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# Discovery Phase of Serum Proteomic Analysis in Post-COVID-19 Syndrome Patients using Two-Dimensional Electrophoresis

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[References \(45\)](#)

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## Abstract

Objective Post-COVID-19 Syndrome (PCS) significantly, adversely affects the quality of life of persons who continue to have symptoms following an initial COVID-19 infection. Hence, the identification of reliable biomarkers for PCS is crucial for understanding its pathophysiology, aiding in diagnosis, prognosis, and devising therapeutic strategies. This study aimed to compare the serum proteomic profiles between PCS and non-PCS (NPCS) patients to identify potential protein biomarkers that could distinguish these two groups. Materials and methods PCS patients were recruited at the post-COVID-19 clinic and confirmed diagnosis by a physician, with prolonged symptoms beyond three months post-infection. While non-PCS patients were individuals who had fully recovered from an

acute COVID-19 infection. Proteins from pooled serum of six PCS patients and ten NPCS participants, matched for age, gender, and race were isolated and separated by two-dimensional electrophoresis (2-DE). PD Quest software was used for analysis, and protein expression with more than a twofold and significant difference were recognised. Subsequently, proteins of interest were identified using Matrix Assisted Laser Desorption/Ionisation Time of Flight (MALDI-TOF) Mass Spectrometry. Results and discussion All subjects were Malay females with a mean age of  $38 \pm 9.7$  for the PCS group and  $40 \pm 11.1$  for the NPCS. The most common clinical symptoms were persistent cough, dyspnea, and fatigue. There were 182 protein spots expressed in serum PCS patients in a range of pH 4 to 7. Two proteins, Haptoglobin and T-cell surface glycoprotein CD8 alpha chain, were found to be significantly overexpressed, while two proteins, namely Vitamin D-binding protein and Immunoglobulin heavy constant alpha 1, were under-expressed in PCS patients when compared to NPCS subjects. Conclusion This discovery phase of proteomic analysis revealed several candidate proteins that are predominantly involved in inflammation and immune response in PCS. These proteins require additional examination during the verification phase to assess their capability in identifying COVID-19 individuals at an elevated risk of developing PCS. (309 words). ©The Ibn Sina Trust.

## Author keywords

post COVID-19 syndrome; proteomic analysis; two-dimensional electrophoresis

## Indexed keywords

### EMTREE drug terms

albumin; biological marker

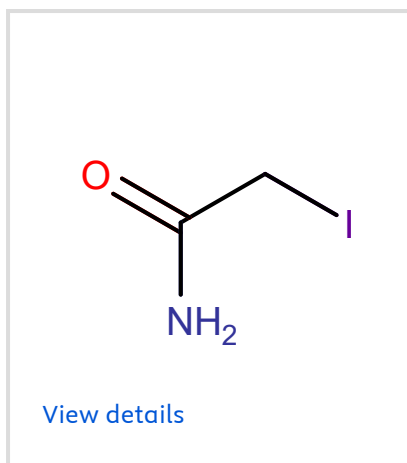
### EMTREE medical terms

adult; ageusia; anosmia; anxiety; Article; blood analysis; clinical article; cognitive defect; comparative study; coughing; densitometry; depression; diarrhea; dyspnea; electrophoresis; fatigue; female; human; insomnia; long COVID; male; matrix assisted laser desorption ionization time of flight mass spectrometry; nausea; polyacrylamide gel electrophoresis; protein blood level; proteomics; punch biopsy; rhinorrhea; sore throat; thorax pain; two dimensional gel electrophoresis; two-dimensional imaging; vomiting

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Funding sponsor	Funding number	Acronym
Ministry of Higher Education, Malaysia <a href="#">See opportunities by MOHE</a> ↗	FRGS/1/2021/SKK0/UIAM/03/3	MOHE
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### Abstract

Author keywords

Indexed keywords

Reaxys Chemistry database information

Device trade names

Funding details

Corresponding authors

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