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The effect of nsPEF on glioblastoma cancer-like stem cell transcription and protein expression

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Abstract

The SUMCASTEC project aims to isolate and neutralise glioblastoma cancer stem-like cells (CSC) using electromagnetic stimulation. With these objectives in mind, normal populations and CSC enriched populations of U-87 MG cells were exposed to nanosecond pulsed electric fields and mRNA and protein expression differences were analysed.

Presented Work

Glioblastoma multiforme (GBM) is a common and aggressive tumour of the glia affecting the central nervous system. It is highly invasive and resistant to all current treatments, with the median survival time for patients being 14.6 months. Current standard treatment includes surgical resection, chemotherapy and radiotherapy^{1,2}. Cancer stem-like cells (CSC) have been identified in GBM tumour masses³ and their multipotentiality, ability to self-renew and resistance to chemotherapy make them a key target for novel GBM treatments.

SUMCASTEC⁴ is part of the European Union's Horizon 2020 research and innovation program. The project aims to isolate and neutralise glioblastoma (CSC) using electromagnetic stimulation.

As part of SUMCASTEC this study focuses on the effects of nanosecond pulsed electric fields (nsPEF) on the glioblastoma cell lines U-87 MG. A cuvette exposure system was used to apply nsPEF to cells that had been cultured under normal conditions and to those that have been cultured under conditions that result in an enrichment in CSC. Transcriptional analysis and protein expression studies were carried out on these cells.

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