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Development of antibody against drug-resistant respiratory syncytial virus: Rapid detection of mutant virus using split superfolder green fluorescent protein-antibody system

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Abstract

Respiratory syncytial virus (RSV) infections are associated with severe bronchiolitis or pneumonia. Although palivizumab is used to prevent RSV infections, the occurrence of palivizumab-resistant RSV strains is increasing, and these strains pose a threat to public health. Herein, we report an antibody with affinity to the S275F RSV antigen, enabling the specific detection of palivizumab-resistant RSV strains. Experimental and simulation results confirmed the affinity of the antibody to the S275F RSV antigen. Furthermore, we developed a rapid S275F RSV antigen detection method using a split superfolder green fluorescent protein (ssGFP) that can interact with the antibody. In the presence of the mutant virus antigen, ssGFP emitted fluorescence within 1 min, allowing the rapid identification of S275F RSV. We anticipate that the developed antibody would be useful for the precise diagnosis of antiviral drug-resistant RSV strains and help treat patients with RSV infections.

Keywords : Antibody, Drug-resistance, S275F mutation, Respiratory syncytial virus, Green fluorescent protein

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