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ABSTRACT SUMMARY

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Title, content, keywords, and sessions

Title: Development of flexible organic microelectrodes for the detection and treatment of brain cancer

Body: Glioblastoma is one of the most resistant tumor to treatments and leaves patients with a poor prognosis. Use of new emerging technologies based on bioelectronics seems to be a promising way for the sensing and treatment of cancer. The work presented here concerns the development of flexible organic microelectrodes for the detection of electrophysiological activity around tumors and subsequently, use pulsed electric fields for cancer therapeutics. In this purpose, we set up an in ovo model of glioblastoma based on the chorioallantoic membrane (CAM) model. The avian CAM is a highly vascularized and transparent extra-embryonic membrane, which performs multiple functions during embryonic development including gas exchange. The grafting of a tumor on this membrane allows to obtain a relevant intravital model of glioblastoma, which is cheaper, less tedious and raises fewer ethical issues than other experiments on animals. We cultured Mouse glioma 261 (Gl261) cells in three dimensions to form spheroids. This model exhibits many features of an avascular tumor, especially the existence of a hypoxic and necrotic core due to the limited diffusion of oxygen to the inner part. The grafting of the spheroid in shell-less quail egg CAM induces angiogenesis, which corresponds to the growth of new blood vessels from the existing vasculature of the embryo. Neovessels supply the spheroid, which leads to the disappearance of the hypoxic core and the growth of the tumor. We apply flexible and biocompatible organic microelectrodes on this model to detect electrophysiological activity around the tumor and apply pulsed electric fields to treat cancer. We track the changes in tumor cells by fluorescence microscopy imaging, using different indicators such as calcium or voltage sensors.

Keywords: Avian chorioallantoic membrane; Flexible organic microelectrodes; Brain cancer.

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.	Yes, Student
Invitation letter for Visa required (presenting author)	No