DOTTORATO DI RICERCA IN BIOLOGIA CELLULARE E DELLO SVILUPPO

42° Cycle

Project proposal for a PhD scholarship

Main research line

Title of the research:
Role of ORF8 variation on immune responses and Covid-19 disease severity.

Supervisor: Paola Del Porto, e-mail: paola.delporto@uniroma1.it

Summary (max 500 words)
Severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) is the causative agent of COVID-19 (Corona Virus Disease 19). Although in the post pandemic years, SARS-CoV-2 morbidity and mortality declined due to less pathogenic variants, active and passive immunization and antiviral therapies, according to CDC and WHO Europe the virus continues to cause hospitalizations and deaths especially in people older than 60 years of age. The outcome of SARS-CoV-2 infection is the result of a complex interplay between the host immune response and the virus. Both innate and adaptive branches of the immune system are essential in protecting the host and clearing the virus. Faced with the formidable defense of host immunity, viruses have evolved multifunctional proteins as weapons of resistance. Among all proteins, SARS-CoV-2 ORF8 is a rapidly evolving accessory protein that has been proposed to interfere with immune responses and disease outcome.
The aim of the proposed research is to characterize the ORF8 genetic diversity and to perform a prospective analysis of the immune responses in COVID-19 patients over 65 years of age following viral infection and with different clinical courses: mild, moderate, or severe.
Results of this study will provide important insights on the characteristics of protective immune responses and on the consequences of ORF8 variation on anti-viral immune responses and/or infection outcome.

Pertinent Publications of the proponent (last 5 years)
1) Zulian V et al. HPV16 E6 and E7 Genetic Variability in Oral and Anal Samples from HIV-Positive MSM.Pathogens. 2025. 14(12):1210. doi: 10.3390/pathogens14121210.
2) La Frazia S et. al. Genomic variability and immunological aspects involved in response to MPXV infection. Front Pharmacol. 2025. 16:1665830. doi: 10.3389/fphar.2025.1665830.
3) Garbuglia AR et al. Update on Hepatitis C Vaccine: Results and Challenges. Viruses. 2024.16(8):1337. doi: 10.3390/v16081337.
4) Occhicone A et al. Enhanced fluorescence detection of miRNA by means of Bloch surface wave-based biochips. Analyst. 2023 Sep 11;148(18):4429-4437. doi: 10.1039/d3an00804e. PMID: 37555461
5) Cavinato L et al. Eur Respir J. 2023. 61(4):2200725. doi: 10.1183/13993003.00725-2022.
6) Blaconà G et al. Downregulation of epithelial sodium channel (ENaC) activity in cystic fibrosis cells by epigenetic targeting. Cell Mol Life Sci. 2022. 79(5):257. doi: 10.1007/s00018-022-04190-9

7) Garbuglia AR et al. mRNA- and Adenovirus-Based Vaccines against SARS-CoV-2 in HIV-Positive People. Viruses. 2022. 14(4):748. doi: 10.3390/v14040748.
8) Lapa D et al. Clinical Relevance of Torque Teno Virus (TTV) in HIV/HCV Coinfected and HCV Monoinfected Patients Treated with Direct-Acting Antiviral Therapy. J Clin Med. 2021. 10(10):2092. doi: 10.3390/jcm10102092.
9) Pierandrei S et al. DNA Methylation Patterns Correlate with the Expression of *SCNN1A*, *SCNN1B*, and *SCNN1G* (Epithelial Sodium Channel, ENaC) Genes. Int J Mol Sci. 2021.22(7):3754. doi: 10.3390/ijms22073754.