Production of a Viral Enhancer Protein Using a Bacterial Platform

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Virus production is a limiting factor in fields that utilize viral platforms, including the fields of vaccinology, oncolytic virology, and gene therapy. Previous research has suggested that inhibiting interferon (IFN)-mediated immune response in cell cultures locally increases the replication of IFN-sensitive viruses: for example, a vaccinia-encoded IFN-inhibitor protein (IFN-IP) has been shown to increase the replication of an oncolytic Herpes Simplex Virus strain by 15 to 20 times in human fibroblast cell cultures. The goal of this project was to produce an IFN-IP from a bacterial platform, with the purpose of using it as a viral replication enhancer for in vitro virus manufacturing. The genes for production of the full-length protein (IFN-IP-FL) and of the bioactive Immunoglobulin G domains of the protein (IFN-IP-IgG) were cloned into a pET-22b(+) vector plasmid. Protein expression was induced with IPTG, and the purified protein was analyzed using a Western Blot, a Bradford Assay, and a Coomassie Stain. The results indicated that a small amount of the protein was produced, observable by Western Blot. The procedure is currently being optimized so that the IFN-IP may be produced in quantities large enough (µg to mg) for use as a replication enhancer in virus production. Increased virus manufacturing capabilities would expedite the development of viral platforms and increase the viability of vaccines and oncolytic virus and gene therapy treatments.