Rare Immune Cells Significantly Associated With Severe COVID-19 Cases

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The SARS-CoV-2 virus, responsible for the COVID-19 pandemic, has resulted in millions of deaths. Rare immune cells are minor cell types with reduced frequency, and their function in COVID-19 patients is poorly understood. My research uses RStudio to investigate if there are more rare immune cells in individuals with severe COVID-19 compared to healthy individuals, and to observe what rare cell names are associated with severe COVID-19. Single-cell RNA sequencing data was provided, and R was used to organize the data, find the number of rare cell types, and to generate comparative figures. CellKb was used to search the rare cell type names from the marker genes. Rare immune cell types were statistically significantly higher in individuals with severe COVID-19 (p value = 0.01536), suggesting that patients with severe COVID-19 have an overwhelming and unbalanced immune response. Of the seven rare immune cell types, five of them were not matched with a name from the cell database. The two rare cell types that were matched with names (Activated_Granulocyte_1 and 2) were neutrophil cells, which previous research suggests may be related to respiratory failure in COVID-19 patients. The marker genes of these rare granulocyte cells were overexpressed compared to the major cell type, consistent with previous literature that suggests that these marker genes could be heavily involved in the pathophysiological response to severe COVID-19. This research suggests that marker genes of these rare cell subtypes could be used as an indicator of whether someone with COVID-19 may develop a serious case.

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