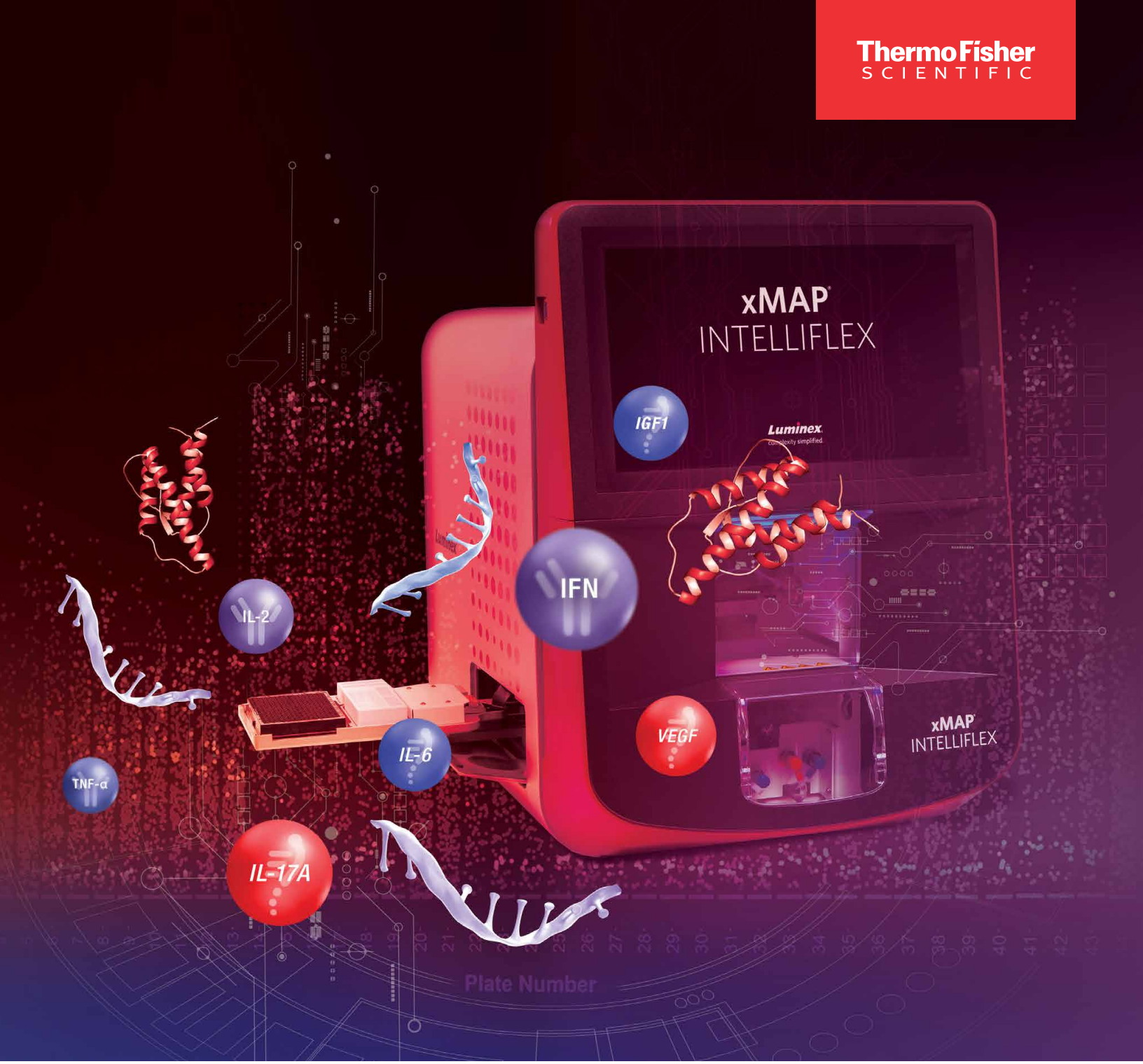
ThermoFisher SCIENTIFIC



Luminex xMAP INTELLIFLEX System

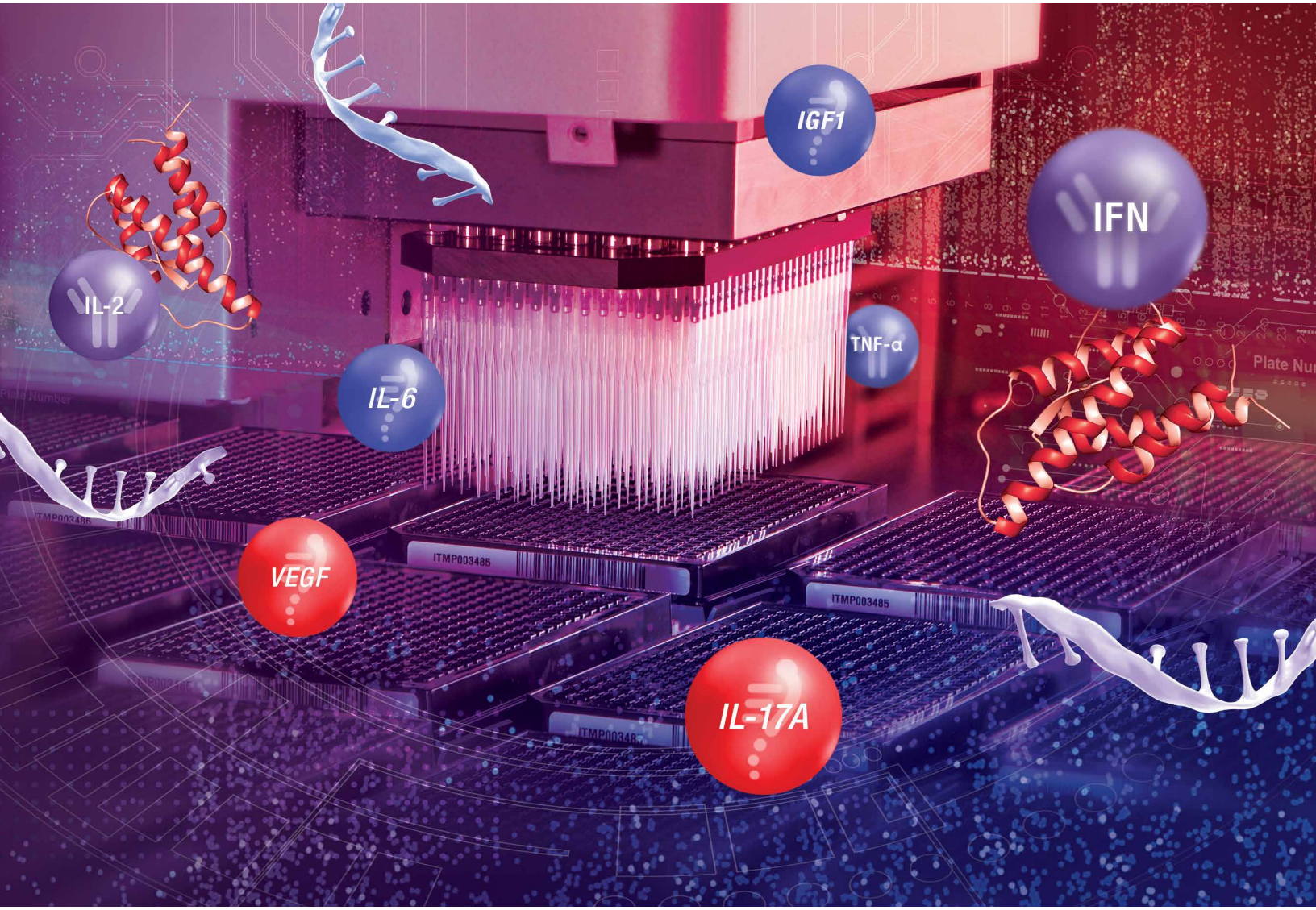
One instrument for high-throughput multiplexing of protein and gene expression analysis

invitrogen

Flexibility and superior results—all in one instrument

The Invitrogen™ Luminex® xMAP® INTELLIFLEX™ System is an advanced multiplexing platform that enables you to obtain accurate and reliable results with both protein and gene expression assays and is designed for a 96- or 384-well high-throughput format. Combining a multiplex assay with higher throughput maximizes the amount of data per sample and the number of samples you can process, which can save you weeks of time when compared to a singleplex or lower-throughput assay. Whether automating a single step or your entire workflow for Invitrogen™ ProcartaPlex™ assays or QuantiGene™ Plex assay kits, our laboratory automation solutions can help you accelerate your research.

The Luminex xMAP INTELLIFLEX System is the newest addition to the well-established family of Luminex® multiplexing systems, which includes the Invitrogen™ Luminex® 200™ Instrument System and the Luminex™ FLEXMAP 3D® Instrument System. Offered in two configurations, both Luminex xMAP INTELLIFLEX systems leverage Luminex™ xMAP® bead-based technology to enable high-level multiplexing (Table 1). And, the Luminex xMAP INTELLIFLEX DR-SE System comes with a dual reporter readout, and side-eject feature.



