Nikolaos Vareltzakis

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PROFILE

Biological sciences graduate with honours of the first class, followed by a Master´s degree in Drug Design and Biomedical Science with Distinction. Currently a Horizon Europe Marie Skłodowska-Curie PhD doctoral candidate under the doctoral network: "Targeting Circadian Clock Dysfunction in Alzheimer's Disease" (TClock4AD).

EDUCATION & QUALIFICATIONS

- University of Verona (UniVR), University of Lisbon (UL), Institute of Molecular Biology and Biotechnology of the Foundation for Research and Technology Hellas (IMBB-FORTH) – **Double Doctoral PhD degree** in Inflammation, Immunity and Cancer (UniVR) and Pharmacy, specialising in Pharmaceutical and Medicinal Chemistry (UL) (2023-ongoing)

- Edinburgh Napier University - **Master`s degree** with Distinction in Drug Design and Biomedical Science (2022-2023)

- Heriot-Watt University - First Class (1:1) Honours **Bachelor's Degree** in Biological Sciences (2018-2022)

WORK EXPERIENCE AND RESEARCH ACTIVITY

November 2023 - Present: I am conducting part of my PhD project in The Laboratory of Neuroimmunology and Neuroinflammation, Department of Medicine, University of Verona, Italy, supervised by Prof. Gabriela Constantin. My project focuses on the role of circadian clock dysfunction on inflammation mechanisms in Alzheimer's disease. More specifically, I am currently examining how the neuronal circadian clock is altered by leukocyte-derived neuroinflammatory molecules in Alzheimer's disease and how targeting it may impact (neuro) inflammation and immune mechanisms involved in AD-like disease. Part of my project will also be carried out in the Institute of Molecular Biology and Biotechnology of the Foundation for Research and Technology Hellas (IMBB-FORTH), under the supervision of Prof. Nektarios Tavernarakis. In IMBB-FORTH, I will focus on how circadian clock factors mitigate neurodegeneration by maintaining mitochondrial homeostasis through mitophagy. Finally, a 2-month intersectoral secondment in BioFabics (Portugal) an R&D company specialized in the generation and culture of 3D Biotissue Analogues has already taken place.

May 2023 - August 2023: Master's thesis project in the Edinburgh Napier University School of Applied Sciences for 4 months under the supervision of Dr Fiona Kerr. This project aimed to follow-up on molecular targets previously identified as correlating with disease progression in Drosophila models of Alzheimer's disease, to translate their relevance to human brain tissue and to assess their potential as disease-modifying drug targets for AD.

September 2021 – November 2021: Honours research project in the Institute of Biological Chemistry, Biophysics and Bioengineering, under the supervision of Dr Stephen Yarwood. The project aided in the discovery of novel candidate drugs that can be used to treat inflammatory diseases.

KEY SKILLS

- Use of analytical balances, sonicators, centrifuge, UV spectrometer.
- Isolation of peripheral mononuclear cells and neutrophils from murine and human blood by density gradient centrifugation as well as from murine bone marrow.
- Neutrophil functional assays including phagocytosis, cytochrome C reduction (superoxide production), and isoluminol chemiluminescence to assess oxidative burst activity.
- Aseptic handling, maintenance, cryopreservation, and subculturing of adherent and in suspension mammalian cell lines (HUVECs, U2OS, SIM-A9, HMC3, HL-60, SH-SY5Y).
- Differentiation of HL-60 cell line to neutrophil-like cells and of SH-SY5Y cells to neuronal-like cells.
- Antibody staining, fluorescence microscopy, and image analysis for (co) localization and quantification of target proteins in fixed cells.
- Use of IMARIS software for quantitative 3D reconstruction of fluorescently labelled cells including co-localization analysis.
- Use of ZEN blue software for image analysis including co-localization analysis.
- Some experience with flow cytometry and use of FlowJo for analysis.
- Some experience with handling and use of laboratory mice. Blood collection, intraperitoneal and subcutaneous injection.
- Isolation of primary neurons from murine brains and subsequent maintenance and cell culture.
- Cell-based assays (EPAC1 and RAP1 activation assays).
- SDS-PAGE, Western-Blotting, Dot- blot, ELISA.
- Bradford assay for protein quantification.
- Densitometry using ImageJ and statistical analysis using Minitab and Graphpad Prism
- RNA extraction from cell lines and primary cells, cDNA synthesis, Primer design, End-point and real-time PCR.
- Use of Nanodrop for DNA, RNA and protein quantification and purity evaluation.
- Use of bioinformatic tools (Partek flow) for scRNAseq analysis.
- Use of molecular docking tools (AutoDock) for docking studies.
- Optical microscopy: brightfield, darkfield, and phase contrast.

