

ICMAB researcher Juan Pellico secures €2 million to develop a “Biological GPS” to fight cancer

The ICMAB-CSIC scientist will develop NanoFLOW, a project that will study how tumour cells are fed and travel around the body by using radioactive nanoparticles. This is possible thanks to having received a Consolidator Grant from the European Research Council.



Juan Pellico at the ICMAB garden | ICMAB-CSIC

BELLATERRA (Spain) December 9, 2025 – Tumoral microvasculature plays a crucial role in the development and evolution of cancer. Not only do these tiny vessels feed the tumour, but they are also the gate through which drugs can enter and from which tumoral cells exit to other parts of the body. However, their small size, fast-changing morphology and complex blood flow dynamics have impeded us understanding them better. NanoFLOW aims to address this challenge.

ICMAB researcher Juan Pellico has secured a €2 million Consolidator Grant from the European Research Council (ERC) to develop NanoFLOW, a research project that will create a “Biological GPS” to study the blood flow through these vessels and observe how tumoral cells move to distant organs (metastasis). It will be possible thanks to Positron Emission Particle Tracking (PEPT), a technique that has been used in industrial reactors for decades. The project, says Pellico, “aims at translating this technique to the biomedical field to address long-standing unmet needs in medical imaging.”

Pellico demonstrated in 2024 that this is possible in a proof-of-concept [paper published in Nature Nanotechnology](#), “now this project goes beyond, developing new probes that allow using this technique in oncology to study new processes that used to be invisible with



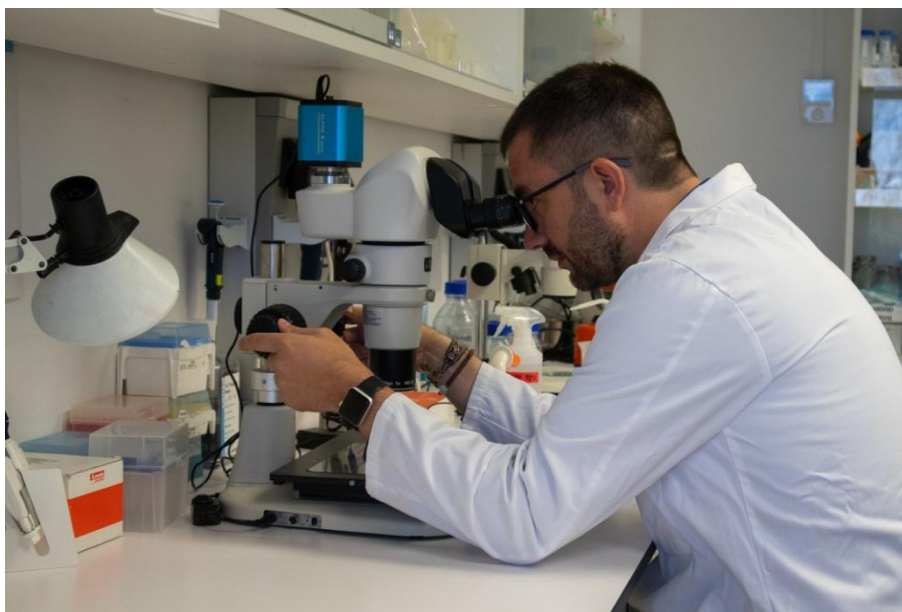
conventional image techniques”, says the researcher. “Essentially, this technique will work as a GPS inside the body, providing data about flow dynamics and tumour cell migration”, says the awarded researcher.

How NanoFLOW will work

NanoFLOW will use a radioactive nanoparticle with coincident photons – these can be tracked around the body; hence, it will show the path the particle follows inside the tumour microvasculature. Additionally, when attach to a cell, it allows observing its dynamics.

“This project will allow us to obtain quantitative, fundamental parameters of blood flow, such as speed, turbulence, and viscosity, even inside the tiniest vessels” says Pellico. “It allows relating the influence of these parameters in the progression of the tumour, as well as the effectivity of the treatments to get to them and the chance to analyse tumour cell migration with high precision.”

About Juan Pellico



Juan Pellico working in one of the ICMAB laboratories | ICMAB-CSIC

Juan Pellico is a Ramón y Cajal researcher at ICMAB since 2025. He obtained his PhD in Chemistry from the Universidad Complutense de Madrid in 2016. After that, he worked at the Advanced Imaging Unit of the Spanish Centre for Cardiovascular Research (CNIC) and then continued his postdoctoral work in the United Kingdom: first as a Research Associate at the University of Oxford (2018-19), and after that, as a Senior Researcher at King's College London (2019-24) – there, he led various research initiatives focused on the application of nanomedicines in medical imaging.



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About the ERC

The ERC, set up by the European Union in 2007, is the premier European funding organisation for excellent frontier research. It funds creative researchers of any nationality and age, to run projects based across Europe. The ERC offers four core grant schemes: Starting Grants, Consolidator Grants, Advanced Grants and Synergy Grants. With its additional Proof of Concept Grant scheme, the ERC helps grantees to bridge the gap between their pioneering research and early phases of its commercialisation.

The Consolidator Grants had a success rate of 11.2% in 2025, three percentage points lower than the 2024 call (14.2%). The intense competition for the ERC funding means a remarkable achievement for Pellico and the ICMAB-CSIC.

If you are interested in more information, photographs, or in interviewing the researcher, we are at your disposal. You can reach out to us at: communication@icmab.es.