Doruk Kaan Bayburtlu

+393518605644

dorukkaan.bayburtlu01@universitadipavia.it

Education

The University of Pavia 10/2022 – 10/2025
PhD. Translational and Precision Medicine

The University of Pavia 10/2020-10/2022
M.Sc. Molecular Biology and Genetics

Sabanci University 07/2012-06/2013
B.Sc. Molecular Biology, Genetics and Bioengineering 07/2014-06/2019

Uskudar Anadolu High School 09/2008-05/2012
Science

Professional Experience

Summer Internship – Dr. Ilker Tinay's Laboratory, Department of Urology, Marmara University Research Hospital 06/2018-08/2018

- Researched the effect of VDR gene polymorphisms on malignant and benignprostate tissues.
- Evaluated the relationship between vitamin D levels and VDR polymorphisms, and the diagnosis of prostate cancer.

Research Experience

Postdoctoral Researcher – Prof. Konstantinos Lefkimmiatis' Laboratory, University of Pavia 10/2025-Present

- Investigated the role of calcium signaling in the dynamic reorganization of the cell nucleus, focusing on the formation and regulation of calcium-tunable biomolecular condensates as a mechanism of nuclear functional remodeling.
- Employed FRET-based biosensors for real-time imaging of cAMP and calcium dynamics in human cardiac fibroblasts (hCFs) to monitor perturbations in second messenger homeostasis induced by patient-derived amyloidogenic light chain proteins.

PhD Researcher – Prof. Konstantinos Lefkimmiatis' s Laboratory, University of Pavia 10/2022-10/2025

- Investigated the mechanisms of nuclear-mitochondrial communication by developing and utilizing a novel *in vitro* 3D hydrogel system.
- Pioneered the use of FRET-based biosensors to perform real-time imaging of cAMP and calcium dynamics directly on isolated organelles, providing novel insights into inter-organelle signaling.
- Characterized the role of a novel calcium-binding protein in forming biomolecular condensates, a key process in cellular organization and signaling.
- Employed a suite of advanced microscopy and biochemical techniques to validate findings, including live-cell imaging, Fluorescence Recovery After

Photobleaching (FRAP), immunofluorescence (IF), Western blotting (WB), and immunoprecipitation (IP).

Graduate Researcher – Prof. Konstantinos Lefkimmiatis' s Laboratory, University of Pavia 09/2021-10/2022

- Developed an *in-silico* workflow to computationally identify and screen for condensate-prone proteins within the human proteome.
- Validated computational predictions by characterizing targeted proteins through immunofluorescence, Western Blotting, and advanced live-cell imaging.

Undergraduate Researcher – Dr. Devrim Gozuacik' s Laboratory, Sabanci University 08/2017-06/2019

- Assisted with projects investigating miRNA-mediated regulation of autophagy in cancer models, gaining proficiency in core techniques like cell culture, Western Blotting, and protein quantification.
- Investigated the potential of miRNAs as biomarkers in bladder and colon cancer, working with both healthy and tumor patient-derived tissues.
- Performed the complete workflow for gene expression analysis, from RNA isolation through to RT-qPCR, to quantify miRNA levels.
- Analyzed biodrop patterns in patient urine and blood samples as a novel method for cancer prognosis.

Skills

Molecular & Cellular Biology

- **Molecular Cloning:** Bacterial Culture, Transformation, Plasmid Purification, Vector/Primer Design, Crispr-Cas9 KO cell line generation
- **Nucleic Acid Analysis:** DNA/RNA Extraction, RT-PCR & qPCR
- **Cell Culture:** Mammalian Cell Culture, Transfection, 3D Hydrogel Models
- **Microscopy & Imaging:** Confocal & Live-Cell Imaging, Immunofluorescence (IF), FRET, FRAP
- **Organelle Dynamics:** Cell Fractionation & Organelle Isolation, cAMP and calcium Imaging on Isolated Organelle

Biochemistry & Protein Analysis

- **Protein Analysis:** Bradford Assay, Total and Fractionated Protein Extraction, Western Blotting (WB), Immunoprecipitation (IP)

Bioinformatics & Data Analysis

- **Environments:** Unix/Linux, Git/GitLab, Jupyter Notebook
- **Software & Languages:** R (R Studio), ImageJ (Fiji), Jalview, MEGA7

Language

- Turkish (Native)
- English (Advanced)
- German (Beginner)

Publications

Abild Meyer C.,# **Bayburtlu D.K.,**# Tsatsani I., Pendlmayr S., Gigliotta A., Di Benedetto G., Daskalakis N.P., Lefkimmiatis K.,* Städler B.* "Reconstructing Organelle Interactions: Mitochondrial Control of Nuclear Calcium in Hydrogel-Based Minimal Systems." *Advanced Materials*, 2026 *(revision submitted).*

Conca, F.,**Bayburtlu, D. K.,** Vismara, M., Surdo, N. C., Tavoni, A., ... & Lefkimmiatis, K. (2025). Phosphatases Control the Duration and Range of cAMP/PKA Microdomains. *Function (Oxford, England)*, *6*(2), zqaf007.

Oral Presentations

Meyer, C. A.*, **Bayburtlu, D.***, Favaro, G., Conca, F., Tavoni, A., Iatrou, A., Daskalakis, N. P., Städler, B. M., & Lefkimmiatis, K. (2025, July). *Development and validation of Inter-organelle Communication Matrixes for studying mitochondrial nuclear communication*. Oral presentation at the HFSP Awardees Meeting, Melbourne, Australia.

Posters

Bayburtlu D.K., Favaro G., Vismara M., Conca F., Tavoni A., Di Benedetto G., Lefkimmiatis K. "Stress-Dependent Regulation of Nuclear Compartmentalization via Biomolecular Condensates." *Poster presentation*, VIMM Retreat, 17th Edition, Galzignano Terme, Padova, Italy.

Bayburtlu, D.K., Conca, F., & Lefkimmiatis, K. (2023, September). *Optimising the isolation of functional nuclei to study nuclear - mitochondria communication*. Poster presented at the ABCD National Congress, Paestum, Italy. (Poster Presenter)

Conca, F., Di Benedetto, G., Iannucci, L.F., Surdo, N.C., **Bayburtlu, D.K.,** Milano, S., Steffan, D., Paoli, C., Scorrano, L., Gerbino, A., Sandri, M., Carrer, A., Bottinelli, R., & Lefkimmiatis, K. (2023, September). *Investigating the basis of nuclear PKA*. Poster presented at the ABCD National Congress, Paestum, Italy.

Verbal Proceeding

Sarigul, H. M., Baykan, O., **Bayburtlu, D. K.,** Haklar, G., & Tinay, I. (2018, October 31-November 4). *The relationship between vitamin D levels and VDR gene polymorphisms on the diagnosis of prostate cancer in patients with elevated PSA levels* [Oral Presentation]. 4th National Urological Surgery Congress, Antalya, Turkey. (Abstract No. SS-160).

References

Konstantinos Lefkimmiatis, PhD
Professor, University of Pavia
Department of Molecular Medicine
E-mail: konstantinos.lefkimmiatis@unipv.it

Devrim Gozuacik, MD PhD
Professor, Koc University,
Department of Medical Biology
E-mail: dgozuacik@ku.edu.tr

Stefano Ciciliot
Associate Professor Universiy of Pavia
Department of Molecular Medicine
E-mail: stefano.ciciliot@unipv.it

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DORUK KAAN BAYBURTLU