The rapid spread of SARS-CoV-2 and the COVID-19 pandemic have underscored an urgent need to understand the mechanisms of infection, including the host immune response, and to devise strategies and therapeutics for mitigating the spread and impact of this strain of coronavirus. COVID-19 research is being performed on the molecular, protein, and cellular levels in many different environments. Flow cytometry is a powerful analytical method that can be a valuable tool for many areas of COVID-19 research, such as:

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

**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

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

**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. Luminex 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 the evaluation of COVID-19 sample sets in a variety of environments. In particular, assays such as the Muse® Count and Viability Assay and the human immunology kits for CD4 T cell, CD 8 T cell, and B cell assessment can provide information on cell count and viability, as well as 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. Cellular analysis provides critical information on immune status, and enables labs to gain key insights into understanding immune response mechanisms. Drug repurposing studies are also important in identifying strategies against viral infectivity. The Guava easyCyte instrument allows multiparametric cellular analysis to be performed in plate- and tube-based formats with ease. The technology is based on microcapillary cytometry, which provides accurate absolute cell counts without reference beads, and utilizes smaller sample volumes, compared to traditional sheath-fluid 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.

Until recently, the 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 be used to study viruses and viral particles due to the high 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, on a highly customizable system.

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

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

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