In silico analysis of different signal peptides for secretory production of truncated keratinocyte growth factor in escherichia coli

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Abstract: Secretory production of recombinant proteins in Escherichia coli has many advantages. However this process is difficult due to its complexities and selection of appropriate signal peptide. Keratinocyte growth factor is a fairly unstable protein due to its high aggregation propensity and therefore its expression as a secretory protein may results in the production of protein with more stability, higher solubility, better folding, enhanced biological activity and N-terminal authenticity and simplified downstream processing. A truncated version of human keratinocyte growth factor with enhanced stability, marketed as Kepivance®, has been FDA approved for treatment of oral mucositis.The aim of this study was in silico evaluation of 32 different secretory signal peptides to determine the best theoretical candidates for the secretory production of recombinant KGF in E.coli. The presence of signal peptide and the location of cleavage sites were predicted by SignalP 4.1. Physicochemical properties of signal peptides which may influence protein secretion were analyzed by ProtParam and PROSOII. Computational analysis of physicochemical properties affecting protein secretion, identified OmpC, Pel2 and Skp as the best theoretical candidates for secretory production of recombinant truncated KGF in E.coli.

Keywords: signal peptide; biological activity; stability