In collaboration with

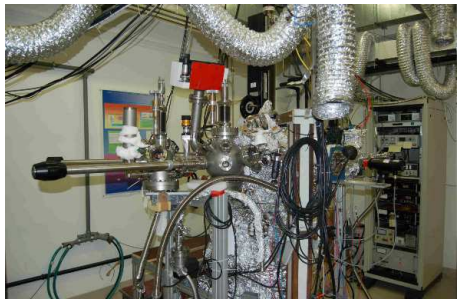
CNR-Istituto Microelettronica Microsistemi

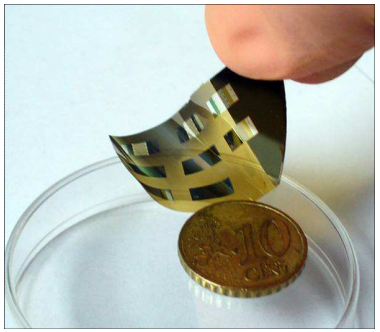
CNR-Istituto Struttura della Materia

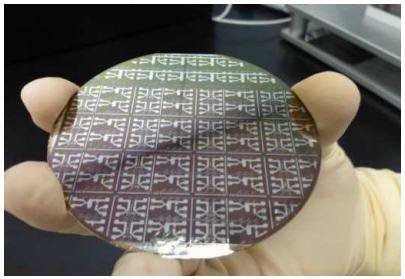
IRCCS-Fondazione Bietti

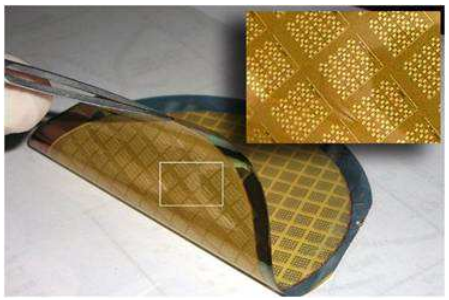
IRCCS - Fondazione "G.B. Bietti"
per lo Studio e la Ricerca in Oftalmologia ONLUS

ELECTROCHEMICAL DEVICES FOR BIOLOGICAL APPLICATION









The development of low-cost and disposable biosensors that permit a swift and reliable response without the usage of expensive instrumentation and time-consuming procedure are nowadays gaining an increasing interest. The project envisages the fabrication of electrochemical miniaturized biosensors, integrated on polymeric substrates, for the detection of biomarkers in ocular diseases.

In collaboration with:

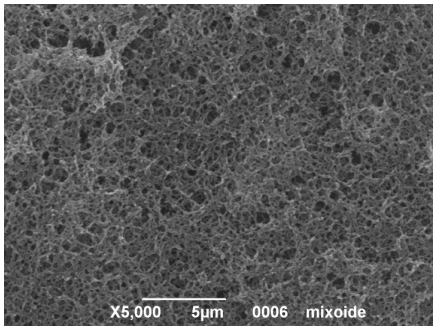
University of Padova, Dep. Industrial Engineering and Dep Surgery Oncology and Gastroenterology, Padova, Italy

Campus Bio-Medico University of Rome, Roma, Italy

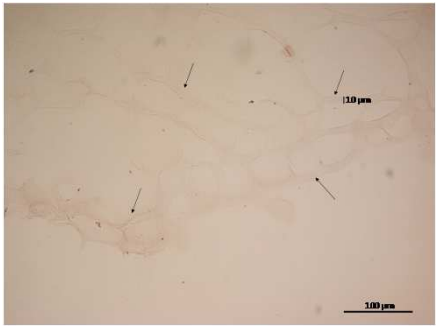
Sarcoma and Melanoma Unit, Veneto Institute of Oncology (IOV-IRCCS), Padova, Italy

Electrochemotherapy (ECT) employs cell electroporation to improve the drug uptake and potentiate the drug activity in tumor treatments.
In ECT studies, spheroids and hydrogels have been recently proposed to better mimic the tissue complexity, although they are limited in cell Extra Cellular Matrix mimicry.
In this collaboration, we are studying a new 3D scaffold for cell culture mimicking the myxoid environment found in some tumors.
HCC1569 and MDA231 cancer lines have been seeded into the novel scaffold and allowed to grow for 7 days.
The proposed 3D myxoid-mimetic scaffolds can promote both cell-cell and cell-matrix 3D interactions: the detected cell morphology is very similar to histology of biopsy samples; cells appear round-shape and not elongated. After adhesion, the cells produced their proper ECM.

Next step will be to culture different cancer cell lines into the scaffold, and proceed to the electroporation by using Propidium Iodide to assess the electroporation efficiency.



SEM images of the dried scaffold



The scaffold after 7 days complete DMEM treatment. (Haematox/Eosin staining)