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Utilizing Systems Biology Methods to Explore the Effectiveness of Autoimmune Disease Medications in COVID-19 Patients

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The COVID-19 pandemic prompted intensive efforts to develop treatment drugs, leading physicians to seek urgent approval for repurposing drugs originally designed for other diseases. Consequently, several of these drugs unexpectedly demonstrated effectiveness in relieving COVID-19 symptoms, as exemplified by drugs used for treating an autoimmune disease, systemic lupus erythematosus (SLE). Despite this encouraging outcome, the underlying mechanisms responsible for this therapeutic overlap remain unknown. In this study, we aimed to suggest the mechanism behind the observed efficacy of SLE drugs against COVID-19, primarily by analyzing RNA-seq data. We identified differentially expressed genes (DEGs) in both SLE and COVID-19 samples, compared to normal samples from their respective RNA-seq data. These shared DEGs were further systematically examined whether they could serve as drug targets of SLE drugs. Special attention was given to genes extensively studied in the context of both diseases through comprehensive literature analysis. This study is anticipated to unveil the common biological mechanism between SLE and COVID-19, potentially opening doors for successful drug repurposing in COVID-19 treatment.