |
| IgA | H, P |
| IgG | H, P |
| IgM | H, P |
| IL-1β | H, M, R |
| IL-2 | H, M |
| IL-4 | H, M, R |
| IL-5 | H, M, R |
| IL-6 | H, M, R |
| IL-6R | H |
| IL-8 (CXCL8) | H |

| Analyte | Species |
|-----------------------|---------|
| IL-10 | H, M |
| IL-12 | H, M |
| IL-12/IL-23p40 | H, M |
| IL-12p70 | H, M |
| IL-17A | H, M |
| IL-17B | H |
| IL-17D | H |
| IL-18 | H |
| Insulin | H, M, R |
| IP-10 (CXCL10) | H |
| I-TAC | H |
| KC/GRO (CXCL1) | M, R |
| KIM-1/TIM-1/HAVCR | H, R |
| LBP | H |
| Leptin | H, M, R |
| MCP-1 (CCL2) | H, M, R |
| MCP-2 (CCL8) | H |
| M-CSF | H |
| MDC (CCL22) | H |
| MIF | H |
| MIG** | H |
| MIP-1β (CCL4) | H |
| MIP-3α (CCL20) | H, M, R |
| MIP-3β (CCL19) | H |
| MIP-4 (CCL18) | H |
| MIP-5 (CCL15) | H |
| MMP-1 | H |
| MMP-2 | H |
| MMP-3 | H |
| MMP-9 | H |
| MMP-10 | H |
| Myeloperoxidase (MPO) | H |
| NT-proANP | R |
| NT-proBNP | H, R |
| Osteocalcin | H, R |
| Osteonectin | H |
| Osteopontin | H, M |
| Osteoprotegerin | H, M |
| P-Cadherin | H |
| Prolactin | H |
| Protein A | H |
| E-Selectin | H |
| P-Selectin | H |
| PYY | H, M, R |
| RANTES (CCL5) | H, M |
| RBP4 | H |
| Resistin | H, M, R |
| Tau | B, H, M |
| Tau (pT181)** | H, M |
| Tau (pT231) | H, M |

| Analyte | Species |
|----------------------|---------|
| Tenascin C | H |
| TGF-β1 | H |
| Thrombomodulin | H |
| TIMP-1 | H |
| TNF-α | H, M |
| TNF-RI | H |
| TNF-RII | H |
| sTroponin I (sTnl) | R |
| Troponin I (TNNI1) | R |
| Troponin ITC Complex | R |
| VEGF-R2 | H |
| YKL-40 | H |

* available in both singleplex and multiplex

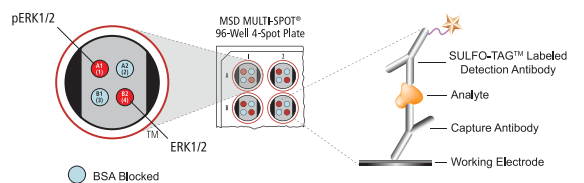
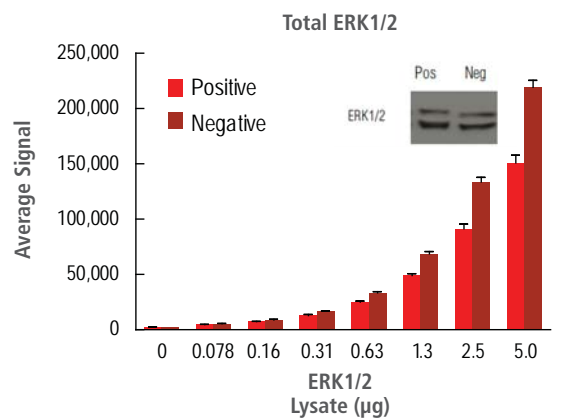
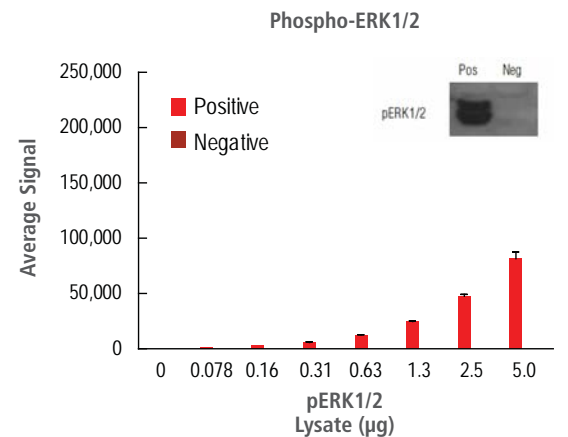
**available in multiplex only

