Deteksi antibodi spesifik SARS-CoV-2 pada plasma konvalesen COVID-19 menggunakan protein rekombinan SPIKE S1 = Detection of SARS-CoV-2 specific antibody in convalescent COVID-19 plasma using recombinant SPIKE S1 protein

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Abstrak

Salah satu terapi COVID-19 adalah plasma konvalesen yang disiapkan Unit Transfusi Darah dari donor yang telah sembuh dari COVID-19. Plasma konvalesen mengandung antibodi netralisasi yang menghambat interaksi antara protein S dengan reseptor ACE2 dengan persyaratan minimal titer 1:160 sehingga diperlukan sistem deteksi antibodi netralisasi seperti tes serologi berbasis ELISA kompetitif yang mudah, murah, cepat dan tidak membutuhkan BSL 3 atau 2. Uji ini membutuhkan protein rekombinan spike S1 yang dapat diekspresikan pada sistem ekspresi mamalia. Penelitian ini bertujuan untuk mendeteksi antibodi spesifik SARS-CoV-2 pada plasma konvalesen COVID-19 menggunakan protein rekombinan Spike S1.Penelitian ini menggunakan plasmid pD609 sebagai vektor ekspresi yang terdapat gen spike S1. DNA ditransfeksi secara transien ke sel CHO. Immunostaining dilakukan setelah transfeksi untuk melihat ekspresi protein rekombinan spike S1 pada sel CHO. Supernatan media sel CHO post transfeksi dianalisis dengan western blot dan ELISA untuk melihat reaktifitas terhadap serum konvalesen COVID-19. Hasil immunostaining menunjukkan plasmid pD609 S1 Spike Foldon-His dapat mengekspresikan protein rekombinan spike S1 SARS-CoV-2 pada sel CHO. Hasil Western Blot dan ELISA menunjukkan supernatan media sel kultur CHO post transfeksi reaktif terhadap serum konvalesen COVID-19. Protein rekombinan spike S1 memiliki potensi untuk dikembangkan dan digunakan dalam uji antibodi spesifik namun hasil ekspresi protein masih rendah.

.....One of the therapies for COVID-19 is convalescent plasma prepared by the Blood Transfusion Unit from donors who have recovered from COVID-19. Convalescent plasma contains neutralizing antibodies that inhibit the interaction between S protein and ACE2 receptors with a minimum requirement of a titer of 1:160 so that a neutalizing antibody detection system is needed such as a competitive ELISA-based serological test that is easy, inexpensive, fast, and does not require BSL 3 or 2. S1 spike recombinant protein that can be expressed in mammalian expression systems. This study aims to detect SARS-CoV-2 specific antibodies in COVID-19 convalescent plasma using recombinant Spike S1 protein. This study used the pD609 plasmid as an expression vector containing the spike S1 gene. DNA was transiently transfected into CHO cells. Immunostaining was performed after transfection to see the expression of the S1 spike recombinant protein in CHO cells. The post-transfected CHO cell media supernatans were analyzed by western blot and ELISA to see the reactivity to COVID 19 convalescent serum. Immunostaining results showed that the plasmid pD609 S1 Spike Foldon-His could express the SARS-CoV-2 spike S1 recombinant protein in CHO cells. The results of Western blot and ELISA showed that the post-transfection CHO cell culture media supernatant was reactive to COVID-19 convalescent serum. S1 spike recombinant protein has the potential to be developed and used in specific antibody assays, but the results of protein expression is still low.