CONTRATOS PREDOCTORALES 2022 SEVERO OCHOA

PROJECT TITLE / JOB POSITION TITLE:

Nanoparticles for radiation therapy enhancement

JOB POSITION RESEARCH LINE:

RL5 - BIOACTIVE MATERIALS FOR THERAPY AND DIAGNOSIS

RESEARCH PROJECT / RESEARCH GROUP DESCRIPTION:

Cancer is a major public health problem worldwide, causing 10 million deaths per year. Cancer is a generic term for a large group of diseases where abnormal cells divide without control beyond their usual boundaries. An enormous effort has been devoted in the past decades to try to understand the origin of the disease and possible ways for its mitigation or elimination, however, many challenges still lie ahead. External beam radiation therapy (EBRT) plays a pivotal role in the treatment of cancer. Noteworthy, half of all cancer patients are treated with EBRT, either as the only treatment or combined with other therapeutic modalities (mainly surgery and chemotherapy). The use of NPs, typically below 300 nm (1 nm=10^{-9} m), in the biomedical field offers a unique platform to adjust essential properties such as solubility, diffusivity, blood-circulation time, pharmacokinetic profile and cytotoxicity. The size of a NP is well below the size of a human cell, thus allowing its interaction and internalization. When EBRT is employed in the presence of certain nanoparticles, various physical processes can occur that produce radiochemical damage to the tissue by the generation of ions and free radicals. Therefore, the aim of the project is the tailored design of nanoparticles as for radiation therapy enhancement.

The researcher will join the Solid State Chemistry SO group and in particular the "Nanoengineering of Carbon and Inorganic Nanomaterials" (NanoCIM) team led by Gerard Tobías Rossell, with a highly multidisciplinary environment. The work will be performed in close collaboration with Hospital Universitari Vall d'Hebrón.

JOB POSITION DESCRIPTION:

The researcher will join the materials science program of the Autonomous University of Barcelona (UAB). She/he will be in charge of the synthesis and functionalization of inorganic nanoparticles and their posterior characterization with a wide variety of techniques including electron microscopy (TEM, SEM), elemental analysis, thermogravimetric analysis and spectroscopic characterization. She/he will also be in charge of performing in-vitro studies with the prepared nanoparticles.

The researcher is expected to have a good academic track record and a solid background in

Campus de la Universitat Autònoma de Barcelona
08193 Bellaterra, Catalunya, Espanya
Telf.: +34 935 801 853
Fax.: +34 935 805 729

chemistry. Previous experience in the synthesis, characterization and in-vitro studies with nanoparticles is desirable.

GROUP LEADER:

Dr. Gerard Tobías Rossell
Email: gerard.tobias@icmab.es
Research project / Research Group website: Nanomaterials for cancer diagnosis and therapy https://icmab.es/ssc/nanocim

Campus de la Universitat Autònoma de Barcelona
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