Intracellular Analytes

| Analyte | Species |
|------------------------------------|------------|
| 4E-BP1 | H, M |
| 4E-BP1 (pT37/46) | H, M |
| Akt* | H, M, P, R |
| Akt (pS473)* | H, M, P, R |
| Akt (pT308)* | H, M |
| Aurora A | H |
| Aurora A (pT288) | H |
| BAD* | H, P |
| BAD (pS112)* | H, P |
| Caspase-3* | H |
| Caspase-3 (p20/p17) (cleaved) | H |
| CHO (HCP) | H |
| CHOP | H, M, R |
| c-Jun | H, M, R |
| c-Kit | H |
| EGFR* | H |
| EGFR (pY1173) | H |
| eIF4E | 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-3 α (pS21) | H |
| GSK-3 β * | H, M, R |
| GSK-3 β (pS9)* | H, M, R |
| HIF-1 α | H, M, R |
| Histone H3 (pS10) | H, M, R |
| HSP27* | H |
| HSP27 (pS78)* | H |
| HSP27 (pS82)* | H |
| HSP70 | H |
| IGF-1R (pY)** | H |
| IRE-1 α (CXCL11) | H, M, R |
| IRS-1 (S312) | H |
| JNK* | |
| P-JNK* | H |
| MDM2* | H |
| MDM2 (ubiquitinated)* | H, M, R |
| MDM2 - p53 complex | H |

| Analyte | Species |
|------------------------|------------|
| MEK 1/2 | H, M, R |
| MEK 1/2 (pS217/pS221) | H, M, R |
| MEK2 | H, M, R |
| Met* | H |
| Met (pY1349)* | H |
| mTOR (pS2488) | |
| mTOR | H, M, R |
| NF κ B (pS468) | H, M, R |
| NF κ B (pS536) | H, M, R |
| p38* | H, M, P, R |
| p38 (pT180/pY182)* | H, M, R |
| p53* | H, M, R |
| p53 (pS15)* | H, M, R |
| p53 (ubiquitinated)* | 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 (p980) | |
| Pleckstrin (pS) | H, M, R |
| PRAS40 | H |
| PRAS40 (pT246) | H, M, R |
| PSD-95 | H, M, R |
| Rb | H |
| Rb (pS608) | H |
| Rb (pS780) | H |
| S6RP | H, M, P, R |
| S6RP (pS235/236) | H, M, P, R |
| S6RP (pS240/244) | H, M, R |
| Sclerostin | H |
| Smad1 (pS463/465) | H, M |
| SRC3 | H |
| STAT3 | H, M, R |
| 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 |

* 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.

