In Silico investigation of different signal peptides to express recombinant Human Serum Albumin in gram negative bacteria

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Abstract: Prokaryote systems such as Escherichia coli (E. Coli) are one of the most affordable and simplest hosts which are being employed to express recombinant proteins, nevertheless without appropriate signal peptide, these systems cannot be used for secretory proteins. Recombinant Human Serum Albumin (HAS) is the most frequent protein in blood circulation which has four disulfide bonds. This protein is usually applied to treat skin burnings [1]. Consequently, production of recombinant HAS protein, using prokaryotic expression system needs a suitable signal peptide for protection of disulfide bonds and prevention of misfolding. In this study, in order to predict the best signal peptides for expression of HAS protein in gram negative bacteria (E. Coli), 50 signal sequences from gram negative bacteria were selected and the most important features of them were evaluated. Hence, n, h and c regions and signal peptide probability were investigated by signalP software"version 3 and 4.1" [2], whereas physico–chemical features were evaluated by Portparam and Solpro [3]. Eventually, Flagellar P-ring protein (flgI), Periplasmic protein trbC (trbc), Penicillin-insensitive murein endopeptidase (mepA), Outer membrane protein C (ompC), and Uncharacterized protein ycgK (ycgk) were introduced respectively, as the best signal peptides to express HAS.

Keywords: Signal peptide, Human Albumin Serum (HAS), E. Coli, Bioinformatics.

References

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