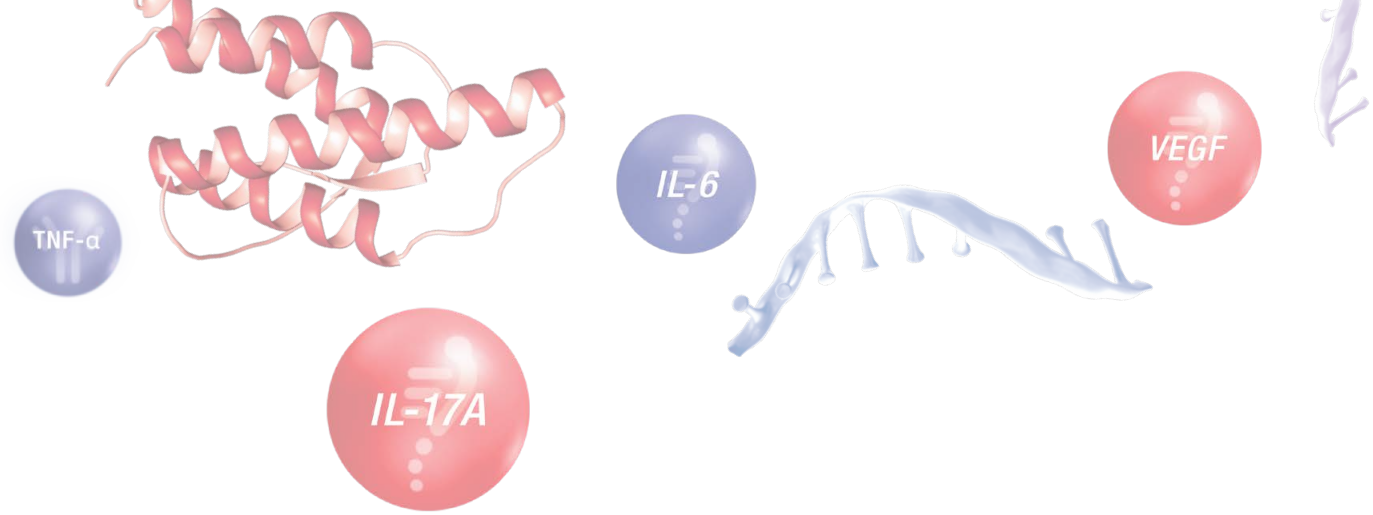


Table 1. Compare the multiplexing systems shown below to determine which Luminex system is right for your laboratory's needs.




	Luminex xMAP INTELLIFLEX DR-SE System	Luminex xMAP INTELLIFLEX System	Luminex FLEXMAP 3D Instrument System	Luminex 200 Instrument System
Applications	Protein, nucleic acid analysis	Protein, nucleic acid analysis	Protein, nucleic acid analysis	Protein, nucleic acid analysis
Cat. No.	APX2021	APX2020	APX1342	APX10031
Multiplex capacity	Up to 500 targets	Up to 500 targets	Up to 500 targets	Up to 100 targets
Read time (96-well plate)	~20 minutes	~20 minutes	~20 minutes	~40 minutes
Read time (384-well plate)	~75 minutes	~75 minutes	~75 minutes	N/A
Dynamic range	≥5.5 logarithmic units	≥5.5 logarithmic units	4.5 logarithmic units	3.5 logarithmic units
Microtiter plate	96- and 384-well	96- and 384-well	96- and 384-well	96-well
Dimensions	58.4 cm (23 in.) W 61 cm (24 in.) D 76.2 cm (30 in.) H	58.4 cm (23 in.) W 61 cm (24 in.) D 76.2 cm (30 in.) H	58.4 cm (23 in.) W 63.5 cm (25.7 in.) D 45.7 cm (18 in.) H	64 cm (25.25 in.) W 60 cm (23.5 in.) D 32.5 cm (12.5 in.) H
Touchscreen	•	•	N/A	N/A
Automated startup	•	•	N/A	N/A
Reporter laser	532 nm (green) and 405 nm (violet)	532 nm (green)	532 nm (green)	532 nm (green)
Dual reporter readout	•	N/A	N/A	N/A
Barcode reader for calibration and verification reagents	•	•	N/A	N/A

"The Luminex multiplexing platform is my go-to system as it provides rapid results that are both accurate and affordable, allowing for disease characterization, pathway detection, and biomarker discovery."

