Supervisor Project Idea

Supervisor

Insert a brief CV and/or external link, the total number of publications, the ORCID link, 5 of the most significant/recent publications, and a list of funded projects and awards. max 300 words

Supervisor: Prof Eng PhD Francesco Piva
CV:
https://www.univpm.it/Entra/Medicine_and_Surgery_2/docname/idsel/671/docname/FRANCESCO%20PIVA
Orcid: https://orcid.org/0000-0003-1850-2482
3,776 Citations. 105 Documents. 31 h-index

5 publications:
1) Effects of extremely low-frequency magnetic fields on human MDA-MB-231 breast cancer cells: proteomic characterization.
Ecotoxicol and Environmental Safety 2023
DOI: 10.1016/j.ecoenv.2023.114650
2) A 50 Hz magnetic field influences the viability of breast cancer cells 96 h after exposure
Molecular Biology Reports 2023
DOI: 10.1007/s11033-022-08069-7
3) Effects of CXCL12 isoforms in a pancreatic pre-tumour cellular model: Microarray analysis
World Journal of Gastroenterology 2021
DOI: 10.3748/wjg.v27.i15.1616
4) Predicting future cancer burden in the United States by artificial neural networks
Future Oncology 2021
DOI: 10.2217/fon-2020-0359
5) LncRNA co-expression network analysis reveals novel biomarkers for pancreatic cancer
Carcinogenesis 2018
DOI: 10.1093/carcin/bgy069

Funded projects:
- Holder of the three-year funding received from the Cariverona Foundation in 2018 for the project "CXCL12 Messengers in pancreatic ductal adenocarcinoma: Pro-tumor or anti-tumor? (IMPAcT)" (2017.0570).
- In 2018 my project “Pancreatic ductal adenocarcinoma and intercellular signals: from a prognostic approach to a treatment strategy” was funded by the Cariverona Foundation with a three-year doctoral scholarship (XXXIV cycle).
- From 2015 to 2017 I was a member of the project "Circulating tumor cells and exosomes in human pancreatic cancer. The impact on prognosis and treatment strategy" funded by AIRC (IG 2014 Id.15821).
- From 2016 to 2017 I was a member of the strategic project of the Polytechnic University of Marche "Study of biological Effects of 50 Hz electromagNetic fieldS and develOpment of a personal miniaturized dosimeteR (SENSOR)".

Research Group Description

Provide the name the reference department and a brief description of the research group, including external links, and available instrumentations and infrastructures. max 300 words

The Applied Biology research group belongs to the Departments of Specialized Clinical and Odontostomatological Sciences of the Faculty of Medicine of the Polytechnic University of Marche.
The group has been studying tumours on cellular models for many years. It has all the equipment for working with cell cultures, for molecular biology (DNA and proteins), and a modern fluorescence microscope. The group has interdisciplinary skills because it is composed of an electrical engineer and a biologist; and has published more than 100 articles in peer-reviewed journals in the fields of molecular oncology, bioinformatics and artificial intelligence.

Link to the construction of a prototype for the generation of magnetic fields for biological uses:
http://www.introni.it/generatore%20campo%20elettromagnetico.html

Links to some Bioinformatics analysis programs produced by the group:
http://www.introni.it/splicing.html
http://www.introni.it/ExportAid/ExportAid.html

Title and goals

Provide the title of the topic and a short summary of the project idea. max 200 words

Design and construction of a non-invasive device to trap magnetic nanoparticles in pancreatic cancer for a more efficient anti-tumour agent delivery.

Pancreatic cancer is the least responsive to chemotherapy treatments because it is composed of a microenvironment that protects it from external actions. Today it is possible to conjugate magnetic nanoparticles to peptides that recognize target proteins in the membrane of tumour cells and simultaneously conjugate them to chemotherapy drugs. These nanoparticles should be administered directly into the pancreas via ultrasound guidance. This project aims to design and create a prototype that generates a special configuration of magnetic fields that can retain the nanoparticles deposited in the pancreas. Through this magnetic trap, we want to maintain a high concentration of chemotherapeutics in the pancreas to make the therapies more effective and not involve the other organs to reduce the side effects. The equipment will be placed outside the patient and will not pose any risk. For this project we are looking for a researcher with experience in using magnetic field simulation software and who has had practical experience. We test the prototype on a physical model that has viscosity and liquid flows like those of the body.

Contact details (*including email address of the supervisor*)

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