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The Early Stage Researchers

The DIRNANO project foresees the participation of 15 Early Stage Researchers (ESR), who are recruited by their Beneficiary.
The ESRs, PhD students, work exclusively on their individual research project which is monitored by their Supervisors.

During the project, ESRs attend Summer Schools and Regular Network Meetings where they have the possibility to share scientific information and present their laboratory results.

Furthermore, for each ESR there are at least two secondments, periods of time spent at another organisation within the consortium with the aim of implementing the individual research project.

All ESRs will be presented individually in this and in April newsletter.

Cristina Fontecha Cuenca

Individual Research Project:

Production and molecular design of recombinant proteins for functional modulation of biomolecular corona effects

Supervisor: Alessandro Negro

Department of Biomedical Science - University of Padova (Italy)

With a background on molecular biology, neuroscience and immunology, my goal is contributing to the development of precision medicine. That is, targeting the drug to the site of action, avoiding the unwanted side effects of medication. To do that, I need to design nanoparticles – our preferred drug carriers – invisible to the immune system so they are not expelled from the body. In my work I focus on genetic engineering to produce proteins from the blood, which would help me understand the interactions between the nanoparticles and the elements of our immune defence.

This knowledge will help us creating nanoparticles capable of evading the immune system.

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Ander Eguskiza Bilbao

Individual Research Project:

Development of therapeutic cancer nanovaccine candidates

Supervisor: Roberto Fiammengo

Department of Biotechnology - University of Verona (Italy)

Cancer is still the leading cause of death worldwide. Therapeutic cancer vaccines stood up as promising candidates for achieving long-lasting remission of tumors. As a biotechnologist with a strong background in nanoparticle science, my project will primarily focus on synthesis of the therapeutic nanoparticle-based cancer vaccine candidates. Nanoparticles may considerably improve antigen presentation to the immune system, increasing the immune response. For this purpose, gold nanoparticles will be used as carriers for tumor-associated self-antigens. The use of therapeutic nanovaccines could open up a series of new possibilities in cancer treatment with possibly fewer side effects than conventional chemotherapy.

Find Out More

Haritha Isukapatla

Individual Research Project:

Green chemical synthesis of novel steroidal complement inhibitors

Supervisor: Alan Christy Hunter

Department of Pharmacy - University of Lincoln (UK)

Liposomal nanomedicines cause problems with activation of our immune system, following their intravenous administration to the patient. In order to avoid these deleterious reactions, my project investigates how different cholesterol structures may reduce these recognition interactions.

This involves green chemical synthesis using microorganisms to functionalize chemically inert positions on the cholesterol skeleton. The analogues behaviour within lipid bilayers (NMR, DSC) optimized using in silico modeling to recognize structures that reduce the Immune system's complement recognition of liposomes.

Enzyme-linked immune absorbent (ELIZA) assays used to determine the effect on complement activation.

If successful, this approach may significantly improve nanomedicine design and therefore patient safety.

Find Out More

Mireia Vilar Hernandez

Individual Research Project:

Stealth coating of NPs with zwitterionic lipid bilayers

Supervisor: Pascal Jonkheijm

LipoCoat BV (The Netherlands)

My project is focused on studying new coatings for nanoparticles that will not activate the immune system.

With this we will improve the efficiency of the nanoparticles. Our approach is to use the main lipids of the cell membrane. We envision to create a coating able to surround different nanoparticles which will broaden the biomedical applications of the nanoparticles. With this new system, we expect to provide nanomedical research with a safer system and with fewer secondary effects. The coated nanoparticles could be used in cancer treatment and vaccines.

Find Out More

Michele Do Nascimento Tomaz

Individual Research Project:

Self organized polymeric Nanoparticles

Supervisor: Fabrizio Mancin

Department of Chemical Sciences - University of Padova (Italy)

My project is focused to developing new molecules that will be used as coating of nanoparticles using different approaches and using different types of nanoparticles such as: gold, lipidic and silica. The modulation of these nanoparticles are important to understand which pathway is the best one to avoid the activation of immune system and deliver medicine on the body in the future.

Find Out More

Carlos Pavón Regaña

Individual Research Project:

Polymer composition and functional effects of the species-specific

biomolecular corona formation on NPs.

Supervisor: Edmondo M. Benetti

Department of Chemical Sciences - University of Padova (Italy)

My research is focused on the synthesis and characterization of polymers, mainly polyoxazolines and polyoxazines, used as coating of little vehicles called nanoparticles (NPs). Currently, polyethylene glycol (PEG) is the gold standard but many people have already developed antibodies against it. For this reason, there is a huge interest in finding a substitute and those polymers are promising. They have a better resistance against external responses, the ability to hide NPs from the immune system and do not accumulate in the body. Then, they can make the NPs, which carry drugs, a more effective tool to treat diseases such as cancer.

Find Out More

Foivos Sokratis Lazaris

Individual Research Project:

Development of unnatural antigens based on Mucin-1

Supervisor: Francisco Corzana López

Departmento de Química - Universidad de La Rioja (Spain)

My project focuses on the development of unnatural antigens based on glycoproteins that already exist in the human body. These glycoproteins, named mucins, are met with different modifications in healthy and cancer cells, making them excellent candidates for future vaccine candidates. In simple terms, I am modifying the amino acids that constitute the mucin-1 to improve its properties and help/guide the immune system to have a stronger immune response towards them. If this proves a success, it is possible to have cancer nano-vaccines in the proximal future that will lead to the better management of the disease and

increased survival rates of the patients.

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