—Douglas D. Fraser, MD, PhD, FRCPC

Learn more at **thermofisher.com/luminex**

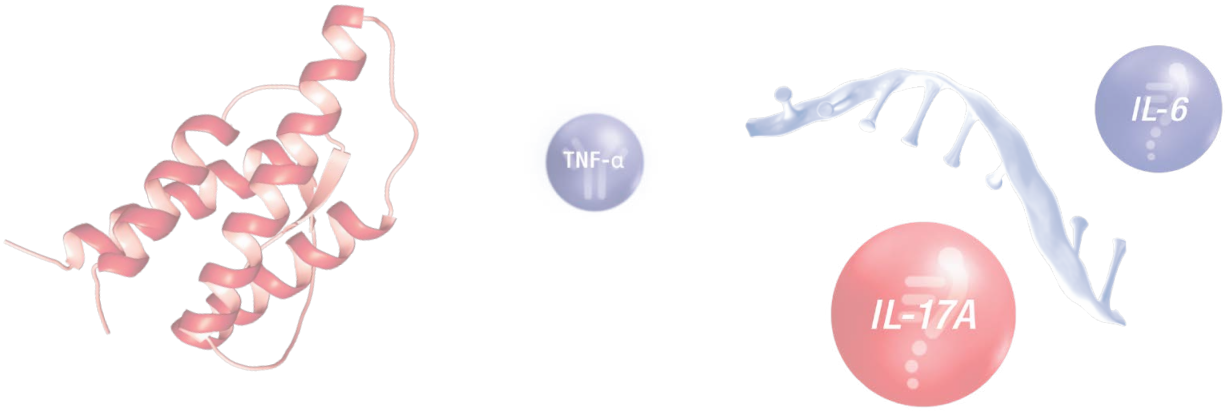
The Luminex xMAP INTELLIFLEX System

The most advanced and versatile multiplexing platform

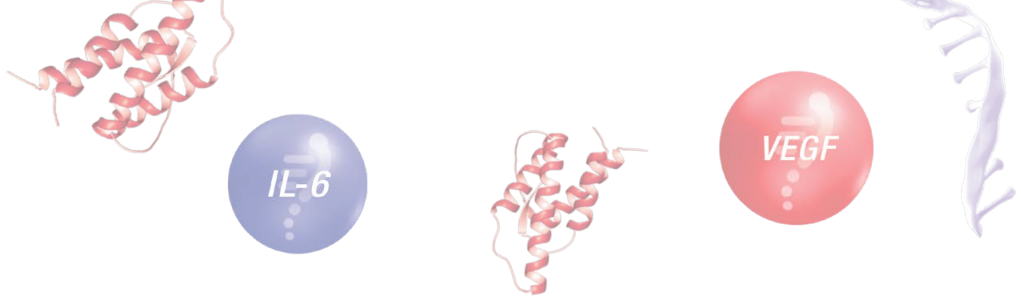
The Luminex xMAP INTELLIFLEX System is a multifunctional multiplexing unit that can process up to 153,600 tests per hour in 96- and 384-well plate formats (Table 2). No other multiplex platform combines low- and high-plex capabilities to deliver fast and reliable results. This system also enables you to acquire data for two parameters per bead simultaneously by introducing an additional laser and a second reporter channel. The system is compatible with all ProcartaPlex multiplex immunoassays and QuantiGene Plex multiplex gene expression assays.

Table 2. Key features of the Luminex xMAP INTELLIFLEX System in both configurations.

Luminex xMAP INTELLIFLEX System	Luminex xMAP INTELLIFLEX DR-SE System
5.5 logarithmic units of dynamic range Flexibility for multiplex targets minimizes the need to dilute samples to fall within the range of the assay.	**All features of the Luminex xMAP INTELLIFLEX System plus:**
Integrated touchscreen PC Integrated touchscreen enables space savings and convenient and intuitive setup.	**Dual reporter system** Second violet (405 nm) laser allows you to monitor two parameters per analyte.
Built-in barcode reader Faster setup and convenient tracking system, particularly for large experiments.	**Side-eject door** Enables end-to-end automation to maximize throughput.
Automated startup, shutdown, and maintenance routines Increase your productivity with walk-away routines.	



Learn more at **thermofisher.com/intelliflex**



Luminex xMAP INTELLIFLEX Software

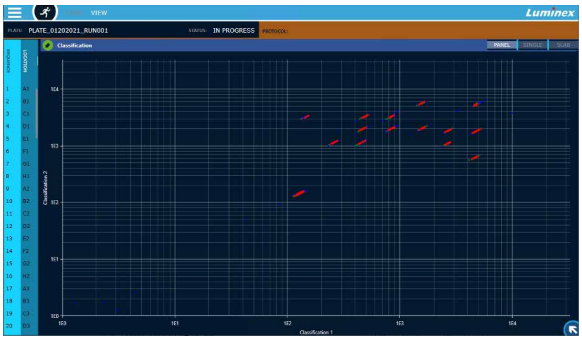
Fast, intuitive, and flexible

Invitrogen™ Luminex® xMAP® INTELLIFLEX Software is user-friendly and allows users to configure and run plate acquisition, customize data output, and maintain the instrument. Plate configuration is intuitive, import-friendly, and flexible, so users can obtain data quickly with minimal training. New tools to monitor ongoing acquisition enable users to assess run performance in real time, which helps ensure collection of high-quality data. Results can be viewed in either a customizable format or a backward-compatible format like Luminex® xPONENT® Software for easy integration into data analysis workflows.

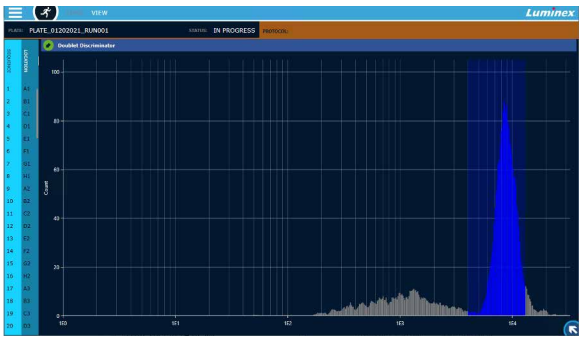
Features:

- **Easier run setup and workflow**—start your run in as little as 20 seconds; configure your plate with just a few clicks or import from a CSV template
- **Improved run monitoring**—quickly navigate between multiple data types for comprehensive monitoring in real time; various ways to view data are shown in Figure 1
- **Customizable output file formats**—compatible with the Thermo Fisher™ Connect Platform

