Chicken single-chain variable fragments against the SARS-CoV spike protein

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摘要

Abstract

The major concern for severe acute respiratory syndrome (SARS), caused by the SARS-associated coronavirus (SARS-CoV), is the lack of diagnostic and therapeutic agents. Using a phage display technology in a chicken system, high-affinity monoclonal antibody fragments against the SARS-CoV spike protein were characterized. Ten truncated spike protein gene fragments were expressed in Escherichia coli cells. Following the immunization of chickens with these recombinant spike proteins, two single-chain variable fragment (scFv) antibody libraries were established with short or long linkers to contain 5x10(7) and 9x10(6) transformants, respectively. After four rounds of panning selection, the scFv antibodies of randomly chosen clones were demonstrated by Coomassie blue staining, and verified by western blot analysis. In a comparison of nucleotide sequences with the chicken germline gene, we found that all clones varied in the complementarity-determining regions, that two scFv antibodies reacted significantly with SARS-CoV-infected Vero cells, and that those two specific scFv antibodies recognized the same region of the spike protein spanning amino acid residues 750-1000. In conclusion, the results suggest that the chicken scFv phage display system can be a potential model for mass production of high-affinity antibodies against the SARS-CoV spike protein.