POLITECNICO DI MILANO

PhD in BIOINGEGNERIA / BIOENGINEERING - 40th cycle

THEMATIC Research Field: INNOVATIVE BIOPRINTING-BASED TISSUE ENGINEERING METHOD FOR SPINA BIFIDA

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0 In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Spina Bifida is a severe congenital malformation that occurs when there is an incomplete closure of the fetal back. This pathology affects 1 in 1000 overall in the world. Despite recently fetal surgery allowed to treat these babies during the pregnancy, the treatments are not fully resolutive. Recently an US based clinical trial exploited the use of stem cells to treat in-utero Spina Bifida to ameliorate the outcomes, however the treatment is delivered via an open surgery, which pose higher risks for the baby and the mother. In the context of an ERC funded project this PhD project aims at developing a bioprinting method based on ECM-hydrogels and stem cells that could be potentially used in the treatment of Spina Bifida via fetoscopic surgery.
Methods and techniques that will be developed and used to carry out the research	The successful candidate will be responsible of: - Culturing stem cells and test different protocols to promote their differentiation - Perform a transcriptomic and proteomic analysis of the cultures - Develop a protocol for the 3D bioprinting of stem cells - Study different gel formulations suitable for the 3D bioprinting - Perform in-vitro testing of differentiation and long term cultures of the 3D bioprinted gels loaded with stem cells

Educational objectives	Mammalian cell culture Biomaterials design 3D bioprinting Microscopy Cellular and molecular biology
Job opportunities	Academic and clinical research Life science companies
Composition of the research group	0 Full Professors 1 Associated Professors 0 Assistant Professors 1 PhD Students
Name of the research directors	Alessandro Filippo Maria Pellegata

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Educational activity: The student will be encouraged to attend to courses at POLIMI or abroad 2 / 3in International Schools. Teaching assistantship: There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations. Computer and desk availability: the student will be allowed to access facilities of the DCMIC.