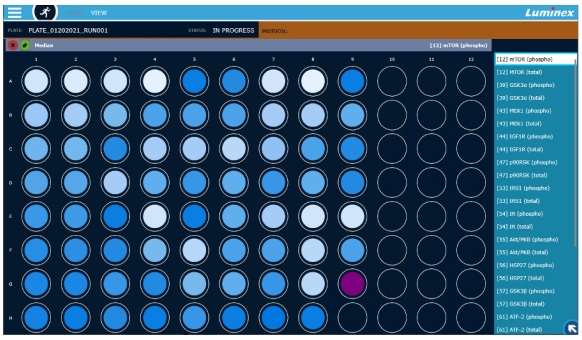
Bead map



Doublet discrimination



MFI heat map



Well status

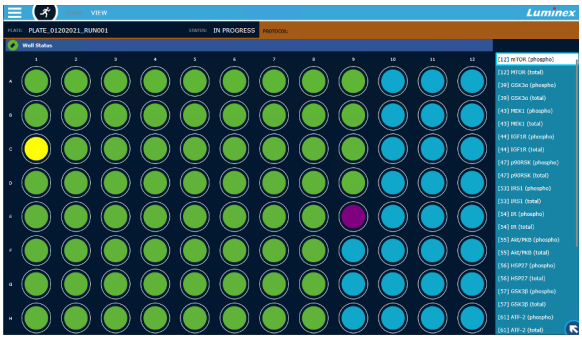


Figure 1. Get insight to assess performance at a glance. Luminex xMAP INTELLIFLEX Software offers different options for run monitoring.

Learn more at **thermofisher.com/cloud**

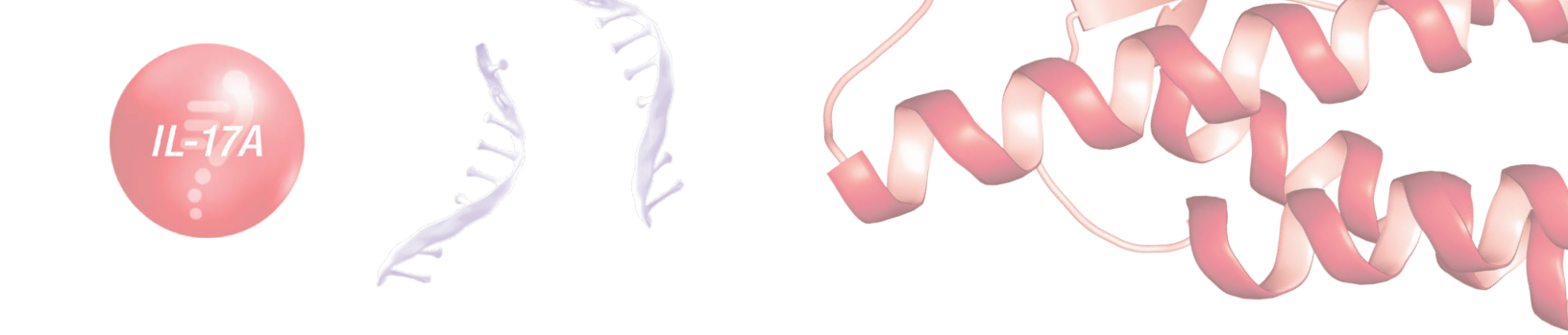
Combine workflows without compromising quality

Multiplex assays for gene and protein analysis

ProcartaPlex and QuantiGene Plex assays help enable a unique high-throughput multiomics approach utilizing the Luminex® platform. Proteomic and genomic workflows can be combined without compromising data interpretation or sensitivity. Investigate cell functions and responses by simultaneously interrogating large sets of RNA or protein targets in single samples in either 96-well or 384-well format (Table 3).

Table 3. High-throughput protein and gene expression assays.

	ProcartaPlex assays	QuantiGene Plex Assay
Intra-assay CV	<15%	
Inter-assay CV	<15%	
Linearity	3–5 logarithmic units	
Maximum assay plex size	65 proteins	80 RNA targets
Formats	96- and 384-well	
Sample types	Serum, plasma, cell culture supernatant (CCS), cerebral spinal fluid (CSF)	RNA; cell and blood lysates; tissue and FFPE homogenates
Species	Human, mouse, rat, canine, porcine, non-human primate (NHP)	All
Compatible Luminex® instruments	xMAP INTELLIFLEX System FLEXMAP 3D System Luminex 200 System MAGPIX® System	
Sample volume	6.3–50 µL	20–80 µL



Protein multiplex assays

ProcartaPlex immunoassays are antibody-based, magnetic bead reagent kits and panels for multiplex protein quantitation on the Luminex instrument platform. We provide the flexibility to mix and match your own panels with a menu that includes more than 500 cytokines, chemokines, growth factors, and other protein targets from a range of species. The newest ProcartaPlex product line includes lyophilized bead kit formats for an easier workflow that reduces hands-on time, enabling you to get results faster. (Figure 2)

Features include:

- **Higher throughput without compromising sensitivity**—increase throughput and sensitivity with only 6.3–50 µL of sample required
- **Easily create your own panels**—use premixed custom combinations from our broad list of targets
- **Consistent results**—scalable and reproducible performance regardless of multiplex level
- **Lyophilized assay format available**—requires less hands-on time for faster results with identical performance as liquid bead format (Figure 2)

