CONTRATOS PREDOCTORALES – MATRANS24 (CEX2023-001263-S)

RESEARCH CHALLENGE:

Soft materials to battle cancer

PROJECT TITLE / JOB POSITION TITLE:

Developing hydrogels to battle cancer through radiotherapy (HyRad)

RESEARCH PROJECT / RESEARCH GROUP DESCRIPTION:
(Max. 2.000 characters – including spaces)

In the HyRad project, we propose to develop novel hydrogels to tackle two main limitations of lung and glioblastoma cancer radiotherapy: the low responses and the high risk of damage to surrounding healthy tissue. In particular, we will develop patient-derived lung cancer organoids to understand tumor biology better and study the incorporation of radiotherapeutic agents into the tumors, as a new approach to reduce radiation dosage and collateral damage. With the same objectives, we propose to create injectable hydrogels with radiotherapeutic agents for glioblastoma management post-surgery. In summary, we aim to address critical gaps in radiotherapy by using advanced soft materials.

This highly interdisciplinary project will involve collaboration across different research groups. It aims to address the challenge of 'Soft Materials to Battle Cancer' within the 'Materials for Health' research line at ICMAB-CSIC.

JOB POSITION DESCRIPTION:
(Max. 2.000 characters – including spaces)
Include all the relevant information about the position, role, responsibilities and skills required within the project/group

The PhD student will join the challenge “Soft materials to battle cancer,” which comprises a few researchers and groups focused on developing different bionanomaterials with applications in cancer research and treatment in collaboration with different Spanish hospitals.

The candidate will synthesize and physiochemically characterize novel bionanomaterials, especially functional nanoparticles and 3D hydrogels, utilizing techniques such as NMR, IR, X-ray tomography, rheology, SEM, TEM, DLS, and confocal microscopy. The student will also determine their properties and functional

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performance. It will be especially important to determine the delivery/release capacity of radiotherapeutic agents to be inserted post-surgery injectable hydrogels.

The candidate will also perform the cell culture studies needed to fabricate patient-derived lung cancer organoids in collaboration with the Hospital General Universitari de Valencia. The cancer organoids will be analyzed by confocal and fluorescence microscopy, ELISA, flow cytometry, RNA seq, among others. Finally, the student will evaluate the use of patient-derived lung cancer organoids to improve current external radiotherapy, through incorporating radiotherapeutic agents.

The PhD student will participate in (inter)national conferences, ICMAB and UAB campus meetings, and the group meetings of both research groups to which she/he will be ascribed. Moreover, the student will be trained in leadership and soft skills.

The academic requirements and skills that candidates should hold are:
• Highly motivated person with good capacity for team work and eager to acquire new knowledge and skills in a multidisciplinary project related to bionanomaterials for cancer research.
• Master degree in Biotechnology, Biomedicine, Chemistry, Materials Science, Nanotechnology, or related fields.
• Good level of oral and written English.
• Experience in synthesis and characterization of biomaterials (nanoparticles and hydrogels will be especially appreciated).
• Experience in cell culture, optical and fluorescence microscopy, and flow cytometry will be appreciated.

PhD CO-DIRECTORS:

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RELATED LINKS TO THE POSITION (optional)
URL: https://icmab.es/
Title link: ICMAB's website