SARS-CoV-2 infection causes immunodeficiency in recovered patients by downregulating CD19 expression in B cells via enhancing B-cell metabolism

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Abstract

The SARS-CoV-2 infection causes severe immune disruption. However, it is unclear if disrupted immune regulation still exists and pertains in recovered COVID-19 patients. In our study, we have characterized the immune phenotype of B cells from 15 recovered COVID-19 patients, and found that healthy controls and recovered patients had similar B-cell populations before and after BCR stimulation, but the frequencies of PBC in patients were significantly increased when compared to healthy controls before stimulation. However, the percentage of unswitched memory B cells was decreased in recovered patients but not changed in healthy controls upon BCR stimulation. Interestingly, we found that CD19 expression was significantly reduced in almost all the B-cell subsets in recovered patients. Moreover, the BCR signaling and early B-cell response were disrupted upon BCR stimulation. Mechanistically, we found that the reduced CD19 expression was caused by the dysregulation of cell metabolism. In conclusion, we found that SARS-CoV-2 infection causes immunodeficiency in recovered patients by downregulating CD19 expression in B cells via enhancing B-cell metabolism, which may provide a new intervention target to cure COVID-19. © 2021, The Author(s).