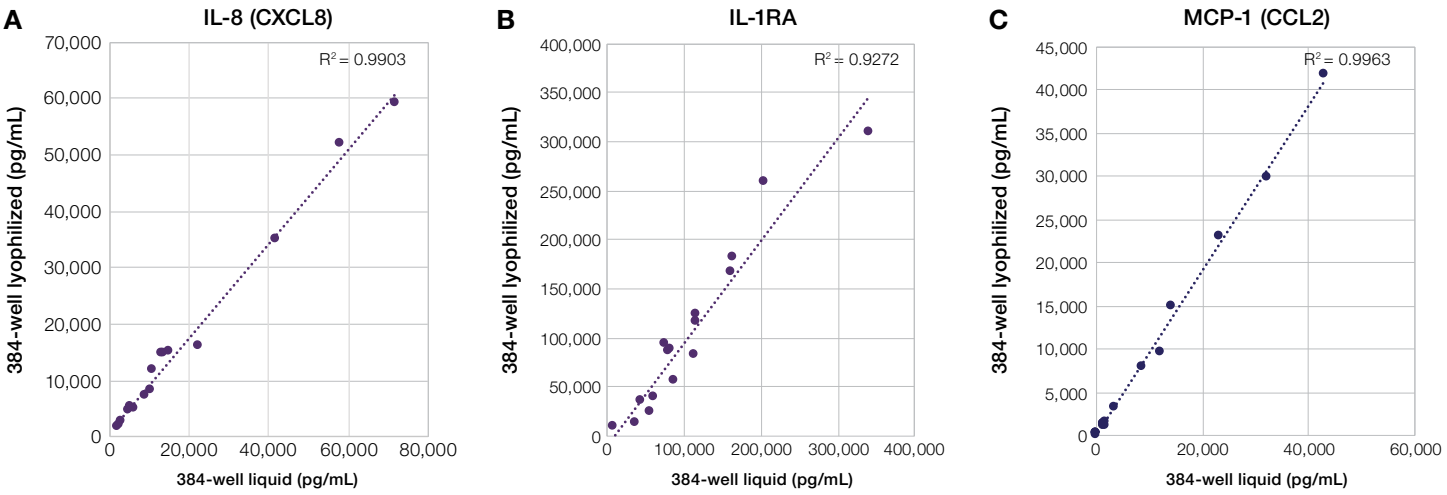


Figure 2. Identical performance of ProcartaPlex 384-well assays in lyophilized and liquid bead formats. ProcartaPlex 384-well assays are available in two formats: ready-to-use plates with pre-dispensed lyophilized beads for workflow convenience (384-well lyophilized) and as liquid formulation of bead sets in a vial to be pipetted onto the 384-well flat bottom plate (384-well liquid). Data of selected analytes in the graphs illustrate sample correlations between the 384-well lyophilized and 384-well liquid format obtained for 16 human plasma samples: **(A)** IL-8 (CXCL8), **(B)** IL-1RA, **(C)** MCP-1 (CCL2). The high sample coefficients (R^2) clearly demonstrate identical performance of ProcartaPlex 384-well assays with lyophilized and liquid bead formulation.

"Our core facility has been using the Invitrogen™ Th1/Th2 Cytokine 36-Plex Mouse ProcartaPlex™ Panel on tissue lysates. We have many customers who have been pleasantly surprised by the reproducibility of the assay and some have commented: 'This assay nicely validated what we have found in the gene expression.'"

—Diane Bender, PhD
The Bursky Center for Human Immunology and Immunotherapy Programs
Washington University School of Medicine

Learn more at **thermofisher.com/procartaplex**

RNA multiplex assays

QuantiGene Plex assays are solutions for fast, high-throughput multiplex quantitation of gene expression and allow for the simultaneous measurement of up to 80 genes in one well of a 96- or 384-well plate. QuantiGene Plex assays are hybridization-based and incorporate branched DNA (bDNA) technology, which uses signal amplification rather than target amplification for direct measurement of RNA transcripts. The assays are extremely easy to run using a simple ELISA-like workflow that does not require RNA purification.

"The versatility and sensitivity of the QuantiGene Plex assay using xMAP bead-based technology enables multiplex RNA quantification readouts, offering opportunities for cancer biomarker validation studies in retrospective material and robust measurements in liquid biopsies. This technology is instrumental in our success to develop novel biomarker panels in various scientific fields."

—Professor Godfrey Grech, PhD
Department of Pathology
Faculty of Medicine and Surgery
University of Malta

Features include:

- **No RNA purification step needed**—simply lyse and go
- **Compatible with difficult samples**—including blood and degraded RNA in formalin-fixed, paraffin-embedded (FFPE) tissues
- **Design your own panels**—our expert bioinformatics team will design probes for any target or species
- **Easy batch processing**—for higher throughput (Figure 3)

A

Parameter	First plate	Last plate
Signal relative to first plate (%)	100%	115%
CV	18%	18%
Linearity	111%	106%

B

Hybridization step	30 min hold before hybridization	30 min hold after hybridization
Pre-Amp	102%	104%
Amp	103%	107%
Label probe	105%	105%
Streptavidin-PE	111%	103%

Figure 3. Consistency in performance between first and last plate of a 10 plate batch enables higher throughput. The new workflow has an assay tolerance of 30 minutes and is verified for processing 10 plates with automation equipment. The time lag between plates in the workflow does not affect the performance of individual hybridization steps. The normalized signals remain robust and consistent. **(A)** Comparison of assay specifications comparing first and last plate of the batch. The time lag does not significantly affect assay performance of the hybridization steps investigated. All plates have C.V. and linearity within 20%. The variation in normalized signal is <15%. **(B)** Comparison of signals for plates held at different steps of the assay for 30 min before and after the particular step.

Build the panel you need

Design a customized and verified QuantiGene Plex assay at **thermofisher.com/order-quantigene-plex**.

