

DC1 – Job Vacancy

Position Description	
Reference	DC1
Title of the project	Tailoring of protease-sensitive nanogels to encapsulate and release antibodies after crossing the BBB
Recruiting Institutions	(1°) University of the Basque Country-POLYMAT (Spain, 24 months); (2°) Technion – Israel Institute of Technology (Israel, 12 months)
Secondment	I+Med (Spain)
Expected Start Date (estimated)	Latest July, if possible, February/March

Job Offer Description	
Keywords	Responsive nanogels, antibody encapsulation, targeted drug delivery through BBB, protease
Project Description	This project aims to develop nanogels that are able to encapsulate Cetuximab and transport it through the blood-brain barrier (BBB). The triggered cleavage of the linkages that form the nanogels' structure should lead to the disintegration of the polymer network mediated by enzyme activity. Continues optimization loops will be undertaken, in order to minimize risks related to the peptide sequence chosen as building blocks, enzyme-mediated degradation profiles, control over size, dispersity and stability in solution, cyto-, geno- and immuno-toxicity. Finally, materials will be assessed in vitro using BBB models and GMB cells. The best performing systems will be assayed regarding feasibility for industrial development in the frame of a secondment in I+Med (Spain).
Objectives	<ul style="list-style-type: none"> - Development of nanogels with high dispersability and stability in water, with hydrodynamic diameter below 200 nm. - Optimization of the synthetic conditions, following (mini)emulsion and (nano)precipitation methodologies, to yield products with low size dispersity. Environmentally friendly and non-toxic reagents and conditions will be prioritized for the synthesis - Screening of peptide sequences and feed-ratios to obtain nanogels with proper mechanical and surface properties to enable: (a) high penetration through the BBB, (b) high antibody encapsulation efficiency without un-specific release by diffusion; (c) enough protease accessibility to the polymer mesh, to enable nanogel degradation and subsequent antibody release.



	<ul style="list-style-type: none"> - Biocompatibility and biological fate, assessed in relevant cell models - Assessment of (a) the nanogels' capacity to cross the BBB and (b) the therapeutic potential.
Expected Results	Crosslinked polymeric nanocarriers will be able to encapsulate the anticancer antibody with a high efficiency (above 30% wt.) and to retain it within the polymeric mesh until the degradation of the nanogel occurs in the near of the cancer cells. The nanogels will have the proper mechanical properties or surface functionalization to squeeze through the BBB. Nanogel degradation will predominantly occur in presence of proteases overexpressed by cancer cells. Nanogel toxicity against normal cells will be minimized, while high antiproliferative activity is maintained against cancer cells when the nanogels are loaded with the therapeutic antibody.
Supervisors	Prof. Marcelo Calderón (University of the Basque Country-POLYMAT) and Prof. Alejandro Sosnik (Technion – Israel Institute of Technology)
Work in the secondment	I+Med (feasibility of industrial development)

Vacancy requirements	
Qualifications	Solid background in organic/polymer chemistry, in nano and biomaterials or nanoscience or bioengineering/biomedical engineering. Having a master degree or equivalent diploma, and not having a doctoral degree.
Requirements	MSCA-recruiting rules are applied. Not having resided in Spain 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	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 Spain: 3.104,20€ (3400€ per month*CCC Spain (91,3%)) + 600 € mobility allowance



THERATOOLS



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	Gross salary per month in Israel: 3.644,80€ (3400€ per month*CCC Israel (107,2%)) + 600 € mobility allowance *CCC (Country Correction Coefficient)
Other benefits	Other benefits: Gross family allowance: 660€ per month - if applicable* *The family allowance will also be made available to researchers whose parental status changes during their project.
Duration	36 months
Type of contract	Full time
Place of work	<i>University of Basque Country: Donostia-San Sebastián, Spain (24 months). At the end of this period, a short secondment in I+Med (Spain) is foreseen.</i> <i>Technion – Israel Institute of Technology: Haifa, Israel (12 months).</i>