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Cloning, Expression and N-Terminal Pegylation of Human Interferon Alpha-2b Analogs and Their Cytotoxic Evaluation against Cancer Cell Lines

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Abstract : In the current research, three recombinant human interferon alpha-2b proteins (two modified and one normal form) were produced and Pegylated with an aim to produce more effective drugs against viral infections and cancers. The modified recombinant human interferon alpha-2b proteins were produced by site-directed modifications of interferon alpha 2b gene, targeting the amino acids at positions 'R23' and 'H34'. The resulting chemically modified and unmodified forms of human interferon alpha 2b were conjugated with methoxy-polyethylene glycol propanealdehyde (400 KDa) and methoxy-polyethylene glycol succinimidyl succinate (400 KDa). Pegylation of normal and modified forms of Interferon alpha-2b prolong their release time and enhance their efficacy. The conjugation of PEG with modified and unmodified human interferon alpha 2b protein drugs was also characterized with 1H-NMR, HPLC, and SDS-PAGE. Antiproliferative assays of modified and unmodified forms of drugs were performed in cell based bioassays using MDBK cell lines. The results indicated that experimentally produced recombinant human interferon alpha-2b proteins were biologically active and resulted in significant inhibition of cell growth.

Keywords : protein refolding, antiproliferative activities, biomedical applications, human interferon alpha-2b, pegylation, mPEG-propionaldehyde, site directed mutagenesis, E. coli expression
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