Courtesy translation of D.R. n. 190/2024

*For more details on the selection process, please refer to the Italian version of D.R. n. 190/2024* available at http://www.hunimed.eu/it/lavora-con-noi/

**SELECTION PROCEDURE FOR RESEARCH FELLOWSHIP**

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| Research Program Title | **The Matrix of Resistance: Unveiling the Mechanisms of Extracellular DNA-Mediated Antimicrobial Protection in Biofilms. (One Health Basic and Translational Research Actions addressing Unmet Needs on Emerging Infectious Diseases - INF-ACT)** |
| Tutor | Prof. Roberto RUSCONI |
| Scientific Area | 05 – Biological Sciences |
| Gross amount of the fellowship | 27.000 Euro |
| Duration of the fellowship | 12 months |
| Objectives of the research | Biofilms, complex microbial communities encased in a self-produced extracellular matrix, represent a significant challenge in various environments, particularly in clinical settings where they cause persistent and chronic infections. Within this matrix, bacterial extracellular DNA (eDNA) has emerged as a fundamental component, playing diverse roles in attachment, aggregation, stabilization, and maturation. Importantly, eDNA serves as a key mediator of antibiotic resistance, shielding bacterial communities and facilitating the horizontal transfer of resistance genes. The focus of this project is on biofilm streamers – suspended filamentous bacterial biofilms prevalent in flowing systems – where eDNA serves as the backbone of these structures, essential for their formation and stability. The project will encompass two primary objectives. The first will investigate the shape and physical traits of biofilm streamers through cutting-edge microfluidic setups featuring isolated cylindrical structures to control their growth, alongside analyzing their chemical composition, and assessing how varying flow |

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| | conditions affect them. The second objective will compare how biofilm streamers and surface-attached biofilms respond to antibiotics, looking at biofilm removal and bacterial survival rates. This approach will shed light on the mechanisms underpinning antibiotic resistance in biofilms, with significant implications for infection control strategies. |
| Activities to be carried out | The collaborator will have to carry out activities related to the maintenance and culture of bacteria and cells, the use and optimization of molecular biology techniques, the fabrication of microfluidic channels and the execution of biochemical, flow cytometric and immunoenzymatic assays. |
| Work place | PIEVE EMANUELE - Milan |
| Mandatory requirements | • Master's degree in Molecular Biology or equivalent. Adequate scientific and professional background to carry out the research activity described in this call. |
| Selection process | Application for admissions must be submitted at the following link**:**<br>https://pica.cineca.it/humanitas<br>No hard copy of the application must be sent by post.<br>At first access, applicants need to register by clicking on "Register" and completing the requested data.<br>If applicants already have LOGINMIUR credentials, they do not need to register again. They must access with their LOGINMIUR username and password in the relevant field LOGINMIUR.<br>Applicants must enter all data necessary to produce the application and attach the required documents in PDF format. |
| Selection criteria | Selection criteria are predetermined by the Selection<br>Committee. Selection criteria will be strongly based on technical skills in the field of microbiology and molecular biology such as:<br>- bacterial and cell cultures;<br>- molecular biology techniques (including RNA and DNA extraction and purification); |

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| | - biochemical, cytofluorimetric, and immunoenzymatic assays;<br>- Experience in the acquisiton and analysis of microscopy images will be also considered. |

**FURTHER INFORMATION:**

In the event of any conflict between Job Opening text and Italian D.R. text, the Italian version will prevail.

For more details on the selection process please refer to the **D.R. n. 190/2024** (http://www.hunimed.eu/it/lavora-con-noi/) or send an inquiry to ufficiodocenti@hunimed.eu or telephone +39 02.8224.5642/5421.