

TOPIC PNRR2

Project title	Use of the RNA Technology for the therapy of infectious diseases based on humoral innate immunity molecules.
Curriculum (standard or clinical)	Standard
Principal Investigator	Cecilia Garlanda
Lab name	Laboratory of Experimental Immunopathology
Main field of interest	Innate immunity, infectious diseases, microbiology, regulation of inflammation
Abstract	<p>The Laboratory developed humoral innate immunity components (the long pentraxin PTX3 and the collectin MBL) as potential therapeutic drugs in infectious conditions, of fungal, bacterial and viral origin. These molecules have large oligomeric structures, which limits the use of the recombinant proteins in therapeutic approaches. PTX3 is an octamer containing 8 identical peptide chains of about 45 kDa each, and MBL is built of subunits that contain three identical peptide chains of about 30 kDa each. This nucleotide length is compatible with mRNA-based therapeutic approaches. The aim is the development of pharmaceutical compositions containing PTX3-encoding mRNA to be used as therapeutic /preventive tool in fungal and bacterial infections, or MBL and optimized muteins-encoding mRNA to be used as therapeutic /preventive tool in COVID-19.</p>
Brief description of the coherence of the Project in relation to the PNRR objectives	<p>The PNRR project has the ambition of placing Italy at the leading edge of discovery in RNA therapeutics and gene therapy. In Spoke #5: Inflammatory and Infectious diseases, the aims include the development of vaccines, prophylactic drugs and innovative therapies against novel emerging viral pathogens, anti-microbial resistant (AMR) bacteria, autoimmune and inflammatory diseases.</p> <p>The PhD project is placed in this line of activities, as it will be focused on the development of the RNA Technology for the therapy of infectious diseases based on humoral innate immunity molecules, namely PTX3 and MBL, which have been extensively studied by the lab in infectious conditions.</p>

PNRR project title	<i>National Center for Gene Therapy and Drugs based on RNA Technology</i>
CUP	G43C22001360007
Scientific references	<p>- Garlanda C et al. PTX3, a Humoral Pattern Recognition Molecule, in Innate Immunity, Tissue Repair, and Cancer. <i>Physiol Rev.</i> 2018 Apr 1;98(2):623-639. doi: 10.1152/physrev.00016.2017.</p> <p>- Stravalaci M, Garlanda C. Recognition and inhibition of SARS-CoV-2 by humoral innate immunity pattern recognition molecules. <i>Nat. Immunol.</i> 2022. <i>Nat Immunol.</i> 2022 Feb;23(2):275-286. doi: 10.1038/s41590-021-01114-w.</p> <p>- Doni A, et al. Serum amyloid P component is an essential element of resistance against <i>Aspergillus fumigatus</i>. <i>Nat Commun.</i> 2021 Jun 18;12(1):3739. doi: 10.1038/s41467-021-24021-y.</p> <p>- Jaillon S, Garlanda C, Mantovani A. The humoral pattern recognition molecule PTX3 is a key component of innate immunity against urinary tract infection. <i>Immunity.</i> 2014 Apr 17;40(4):621-32.</p>
Required skills to carry out the project	Previous experience in the field of microbiology is required.