MSD Services and Custom Assay Capabilities: Personalized Development and Support

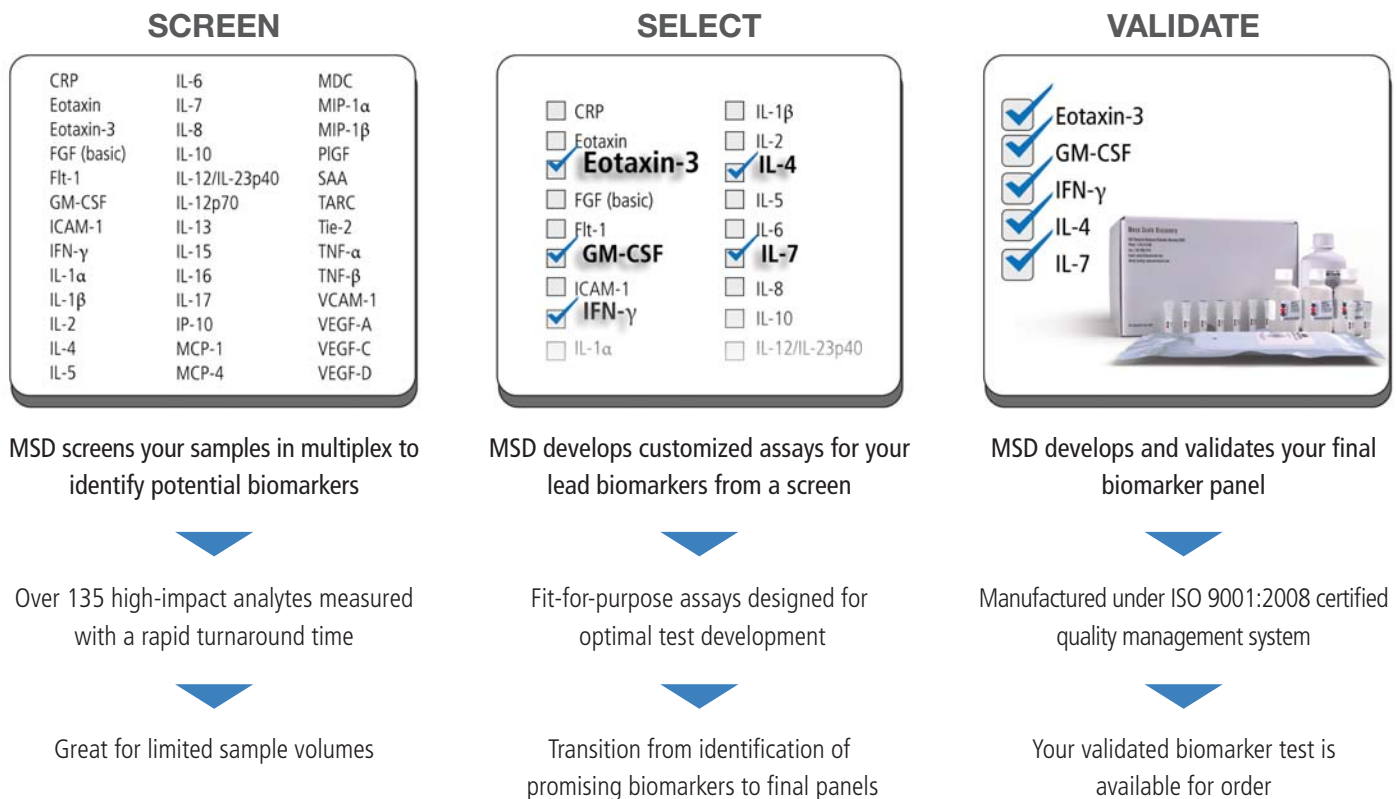
With over 20 years of experience in developing immunoassays of unsurpassed quality and performance, MSD's personalized services provide you with the tools to precisely measure biomarkers and meet the requirements of each unique project.

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.



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

S-PLEX Sample-Testing Services: MSD's Most Sensitive Assay Platform



S-PLEX assays achieve femtogram/mL sensitivity with the precision and reliability you have come to expect from MSD. We offer S-PLEX sample-testing services with even higher sensitivity than currently available from MSD. Now you can detect and quantitate very low abundance proteins in your samples with the confidence that you are specifically measuring your protein of interest. Our experts will work with you to understand your sample-testing needs and develop a plan that is right for you.

