Detection of Antinuclear Antibodies Targeting Intercellular Signal Transduction, Metabolism, Apoptotic Processes and Cell Death in Critical COVID-19 Patients


Faculty and Postdoc Health and Biomedical Sciences

Barzan Holdings, Qatar University Biomedical Research Center, Doha, Qatar, Sidra Medicine, Hamad Bin Khalifa University, Weill Cornell Medicine–Qatar, Cornell University

Background

The heterogeneity of COVID-19 has led to its diverse symptoms and severity. The heterogeneity of COVID-19 has been shown to be the leading cause of mortality in COVID-19 patients. ARDS has been characterized by a hyper cytokine storm.

Methods

Sample Collection and Ethical Compliance

Informed consents were obtained. Sera samples were collected from COVID-19 patients at different clinical stage classified to 1) mild/ asymptomatic 2) severe/ critical (ICU)

ANA IgG ELISA

Cutoff (Co)= Negative control (OD 450nm)= 0.250

Negative/ normal Samples= Sample/Co < 0.8
Moderate/ equivocal Samples= Sample/Co (0.8-1.1)
Positive/ abnormal Samples= Sample/Co > 1.1

ANA Hep-2 IFA Assay

A Positive reaction is indicated by the presence of any pattern of nuclear apple-green staining. A positive reaction was observed at dilution 1:40

PhIP-Seq and Peptide enrichment analysis

A) Create library
B) Screen Serum
C) Analyze Data

Gene set Enrichment Analysis

A set of 79 differentially enriched peptides were screened for autoantibody-autoantigen interactions in ICU patients and asymptomatic COVID-19 cases. B) Heatmap plot showing the binding profile of the 79 differentially enriched (DE) peptides in ICU cases versus asymptomatic cases. C) Stacked bar plot showing the results of a gene set enrichment analysis of the peptides shown in (B).

Conclusion

Our results further support the notion of routine screening for autoimmune responses in COVID-19 patients, which might help improve disease prognosis and patient management.

Acknowledgment

This project was supported by Qatar National Research Funds (QNRF) grant# NPRP11S-1212-17002 and Sidra Medicine (Q37042MR).