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Mimotopes selected with neutralizing antibody against multiple subtypes of influenza A

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Background: The development of novel influenza vaccines inducing a broad immune response is an important objective. The mimotopes of viruses are considered to be good targets for the vaccine design. The aim of this study was to prepare mimotopes against multiple subtypes of influenza A and evaluate its immune responses in flu virus challenge Balb/c mice.

Methods: The mimotopes of influenza A including pandemic H1N1, H3N2, H2N2 and H1N1swine-origin influenza virus were screened by peptide phage display libraries , respectively. These mimotopes were engineered in one protein as multi- epitopes in E. coli system and purified by affinity chromatography with Ni2+-NTA-resin. Balb/c mice were immunized using the multi- mimotopes protein and specific antibody responses were analyzed using hemagglutination inhibition (HI) assay and enzyme-linked immunosorbent assay (ELISA).The lung inflammation level was evaluated by hematoxylin and eosin (HE).

Results: linear heptopeptide and dodecapeptide mimotopes were obtained for H2N2 antibody C179, H1N1, H3N2 and swine-origin influenza virus antibodies. The recombinant multi-mimotopes protein was expressed in Escherichia coli as a 73kDa recombinant fusion protein . Comparing immunized infected groups with unimmunized infected subsets , there was a significant difference was observed in the body weight loss and survival rate, the antiserum contained higher HI Ab titer against H1N1 virus , the lung inflammation level were significantly decreased.

Conclusions: phage-displayed mimotopes against multiple subtypes of influenza A were accessible to the mouse immune system and triggered a humoral response to H1N1, H3N2, H2N2 and swine-origin influenza virus strain. The recombinant multi-mimotopes could provide a novel and promising vaccine candidate for the inducing a broad immune response.