BLOOD PROTEOMICS OF COVID-19 INFECTION IN THE STATE OF PARÁ REVEALS NOVEL BIOMARKER CANDIDATES

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COVID-19 is an infectious disease caused by SARS-CoV-2, a member of the coronavirus family, which emerged in China in 2019 and quickly spread worldwide, leading to an ongoing pandemic. SARS-CoV-2 primarily affects the respiratory system and can cause COVID-19, characterized by symptoms such as fever, cough, shortness of breath, fatigue, and loss of smell and taste. However, the virus is also known to affect other organs, including the liver, kidneys, gut, and brain. COVID-19 can manifest with mild, moderate, or no symptoms, but in severe cases, it can cause multiple organ failure and death.

Proteomic analysis of COVID-19-infected patients can provide valuable data about the events and mechanisms related to the initial, progression, and terminal stages of the disease. Such information can lead to better prevention, treatment, and recovery strategies. This study aims to search for and verify protein biomarkers found in the plasma of different groups of patients infected with SARS-CoV-2 in the state of Pará. Blood samples were collected from patients with mild, moderate, and severe COVID-19. The plasma proteins were depleted to evaluate high and low abundance proteins. Subsequently, the samples underwent reduction, alkylation, digestion, and desalination processes before being analyzed using a liquid chromatography platform coupled with mass spectrometry. Protein identification and verification, as well as statistical analyses, were performed using dedicated software, and systems biology analyses were conducted using freely available software.

The obtained results show the benefits of the plasma protein depletion methodology, as it allows for the identification of a larger number of proteins, aiding in the evaluation of potential COVID-19 biomarkers. Additionally, it was observed that proteome alterations significantly correlate with

disease severity, with patients exhibiting moderate and severe symptoms showing higher amounts of differentially expressed proteins such as C-reactive protein, S100-A9 protein, serpina 3, haptoglobin, apolipoproteins, complement factor, serum amyloid, and others. These proteins are related to cell adhesion, host-virus interaction, oxygen transport, acute phase response, complement pathway, and innate immune response.

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