DIGITAL SKILLS

- Excellent knowledge of Microsoft 365 software (Microsoft Word, Excel, Powerpoint etc.)
- Use of IMARIS, ImageJ
- FlowJo for the analysis of flow cytometric data.
- GraphPad Prism for visualizing data and performing statistical analysis.

ABSTRACTS, ORAL PRESENTATIONS, POSTERS

- Nikolaos Vareltzakis, Eleonora Terrabuio, Enrica Caterina Pietronigro, Vittorina Della Bianca, Alberto Poli, Pallab Majumder, Gabriele Angelini, Alessandro Bani, Antonella Calore, Gabriela Constantin, **CIRCADIAN CLOCK DISRUPTION AND ITS IMPACT IN BRAIN-INFILTRATING NEUTROPHILS IN ALZHEIMER'S DISEASE,** POSTER PRESENTATION, XXXII AINI Congress, Cagliari (Italy), 6-9 May, 2024.

- Nikolaos Vareltzakis, Eleonora Terrabuio, Enrica Caterina Pietronigro, Vittorina Della Bianca, Alberto Poli, Pallab Majumder, Gabriele Angelini, Alessandro Bani, Antonella Calore, Gabriela Constantin, **ALTERATION OF CIRCADIAN CLOCK GENES IN BRAIN-INFILTRATING LEUKOCYTES IN ALZHEIMER'S DISEASE, ORAL AND POSTER COMMUNICATION,** 7th Brainstorming Research Assembly for Young Neuroscientists (BRAYN), Verona (Italy), October 9-11, 2024.

- Eleonora Terrabuio, Enrica Caterina Pietronigro, Vittorina Della Bianca, Elena Zenaro, Barbara Rossi, Nikolaos Vareltzakis, Fabiana Mainieri, Antonella Calore, Pallab Majumder, Ermanna Turano, Carlo Laudanna, Gabriela Constantin, **Tissue resident memory leukocytes alter neuronal functionality during neurodegenerative diseases**, POSTER PRESENTATION, XV National Congress SIICA 2025, Perugia (Italy), June 17-20, 2025.

- Nikolaos Vareltzakis, Eleonora Terrabuio, Enrica Caterina Pietronigro, Vittorina Della Bianca, Alberto Poli, Pallab Majumder, Gabriele Angelini, Alessandro Bani, Antonella Calore, Gabriela Constantin, **CIRCADIAN CLOCK DISRUPTION AND ITS IMPACT IN BRAIN-INFILTRATING NEUTROPHILS IN ALZHEIMER'S DISEASE,** POSTER PRESENTATION, Scientific Meeting Spoke 7 PNRR MNESYS «Neuroimmunology & Neuroinflammation», Verona (Italy), September 26, 2025.

- Nikolaos Vareltzakis, Eleonora Terrabuio, Enrica Pietronigro, Vittorina Della Bianca, Antonella Calore, Fabiana Mainieri, Elena Zenaro, Gabriela Constantin, **ALTERATION OF THE NEURONAL CIRCADIAN CLOCK BY LEUKOCYTE-DERIVED NEUROINFLAMMATORY MOLECULES IN ALZHEIMER'S DISEASE**, AD/PD™ 2026 International Conference on Alzheimer's and Parkinson's Diseases and related neurological disorders, Copenhagen (Denmark), March 17-21, 2025.

- Joint PhD Day and PhD day of the PhD school "Inflammation Immunity and Cancer". Poster communication and oral communication.

- Summer school on public engagement and dissemination, Milan, September 24-25, 2024. Poster communication.

ADDITIONAL INFORMATION

Awards–

XXXII AINI Congress travel grant (2024), "Best Poster Presentation" Inflammation, Immunity and Cancer PhD Day (2024), University Class Medal (2023), Received the Deputy Principal's Award twice, recognising academic excellence (2018, 2020), Graduate Employability Masterclasses - Gold Badge (2020)

Languages – Fluent in Greek and English; Upper Intermediate in German (B2)

References available upon request.