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ABSTRACT SUMMARY

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Title, content, keywords, and sessions

Title: Synergistic cell death effect of 10 ns PEFs and low-concentration gemcitabine on pancreatic cancer in vitro

Body: Introduction The use of chemotherapy drugs before or after surgery is common in human pancreatic cancer. This type of cancer has a very poor prognosis and leads to a rapid deterioration of the general state of the patient, limiting the use of chemotherapies, and justifying the development of alternative and innovating treatments, as bioelectric therapies. Methods Gemcitabine, used as palliative chemotherapy in pancreatic cancer, has been tested in vitro in combination with nanosecond pulsed electric field (~10 ns) on murine pancreatic cancer cells KPC 4580. After obtaining the IC 50, the KPC 4580 were treated with 10, 100, 500 and 1000 pulses of 10 ns duration and electric field of 10 kV/cm in a cuvet exposure system, alone, or before treatment to gemcitabine at 0.15 μ M or 15 μ M during 24h. Apoptosis rate was evaluated by fluorescence using a flow cytometer (AnnexinV, Muse® Cell Analyzer, Millipore). The cells were then plated in wells and cell nuclei were labeled by DAPI to estimate the survival rate by fluorescence microscopy. A MTT assay was also performed to test the in vitro cytotoxicity of the treatments. Results The gemcitabine chemotherapy doses (0.15 and 15 μ M) alone have been associated with 24h cell survival of 65% and 50% respectively. A strong decrease in cell survival at 24 hours is also observed with the use of nsPEF alone, with a dose-dependent relation according to the number of pulses. Interestingly, the association of nsPEF with low-dose cytotoxic gemcitabine regains a synergy of action and increases cell death. The cell death profile with AnnexinV/7-AAD study finds apoptosis as a major mechanism of cell death for both cell groups, regardless of their exposure to chemotherapy. Conclusion The combination of nsPEF with low doses of cytotoxic drugs has a synergistic effect on cell death in vivo for pancreatic cancer cells, a cancer that is classically resistant to therapeutic drugs or leading to poor prognosis for patients. The combination of both reduced drug doses and nsPEF treatments could limit side effect and toxicity of chemotherapy, which may provide improved treatment for patients than either treatment alone.

Keywords: nsPEF; cancer; in vitro; chemotherapy; pancreas.

Session(s):
none selected

Classification

Subject area	Topic	
Medical applications	Cancer therapy	✓

Other data

Inquiry	Opted for
Please indicate your preferred type of presentation	Poster
If selected for Poster, willingness to participate in interactive poster session	Yes
Applying for Student / Early Career Investigator Award Note: Early Career Investigators must be either under the age of 35 or within 5 years of receiving their doctoral degree (i.e. M.D., Ph.D., etc.) and working in the field of electroporation and pulsed electric fields in biology, medicine and food & environmental technologies.	No
Invitation letter for Visa required (presenting author)	No