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C-di-GMP as an effective microneedle vaccine adjuvant candidate on mouse

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Microneedle (MN) vaccination presents many attractive advantages as future vaccine delivery method. MN requires minimal education for administration. Injection in to epidermis and dermis and stimulations of antigen presenting cells such as Langerhans cells and dermal dendritic cells enable robust immune response. Microneedle research results show promising future as alternate delivery method. However, there is more study to be done for the role and effect of adjuvants in microneedle vaccination. In this study, c-di-GMP (cycle-dimeric-guanosine monophosphate), which is an endoplasmic reticulum protein STING (stimulator of interferon genes) ligand, was chosen as potential candidate for microneedle adjuvant. Six week old mice were divided into four groups (fourteen mice in each group) to study protective efficacy of the adjuvant with variation of adjuvant amount. Mice were bled on second and fourth week each for serology tests. Hemagglutination inhibition (HI) and mouse IgG enzyme-linked immunosorbent assay (ELISA) were done with serum collected on week two and four. After the mice were challenged with pH1N1 strain, 4 mice each from the groups were chosen to collect lung and spleen to test for 6 types of cytokine analysis. Remaining mice were watched for fourteen days after the challenge for body weight and mortality. Lung viral titer was determined by plaque assay. Lower titer was observed in lung. All mice in the control group died in five days after the challenge. All adjuvant vaccinated mice survived with lowest body weight loss. One mouse died in the group vaccinated with only virus. Two adjuvant vaccinated groups showed some stimulation of immunity in cellular level. C-di-GMP has proven its capacity as adjuvant in mucosal immunity in previous studies. In this study c-di-GMP showed its capacity as potential candidate for adjuvant in microneedle application.

Biography

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