

## BRIEF REPORT

# The COVID-19 Host Genetics Initiative: UHS is a Global Partner

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### How to Cite This:

Jahan S, Afzal N. The COVID-19 host genetics initiative: UHS is a global partner. *Biomedica*. 2020; 36 (COVID19-S2): 307-8.

### OVERVIEW:

The COVID-19 pandemic is a global crisis causing severe loss to the world economy and health system. Better understanding and treatment of COVID-19 are desperately needed, it is vital for the scientific community to come together around this shared purpose. *The COVID-19 host genetics initiative* (<https://www.COVID19hg.org/partners/>) brings together the human genetics and molecular biologist to generate, share, and analyze data to learn the genetic basis of COVID-19 susceptibility, severity, and outcomes. Such findings could help to identify individuals at unusually high or low risk, and contribute to global knowledge of the biology of SARS-CoV-2 infection and progression of disease. Main goals of this collaborative initiative are to;

1. Provide an environment to foster the sharing of resources to facilitate COVID-19 host genetics research.
2. Organize analytical activities across studies to identify genetic determinants of COVID-19 susceptibility and severity.
3. Provide a platform to share the results from such activities, as well as the individual-level data where possible, to benefit the broader scientific community.

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### INTRODUCTION

Total 164 studies have been registered from all over the world including all retrospective and prospective studies. Thirty out of these studies are focusing on host genetics and immunological basis of COVID-19 including HLA typing and other immunology assays. From Pakistan, Department of Immunology of University of Health Science (PI: Dr Shah Jahan and Co-PI: Prof. Nadeem Afzal), is part of this research initiative. Project titled "*Immunological, viral and genetic basis of COVID-19 in local Patients*" has been selected as global partner.

The core objectives of this project include:

1. To determine the levels of Specific antibodies and cytokines in COVID-19 active and recovered patients and healthy control.
2. To analyze Gene expression of Receptors (ACE-2 and TLRs), Cytokines (TNF $\alpha$ , IFN $\alpha$ ,  $\beta$ ,  $\gamma$  and IL-1 $\beta$ , 2, 4, 6, 9 and 10) in local patients by Real time PCR.
3. To sequence and analyze variation of Receptors ACE-2 and TLRs and host genes involved in immune response and HLA typing in COVID-19 patients.
4. To explore complete genome of SARS-CoV2 from different infection clusters of Pakistan and Epitopes mapping of E, M and S proteins to evaluate impact on immunogenicity in infected Patients.

Department of Immunology is an integral part of the basic medical sciences division at the University of Health Sciences that consists of faculty with expertise in basic and clinical

immunology. Its research goals include host pathogen interactions, particularly those pathogens that impact health and wellbeing in the country. The Department offers M. Phil and Ph.D. degree programs. Department has state of the art lab for basic and advanced research facility including Flow cytometry, Real time PCR with UHS Cell culture, Resource Lab and specialized COVID-19 diagnostic labs as collaborative departments.

For this COVID-19 project, local collaborators are University of Gujrat, and FC University Lahore Pakistan and International collaborator include Institute of Molecular and Clinical Research Basel – IOB Switzerland. Sample collection from Jinnah and Meo Hospitals of Lahore and DHQ Hospitals of the

Punjab (Gujrat, Rawalpindi, Gujranwala Sahiwal and Multan) is under process. Immune profiling will be completed in first quarter and all other experiments and data analysis will be completed in one year.

This study will help to understand immune responses of COVID-19 in active and recovered patients. Interaction of viral and host genetics with immune responses in COVID-19 patients will be helpful to understand molecular mechanisms and therapeutic targets. Epitopes mapping of E, M and S proteins to find vaccine candidates and its impact on immunogenicity in infected patients and healthy population will also be studied. Results of the study shall be published in due course of time.

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