Designing and Construction of Recombinant Plasmid Consisting of Basic Fibroblast Growth Factor and Immunodominant Fragments of Pseudomonas Exotoxin

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Abstract

Background and Objective: the inhibition of tumor-associated angiogenesis can significantly reduce the tumor proliferation. The basic fibroblast growth factor (bFGF), an important angiogenic factor, is considered as a potential therapeutic target for cancer therapy. The purpose of this study was evaluating, designing and construction of new recombinant DNA molecule in order to have efficient expression of a fusion protein consisting of the bFGF and immunodominant epitopes of Pseudomonas toxin.

Material and Methods: Different types of peptide linker, codon adaptation index (CAI) and adding signal peptide were considered in designing of immunogenic coding sequence. After software evaluation, the recombinant DNA molecule was ordered in the puc57 cloning vector. Then, coding sequence inserted into the multiple cloning site of pET28-a plasmid. Finally, PCR and enzymatic digestion tests were done for evaluation of recombinant expression vector.

Results: Optimization of DNA sequence, codon adaptation index (CAI) increased from 0.69 to 0.83 and GC content decreased from 61 to 54.77. The presence of 1214-bp PCR product and 1029-bp one obtaining from enzymatic digestion confirmed the correction of the cloning process.

Conclusion: According to the previous studies, it is the first work for designing, optimizing and synthesis of recombinant DNA consisting of bFGF and immunodominant epitopes of Pseudomonas toxin.

Keywords: Tumor angiogenesis, immunodominant epitopres of Pseudomonas toxin, Fibroblast growth factor 2, DNA 2 software

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