Learn more at **thermofisher.com/quantigene**

Two assays, one technology

High-throughput measurements of protein and gene expression on a single platform

The ability to perform both RNA and protein measurements using unified, high-throughput workflows makes the ProcartaPlex and QuantiGene Plex assays ideal tools for large-scale screening studies that benefit from automated workflows. A more robust and accurate picture of cell states can be obtained by examining variations in both RNA and protein expression (Figures 4 and 5). RNA levels can be transient and may not correlate with protein levels, which are likely to remain stable for longer periods of time to maintain cellular functions. Due to differences between timing and expression levels, one assay may detect changes that the other does not. Therefore, analyzing both data sets can provide more detailed insights.

Workflow description

In a typical workflow, cells are treated with various stimulants or compounds. Cell lysates are collected to analyze RNA, membrane proteins, and intracellular proteins, while cell supernatants are collected to analyze cytokines or other secreted proteins. Samples are then interrogated with kits that target the analytes of interest.

U937 cells stimulated with:

- PMA
- LPS

Cell lysate

Supernatant

QuantiGene Plex panel

36-plex validation panel

ProcartaPlex panel

Th1/Th2 cytokine and chemokine panel (20-plex)

Luminex xMAP INTELLIFLEX DR-SE System

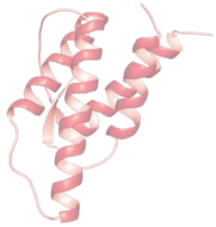


Figure 4. Up to 65 protein and 80 RNA targets can be measured in a single sample in 384-well format. U937 cells cultured in 384-well plates were stimulated with PMA (24 hours) or LPS (48 hours). The cell culture supernatants were collected, and secreted proteins were measured using the Invitrogen™ Th1/Th2 Cytokine 20-Plex Mouse ProcartaPlex™ Panel. The cells were lysed using Invitrogen™ QuantiGene™ Lysis Mixture, and changes in gene expression were quantified using an Invitrogen™ QuantiGene™ Plex 36-plex panel. Both assays were run on a Luminex xMAP INTELLIFLEX DR-SE System.

