

DC7 – Job Vacancy

Position Description	
Reference	DC7
Title of the project	Self-assembled sensorized 3D models of the blood-brain tumor barrier
Recruiting Institutions	(1°) Italian Institute of Technology (Italy, 24 months) and (2°) University of Aveiro (Portugal, 12 months)
Secondment	BeonChip
Expected Start Date (estimated)	Latest June, if possible, March/April

Job Offer Description	
Keywords	Glioblastoma spheroids; Brain tumor microenvironment; Blood-brain barrier; Microfluidic systems; Extracellular matrix
Project description	<p>The topic of the project is highly multidisciplinary and related to important aspects of nanomedicine research, especially focused on the central nervous system. A background in bioengineering, materials science, nanotechnology, biotechnology, or related fields is warmly welcome.</p> <p>The experimental objective foresees the design, the set-up, and the characterization of biomimetic sensorized brain-on-a-chip models integrating glioblastoma spheroids and other healthy cells of the brain microenvironment. These models represent integrated bio / non-bio systems exploitable for drug screening and biological research. The model involves a microfluidic system mimicking the blood-brain barrier (BBB), a fundamental component for testing drug and drug-loaded nanomedical products from the circulatory stream to the brain. Examples of 3D and 2.5D BBB systems previously developed by our Consortium have been prepared through two-photon lithography [doi.org/10.1002/sml.201702959] and laser cutting [doi.org/10.1016/j.matdes.2020.108742].</p> <p>During the project, the functionality of the obtained BBB models will be assessed by monitoring the biochemical and physical features of the barrier (TEER, tracer apparent permeability, expression of typical cellular markers, etc.). The platforms will be provided with suitable sensors/electrodes for real-time TEER measurements: a key feature for a quick and non-invasive assessment of barrier development and integrity. The BBB model will be integrated with biomimetic extracellular matrices (e.g., decellularized brain components and hydrogels) loaded with</p>

	different kinds of cells to obtain the complete biomimetic system suitable for advanced in vitro testing.
Objectives	O1: Obtain biomimetic glioblastoma spheroids O2: Obtain biomimetic BBB models O3: Characterization of the BBB model and tests with nanocarriers O4: Sensorization
Expected Results	Development and validation of a 3D sensorized biomimetic model of glioblastoma tumor microenvironment inclusive of blood microcapillaries. The sensorized model will represent a relevant platform for the screening of therapeutic drugs.
Supervisors	Dr. Gianni Ciofani and Dr. Attilio Marino (Italian Institute of Technology), Dr. Arianna Menciassi (Scuola Superiore Sant'Anna di Pisa), and Dr. Mariana Oliveira (University of Aveiro)
Work in the secondment	A 2-months secondment at the Spanish company Beonchip is envisioned with the aim of engineering microfluidic chips to mimic dynamic conditions of the biological barriers and integration of sensors to monitor the TEER. For optimized configurations, upscaling of the manufacturing process is considered to ensure reproducibility between chips. Moreover, a 1-month secondment at the German Company Nanoscribe GmbH is also planned to provide training on innovative fabrication approaches, such as two-photon lithography and direct laser writing, and their industrial spillover. This experience will provide a non-academic perspective to the training network, giving lectures in training schools specifically organized for young trainees (with a special focus on industrial research management, transfer of technology, entrepreneurship and creation of spin offs, IPR, resume and interview preparation and dissemination and commercial exploitation of results).

Vacancy requirements	
Qualifications	Background in material science, bioengineering, or tissue engineering is required. Having a Master degree or equivalent diploma, and not having a doctoral degree.
Requirements	MSCA-recruiting rules are applied. Not having resided in Italy for more than 12 months in the 3 years immediately before the recruitment date, and not having carried out their main activity (work, studies, etc.) in Spain during this period.
Languages	Excellent command of written and spoken English is a must
Skills	Ability for research management, dissemination, communication with colleagues and supervisors, strong teamwork spirit, creativity, problem solving and attention to safety
Experience	Research experience in the academic or industrial sector will be considered

Job Details	
Salary	<p>Salary and benefits will follow the rules of the MSCA-DN, as foreseen in the Marie Skłodowska-Curie Actions Work Programme. Gross salary per month in Italy: 3.311,60€ (3400€ per month*CCC Spain (97,4%)) + 600 € mobility allowance Gross salary per month in Portugal: 2.866,20€ (3400€ per month*CCC Spain (84,3%)) + 600 € mobility allowance</p> <p>*CCC (Country Correction Coefficient)</p>
Other benefits	<p>Other benefits: Gross family allowance: 660€ per month - if applicable*</p> <p>*The family allowance will also be made available to researchers whose parental status changes during their project.</p>
Duration	36 months
Type of contract	Full time
Place of work	<p><i>Italian Institute of Technology: Pisa, Italy (24 months)</i> <i>University of Aveiro: Aveiro, Portugal (12 months)</i> The prospective Ph.D. will be, upon successful accomplishment of their course of studies, awarded with a double degree by the University of Aveiro and Scuola Superiore Sant'Anna di Pisa</p>