S-PLEX Assays Available for Sample-Testing Services

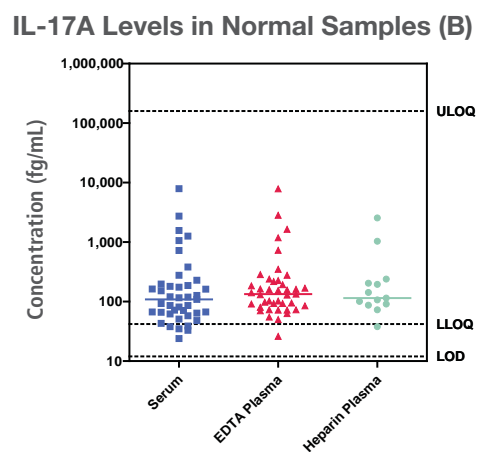
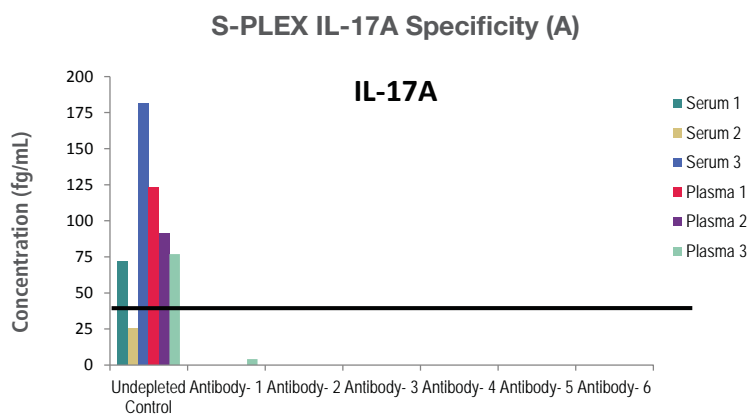
| Target Analyte (hu) | Limit of Detection (LOD) (fg/mL) | Lower Limit of Quantitation (LLOQ) (fg/mL) | Upper Limit of Quantitation (ULOQ) (fg/mL) |
|---------------------|----------------------------------|--------------------------------------------|--------------------------------------------|
| Cardiac Troponin I | 25 | 125 | 480,000 |
| IFN- γ | 2.5 | 14 | 56,000 |
| IL-2 | 0.8 | 1.9 | 22,000 |
| IL-4 | 0.7 | 3.6 | 10,000 |
| IL-6 | 0.7 | 3.1 | 12,000 |
| IL-10 | 0.7 | 2.3 | 25,000 |
| IL-17A | 12 | 42 | 160,000 |
| PSA (free) | 141 | 480 | 240,000 |
| Tau | 6.2 | 21 | 160,000 |
| TNF- α | 6.7 | 18 | 120,000 |
| TSLP | 1.5 | 6.0 | 20,000 |

S-PLEX assays currently in development for sample-testing services:

- GFAP
- HIVp24
- IL-1 β
- IL-5
- IL-13
- IL-21
- IL-25
- Phospho-Tau

Sensitivity You Can Trust

S-PLEX technology utilizes a novel process to generate sensitivity that is up to 1000 times greater than ELISAs. The assays detect a few hundred molecules per sample with extremely high specificity. Target depletion studies were used to validate the specificity of each S-PLEX assay. Data for IL-17A are shown below.



(A) Six unique IL-17A specific antibodies were selected to deplete IL-17A from six normal samples (three serum and three plasma samples). Data are presented relative to the undepleted control samples. IL-17A depletion was 95% or greater in the six samples tested. (B) IL-17A levels were measured in 42 serum, 42 EDTA plasma, and 12 heparin plasma samples from normal individuals.



MESO® QuickPlex SQ 120

MESO SECTOR S 600

Customer Support

Phone: 1-240-314-2795

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Hours of Operation: 5:00 AM to 8:00 PM, Monday – Friday, U.S. Eastern Time

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The 6E10, 4G8, 12F4 antibodies used in MSD A β assays, the thrombomodulin antibody used in MSD Thrombomodulin and Vascular Injury Panel I assays, the DJ-1 protein used in the MSD DJ-1/PARK7 assay, and the detection antibody used in MSD Tau assay are supplied by BioLegend (previously from Covance Research Products).

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