Mass Cytometry in COVID-19 Research
As of December 7, 2020

Publications, Preprints and Clinical Research Trials
Mass cytometry, powered by CyTOF® technology, is being used in dozens of labs around the world as well as several large consortia to understand the immune response to COVID-19 infection and provide critical information needed for the development and design of therapies and vaccines. The following is a current list of publications and clinical research trials where CyTOF is being utilized.

Publications


**Reviews and Commentary**


**Preprints**


### Clinical Research Trials

**Immunophenotyping Assessment in a COVID-19 Cohort (IMPACC)** (NCT04378777)

**Sponsor:** National Institute of Allergy and Infectious Disease (NIAID); 12 participating institutions in North America

“This surveillance study will collect detailed clinical, laboratory, and radiographic data in coordination with biologic sampling of blood and respiratory secretions and viral shedding in nasal secretions in order to identify immunophenotypic and genomic features of COVID-19-related susceptibility and/or progression. The aim: for the results obtained from this study to assist in generating hypotheses for effective host-directed therapeutic interventions, to help to prioritize proposals for such interventions, and/or optimize timing for administration of host-response directed therapeutics.”

**In-Depth Immunological Investigation of COVID-19. (COntAGIouS)** (NCT04327570)

**Sponsor:** Universitaire Ziekenhuizen Leuven

“The COntAGIouS trial (COvid-19 Advanced Genetic and Immunologic Sampling; an in-depth characterization of the dynamic host immune response to coronavirus SARS-CoV-2) proposes a transdisciplinary approach to identify host factors resulting in hyper-susceptibility to SARS-CoV-2 infection, which is urgently needed for directed medical interventions.

“The overall aim of this prospective study is to provide an in-depth characterization of clinical and immunological features of patients hospitalized in UZ Leuven because of SARS-CoV-2 infection. Assessed characteristics will be compared between severe and non-severe COVID-19 patients, and between COVID-19.”
Prospective Natural History Study of Smoking, Immune Cell Profiles, Epigenetics and COVID-19 (NCT04403386)

Sponsor: National Institute of Environmental Health Sciences (NIEHS)

“This study is a prospective, longitudinal, observational, single-center, exploratory study to collect samples and data that will enable explorations of the interaction between smoking, immune system characteristics and Coronavirus Disease 2019 (COVID-19). This study will collect baseline samples and data prior to COVID-19 infection required to explore these interactions prospectively. Early evidence in the COVID-19 pandemic suggests that smokers have higher risk for morbidity and mortality associated with COVID-19 infection. We have identified smoking-associated altered epigenetics, transcription and changes in immune cell profiles. We propose that the immune system senescence associated with prior smoking is a susceptibility factor in COVID-19 morbidity.”

Mesenchymal Stem Cell for Acute Respiratory Distress Syndrome Due for COVID-19 (COVID-19) (NCT04416139)

Sponsor: Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran

“Acute Respiratory Distress Syndrome (ARDS) is the main cause of death from COVID-19. One of the main mechanisms for ARDS is the violent storm of cytokines and chemokines, which cause uncontrolled fatal systemic inflammation by the immune system on the body, with additional multiple organ failure. ...”

“The plasticity of Mesenchymal Stem Cells (MSC) regulates inflammation and immunity. ... IV application of allogeneic MSC has been shown to control the inflammatory response in various diseases, such as the graft-versus-host reaction and the ARDS caused by H5NI.

“The objective of this study is to describe the clinical changes secondary to IV administration of allogeneic MSC, in patients with bilateral COVID-19 pneumonia complicated by severe ARDS ...”

Systematic Assessment of SARS-CoV-2 Neurotropic Capacity in Modestly and Critically Ill Patients, and Patients Who Died From COVID-19 (NCT04472013)

Sponsor: University Hospital, Basel, Switzerland

“This study is to analyze the microglia reaction or direct neurotropic effects of CNS COVID-19 in pathogenesis and brain stem dysfunction in critically ill patients. ...”

“Primary endpoints of this project are the multidimensional integration of the analysis from the procedures described above and assessment of the correlation between the gained clinical data (MRI, mental/neurological state), the body fluid proteomic and mass-cytometric analysis (CSF and Plasma proteomics, peripheral blood mass cytometry) and the CODEX analysis of defined brain regions on autopsy specimens.”