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Immunogenicity of M13 phage vaccine displaying N-terminal region of amyloid beta peptide: comparison of M13 phage vaccine expressed as g3p fusion and g8p fusion.

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Abstract

Antibodies against amyloid-ß peptide (Aß) can reduce amyloid deposits and are considered as a potential therapeutic approach for Alzheimer's disease[1,2]. We have recently shown that M13 phage stimulate an innate immune response and induce a strong primary IgG response in mice without any inflammatory adjuvant materials[3,4]. Even a single immunization with 10^{11} pfu of phage induced a long-lasting antibody response. To investigate the potential of M13 phage as a vaccine carrier for Aß peptide, the sequences of 1-15 region of Aß were genetically linked to the N-terminus of M13 gene 3 protein or gene 8 protein, that correspond to Aß-g3p phage and Aß-g8p phage, respectively. When C57BL/6 mice were immunized subcutaneously with 10^{11} pfu of Aß-g3p phage in PBS solution, anti-Aβ IgG response was induced in two weeks after the secondary immunization. In the case of Aβ-g8p phage, anti-Aß IgG response was induced during a primary response. Anti-Aß antibody titer was comparable in the two mice groups. We also observed that Aβ-g8p phage induced IgG class switch in athymic (nu/nu) BALB/c mice, indicating that there are different immunological mechanisms of phage vaccine between g3p fusion and g8p fusion. Considering safety and habitual presence of an M13 phage, Aß1-15-displaying M13 phage may be promising as a safe AD vaccine.

References

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