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Bacterial Nucleotide Immunogen Enhances the efficacy of vaccine

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Abstract

Bacterial nucleotide especially plasmid DNA and their fragments act as Good Immunogen during vaccine development and its efficacy in inducing immune response is good. The plasmid DNA has short sequence DNA. In induce both cellular and humoral immune responses. It has lot of advantages, it is stored in room temperature . Transport is very easy, preparation method is also easy. So it is highly suitable for vaccine development for most of the bacterial infectious diseases. Nowadays, Multidrug resistant pathogens appear in many places in our global threat , WHO advise to produce new vaccines against these MDR-pathogens, these short sequence nucleotide open new window to develop new vaccine.

Key words plasmid DNA, vaccine, Nucleotide,

Introduction

Immunogens are parts of pathogens which is able to stimulate cell mediated and humoral mediated immunity. These are the important component in vaccine development however the efficacy of various bacterial Immunogens may vary . In this article, efficacy of bacterial nucleotide Immunogens were discussed. The bacterial plasmid DNA are short sequence nucleotide which is act as good Immunogen . This plasmid DNA is extra chromosomal DNA and it is present in the cytoplasm of the bacterial cell.

Plasmid DNA

The plasmid DNA is self-replicating double stranded circular DNA molecules present in Bacterial cell. It always carries one or more gens responsible for useful characteristics .They have their own origin of replication and they replicated independently. Usually plasmid DNA used as vector for r DNA Technology. At the time of extraction of plasmid DNA, first take appropriate amounts of bacterial broth culture cells, They have harvesting by centrifugation, then they were lysis for isolation of plasmid DNA. For isolation various methods are used, However

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easiest and convenient methods is alkaline lysis methods[1].

Vaccine Experiment Design

In our lab studies, For nucleotide Immunogens Preparations, first plasmid DNA was isolated from pathogenic bacteria by alkaline lysis method and purified then it was dissolved in double distilled water. For immunization, it was administrated into intramuscular injection or sometimes provided through oral drops to albino rats. After two weeks later, blood sample were collected for analysis which shows elisitated antibody and cellular immune responses. The double digested plasmid DNA shows good results. It has many advantages such as sequence decoding is easy, preparation process is easy compared to long sequence DNA . The preparation cost is low. However the efficacy is high [1].

Engineered Plasmid DNA

During lab trails, isolated naked plasmid DNA was used as Immunogen in *Aeromonas hydrophila*. It gives good results in albino rats [2]. Similar trials are repeated in various bacterial pathogens such as *Escherichia coli* ,*Staphylococcus aureus* and *salmonella typhi*[3,4,5]. Temperature and U.V induces immediate mutation in microbes.[6,7].The mutant strain pathogens also produced good immune responses in various trials [3,8,9]. The single and double enzyme digested plasmid DNA also acted asgood Immunogen invarious bacterial pathogens [3, 4, 5].

Cocktail plasmid DNA

For more than one disease prevention, cocktail vaccine trials were conducted. During these experiment the maximum immune responses were observed in digested plasmid DNA compared to whole plasmid DNA and in cocktail genomic vaccine trials, more immune responses were also observed in Enzyme digested DNA compared with Undigested DNA treatment [10].During optimization of *S.typhi* oral plasmid DNA vaccine, the maximum efficacy was observed in double digested plasmid DNA vaccine compared to whole plasmid DNA vaccine.

Plasmid DNA with Protein

In our lab trail, mixer of plasmid DNA with protein was used as vaccine. In this vaccine, plasmid DNA is combined with other protein Immunogens and inactivated pathogen cell which are produced good immune responses . The inactivated cells and proteins produced immediate short term immune responses But the nucleotide Immunogen possible to produce long term immunity.,. So the mixture of various components of the cell produces more immunity. This type of vaccine trials were checked in *Staphylococcus aureus.* This vaccine produced good results [11].

Conclusion

The whole plasmid DNA and their enzyme digested nucleotide fragments produce more immune responses. In various bacterial DNA fragments produce good immune responses. The nucleotide with antigenic protein produced very

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good results. So these are recommended to prepare good vaccine. These Immunogens have good efficacy to stimulate mucosal immunity [12].

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