In the fields of molecular biology and genetics, c-Fos is a proto-oncogene that is the human homolog of the retrovirus oncogene v-fos.

It was first discovered in rat fibroblasts as the transforming gene of the FBJ MSV (Finkel-Biskis-Jinkins murine osteogenic sarcoma virus). It is a part of a bigger Fos family of transcription factors which includes c-Fos, FosB, Fra-1 and Fra-2 as well as smaller FosB splice variants, FosB2 and  $\Delta$ FosB.

It has been mapped to chromosome region  $14q21 \rightarrow q31$ . C-fos encodes a 62 kDa protein, which forms heterodimer with c-jun (part of Jun family of transcription factors), resulting in the formation of AP-1 (Activator Protein-1) complex which binds DNA at AP-1 specific sites at the promoter and enhancer regions of target genes and converts extracellular signals into changes of gene expression.

It plays an important role in many cellular functions and has been found to be overexpressed in a variety of cancers.

The FOS promoter caused significantly higher transcriptional activity in glioma cell lines than all alternative promoters with the exception of CMV. The FOS promoter showed 13.9%, 32.4%, and 70.8% of the transcriptional activity of CMV in three glioma cell lines (U87, U251, and U373). Importantly, however, the FOS promoter showed only 1.6% of the transcriptional activity of CMV in normal astrocytes. We also tested the biologic activity of recombinant adenovirus containing the suicide gene herpes simplex virus thymidine kinase (HSV-tk) driven by the FOS promoter, including selective killing efficacy in vitro and tumor inhibition rate in vivo. Adenoviral-mediated delivery of the HSV-tk gene controlled by the FOS promoter conferred a cytotoxic effect on human glioma cells in vitro and in vivo. This study suggests that use of the FOS-tk adenovirus system is a promising strategy for glioma-specific gene therapy but still much left for improvement <sup>1</sup>.

## 1)

Pan J, Wang H, Liu X, Hu J, Song W, Luo J, Jiang S, Yan F, Zhai B. Tumor Restrictive Suicide Gene Therapy for Glioma Controlled by the FOS Promoter. PLoS One. 2015 Nov 16;10(11):e0143112. doi: 10.1371/journal.pone.0143112. eCollection 2015. PubMed PMID: 26571389.

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