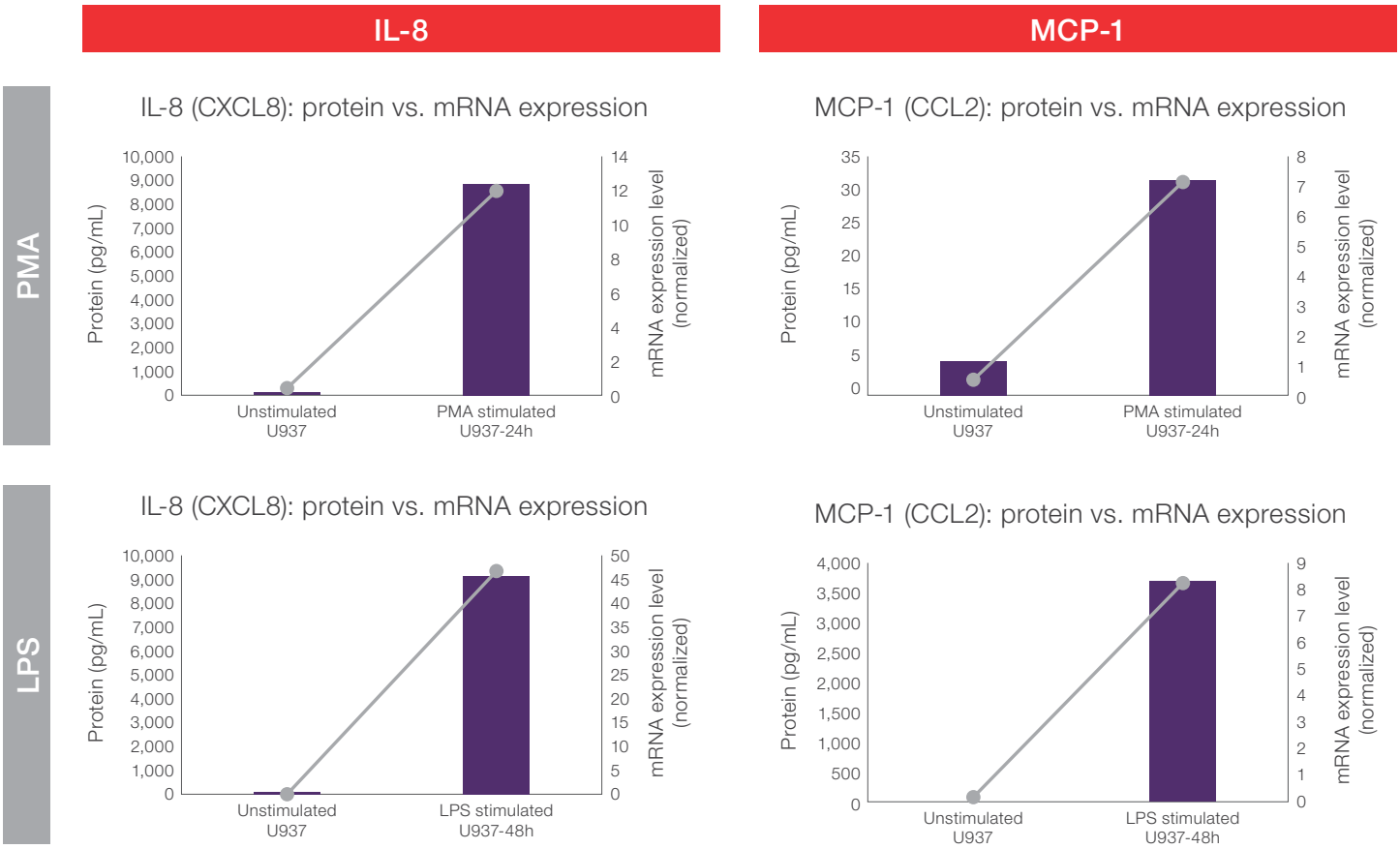


Figure 5. Increase throughput without compromising sensitivity. Total protein quantitation (bar graphs) and normalized gene expression analysis (line graphs) show an excellent correlation between gene expression and protein translation for the representative targets MCP-1/CCL2 and IL-8/CXCL8 after cells were stimulated with PMA or LPS.

White paper:

Multiplexing protein and gene level measurements on a single Luminex platform

To read the full publication, visit **thermofisher.com/luminex**.

"Our core facility performed a custom Invitrogen™ QuantiGene™ 80-plex mouse gene expression assay for a client who had FFPE sections on glass slides. He was delighted to find the QuantiGene Plex assay reproduced his previous findings gathered at his former university. I personally like this assay's ability to hybridize to lower-quality RNA targets without the worry of RNases degrading your targets. The sample preparation is simple, fast, and can be used with FFPE tissues."

—Diane Bender, PhD
The Bursky Center for Human Immunology and Immunotherapy Programs
Washington University School of Medicine

Laboratory automation solutions

Innovative mechanical integrity for secure automation

Multiplex protein and gene expression assays can be automated with the help and support of our laboratory automation team, bringing decades of experience in automated incubation, laboratory robotics, and workflow scheduling. Our dedicated team of specialists provides automation support and expertise to meet your laboratory's high-throughput needs.

We provide scalable solutions for single-step liquid transfers all the way up to full systems that require reagent dispensing, plate sealing and peeling, and magnetic bead washing. Solutions for multiple throughputs with partial plates or multiple plates in the same run as well as customizable setups and concepts for ProcartaPlex and QuantiGene Plex assays are available.

Automation—not just for throughput

Automation can improve more than just capacity and throughput.

Decreases hands-on time
Increase walk-away time to maximize skilled labor resources

Maximizes throughput
Boost instrument uptime and number of runs

Reduces error
Reduce the number of manual processes and opportunities for human error

Generates reproducible results
Improve sample processing uniformity

Enables flexible scaling
Adapt to current workflows and future capacity needs

Supports social distancing
Work remotely with the help of automation

Learn more about laboratory automation solutions at **thermofisher.com/labautomation**

ThermoFisher SCIENTIFIC

Custom services available

Assay development service

Custom assay development services are available for protein and gene targets that are not commercially available. You're leveraging years of assay development experience when you use our services. Let us help you save time so you can focus on what really matters—your research.

Benefits include:

- Dedicated project managers who work with you at every stage of your project
- Saving time and money and avoiding the hassle of optimization and troubleshooting
- Confidence that you're getting the best assay possible

Sample testing service

Don't have a Luminex xMAP instrument? Not sure if it is the right platform for your investment? Test the technology and see for yourself whether the data meets your expectations. Our service team of highly skilled technicians ensures delivery of high-quality data and results.

Benefits include:

- Confidence that your precious samples will be run by experts
- High-quality reports for your assay data
- Minimal investment needed to decide whether to invest in a full Luminex platform

Learn more about our custom services at **thermofisher.com/immunoassayrequests**

Ordering information

Description	Quantity	Cat. No.
Luminex xMAP INTELLIFLEX instruments and accessories		
Luminex xMAP INTELLIFLEX DR-SE System	1 system	**APX2021**
Luminex xMAP INTELLIFLEX System	1 system	**APX2020**
INTELLIFLEX Calibration Kit	20 reactions	**IFXCALK20**
INTELLIFLEX Performance Verification Kit	20 reactions	**IFXPVERK20**
Luminex FLEXMAP 3D instrument and accessories		
Luminex FLEXMAP 3D Instrument System		**APX1342**
Luminex FLEXMAP 3D Calibration Kit	25 reactions	**F3DCALK25**
Luminex FLEXMAP 3D Performance Verification Kit	25 reactions	**F3DPVERK25**
Luminex 200 instrument and accessories		
Luminex 200 Instrument System		**APX10031**
Luminex 200 Calibration Kit	25 reactions	**LX2RCALK25**
Luminex 200 Performance Verification Kit	25 reactions	**LX2RPVERK25**
Sheath fluid		
xMAP Sheath Fluid Plus	20 L	**4050021**
xMAP Sheath Concentrate PLUS, RUO	1 L	**4050023**

See more ProcartaPlex multiplex assays at
thermofisher.com/procartaplex

See more QuantiGene Plex assays at
thermofisher.com/qgp

Learn more at **thermofisher.com/intelliflex**

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