The rapid spread of the COVID-19 pandemic has underscored an urgent need to understand the mechanisms of SARS-CoV-2 infection, including the host immune response. Cellular, molecular, and protein analyses provide critical information that enable labs to characterize and screen for COVID-19 and other diseases, as well as monitor infection status and immunity, identify targets for possible treatments or interventions, and develop therapeutics.

Flow cytometry is a powerful analytical method that can offer key insights into these areas of research. For researchers investigating COVID-19, flow cytometry can also support studies related to:

**Viral entry and infection mechanisms**
- Characterizing SARS-CoV-2
- Cell-virus interactions
- Impact on surface markers; ACE2 receptor expression
- Antiviral development; vaccine strain production

**The immune response**
- Response to stimulation with viral proteins/peptides
- Cytokine secretion
- Impact of drugs and treatments

**Viral function and its impact on the immune system**
- Phenotyping studies; reduction in absolute CD4 and CD8 T cell counts and population percentages
- T cell exhaustion, senescence, and differentiation
- Cellular inflammation; monitoring monocyte populations

**Repurposing drugs for antiviral development**
- Drug screening in specific cell types
- Modulation of viral activity and infectivity
- Identification of compounds
- Toxicity of antiviral compounds

Luminex offers a broad range of flow cytometry analyzers with unique capabilities to advance your COVID-19 research. Our flow cytometers and cellular analysis instruments give you instant access to all facets of cellular phenotypes and morphology.

**The Guava Muse Cell Analyzer** is a powerful, compact system that uses innovative Guava microcapillary technology to provide quick and accurate absolute cell counts, viability, and basic cell health analyses. Data from Guava assays can be valuable for pre-screening and evaluating COVID-19 sample sets in a variety of environments. In particular, assays such as the Muse Count & Viability Assay and the human immunology kits for CD4 T cell, CD8 T cell, and B cell assessment can provide information on cell count and viability, and can identify and count specific lymphocyte subsets, using a convenient, no-wash protocol.

**The Guava easyCyte System** is a versatile benchtop platform for multi-dimensional immunophenotyping and cell health assessment. It runs validated assays, such as Guava ViaCount, which provides information on both cellular counts and viabilities, as well as user-defined protocols. The Guava easyCyte instrument also supports multiparametric cellular analysis in plate- and tube-based formats. Its unique microcapillary cytometry technology provides accurate absolute cell counts without reference beads, and uses smaller sample volumes compared to traditional, sheath-based instruments.
The Amnis® CellStream® Flow Cytometer is an easy-to-use, compact benchtop system that offers high sensitivity for precise detection of viral particles. The flexible, modular design of CellStream allows the system to easily grow with your changing research needs.

The Amnis® ImageStream® X Mk II Imaging Flow Cytometer offers high-end detection of viral particles, which includes acquisition of image data. Along with high-powered lasers, the new High Gain mode for the ImageStream System delivers increased sensitivity for detecting small particles.

Small Particle Analysis

Until recently, analysis of viruses and viral particles by flow cytometry was limited due to the range of detection (300–500 nm) and the low signal-to-noise ratio of traditional flow cytometers in the lower size range. However, advances in flow cytometry, such as the development of camera-based systems, now allow for the analysis of small particles. Amnis CellStream and ImageStream flow cytometers can both be used to study viruses and viral particles due to the exceptional sensitivity of time delayed integration (TDI) and CCD camera technology, which is unique to Amnis systems. These flow cytometers also offer a low signal-to-noise ratio, further increasing their ability to resolve particles as small as 50 nm with unparalleled sensitivity, using highly customizable systems.

Conclusion

With our innovative range of flow cytometry systems, you can choose the platform that best fits your needs and take your research to the next level. Learn how our automated, flexible, easy-to-use flow cytometers can help accelerate discovery in your COVID-19 research by visiting our website.

To learn more, please visit luminexcorp.com/flow-cytometry-and-imaging/

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**Kit Part Number** | **Product Name** | **Data Provided** | **Sample Type** | **Platform**
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FCPA100101 | Guava® SARS-CoV-2 Multi-Antigen Antibody Kit | Detects IgG, IgM, and IgA antibodies against three SARS-CoV-2 antigens in parallel (nucleocapsid protein (N), receptor-binding domain (RBD) of the spike protein, and the S1 subunit of the spike protein (S1)). | Serum or plasma from human whole blood | Guava® Muse® Cell Analyzer, Guava® easyCyte™ Systems, or any 3rd party flow cytometer equipped with a 488 nm or 532 nm laser
MCH100102 | Muse® Count & Viability Kit | Absolute cell count and viability | Cultured mammalian cells | Guava® Muse® Cell Analyzer
MCH100103 or MCH600103 | Guava® ViaCount™ Kit | Absolute cell count and viability | Cultured mammalian cells | Guava® easyCyte™ Systems
4000-0040 or 4000-0041 | Muse® Human CD4 T Cell Kit | Concentration and percentages of CD4+ T cells and lymphocytes | Human whole blood or peripheral blood mononuclear cells (PBMCs) | Guava® Muse® Cell Analyzer or Guava® easyCyte™ Systems
MIM100101 | Muse® Human CD8 T Cell Kit | Concentration and percentages of CD4+ T cells and lymphocytes | Human whole blood or peripheral blood mononuclear cells (PBMCs) | Guava® Muse® Cell Analyzer or Guava® easyCyte™ Systems
MIM100102 | Muse® Human B Cell Kit | Concentration and percentages of B cells and lymphocytes | Human whole blood or peripheral blood mononuclear cells (PBMCs) | Guava® Muse® Cell Analyzer or Guava® easyCyte™ Systems