Short CV - George Diallinas

Educational trajectory

Prof. Diallinas obtained his **B.Sc in Cell Biology** from Essex University in 1984 and a **M.Sc. in Microbiology** from the Université de Paris Sud-XI in 1985, where he also obtained his **Ph.D. on Molecular Genetics** in 1989, under the supervision of Prof. Claudio Scazzocchio, a leading figure in the field and history of *Fungal Genetics*. After Paris, he worked as a postdoctoral fellow at the Institute of Molecular Biology and Biotechnology (IMBB) in Crete on the regulation of gene expression by amino acid availability in yeast, in the lab of Prof. George Thireos. In 1994-1996 he moved back to the Université de Paris-Sud with a *Marie-Curie* fellowship, where he worked on the development of *Aspergillus nidulans* as a model system to study transporters. In 1997 he returned to IMBB with an extend *Marie-Cure Repatriation Grant*, as a Research Associate, and in 1998 he was elected lecturer at the Department of Biology in the National and Kapodistrian University of Athens (NKUA). From 2013 he is full **Professor at NKUA** and in 2018 he was elected as **EMBO member**. His work is reflected in > 116 scientific publications, >175 presentations in congresses and >36 invited international talks. In 2023 Prof. Diallinas passed in the **2nd round of ERC advanced grants**, but his proposal was not funded.

Research interests and major achievements

Prof. Diallinas pioneered the study of the structure-function relationship of nucleobase and amino acid transporters. He introduced the concept of gates in transporters, establishing the dual importance of elements outside the binding site in transporter specificity. His dissection of the UapA (xanthine-uric acid transporter of Aspergillus nidulans) is unsurpassed among Eukaryotic transporters (Diallinas, TIGS, 2016). This went from the cloning of the cognate gene during his Ph. D. (1989) to the determination of the three-dimensional structure of UapA complexed with xanthine (Algüel et al., Nat. Com. 2016; Dimakis et al., Genetics, 2022). The UapA structure vindicated completely models based on classical and reverse genetics and established an unexpected functional role for dimerization of the UapA molecule. In two subsequent relevant publications the Diallinas group showed that membrane phospholipids have a crucial role in dimerization and sorting of UapA to the plasma membrane (Pyle et al., Cell Chem Biol, 2018; Kourkoulou et al., Genetics, 2019). His group extended structure-function studies in several other transporters, contributing also to an understanding of their molecular and functional evolution. In the recent years, the Diallinas group studies transporters as model membrane cargoes for dissecting subcellular trafficking and turnover mechanisms. In this direction, work by his group led to several original basic findings in cell biology, including the characterization of two distinct mechanisms governing the endocytosis of transporter versus apical cargoes (Martzoukou et al., eLIFE, 2017), as well as, the most recent discovery that transporters traffic to the PM, in specialized COPII vesicles, directly from the ER, bypassing the Golgi (Dimou et al., EMBO R 2020; Dimou et al., Front Cell Dev Biol, 2022; Sagia et al., Review Commons, 2024).

Current composition of the laboratory

Prof. George Diallinas, PI Georgia Sagia, PhD candidate, 2022-2026 Xenia Georgiou, PhD candidate, 2022-2026 George Broutzakis, PhD candidate, 2022-2026 Yiannis Pyrris, PhD candidate, 2022-2026 Dr. Sofia Dimou, postdoc fellow, 2023-2025 Sofia Politi, MSc student 2024-2025

Organisation of scientific meetings

- 2001 President of the organizing and scientific committee, 19th Small Meeting on Yeast Transport and Energetics (SMYTE), Chania, Crete, Greece.
- 2013 Member of the organizing and scientific committee of the 62th Scientific Conference of the Hellenic Society of Biochemistry & Molecular Biology.
- 2016 President of the organising and scientific committee, 34th Small Meeting on Yeast Transport and Energetics (SMYTE), Chania, Crete, Greece.
- 2018 Co-organizer and member of scientific committee, 36th Small Meeting on Yeast Transport and Energetics (SMYTE), Martina Franca, Italy.
- 2022 Organizer and member of scientific committee of EMBO Workshop on *Membrane* transporters as essential elements of cellular function and homeostasis, 23 – 27 August 2022, Chania, Greece, <u>https://meetings.embo.org/event/21-membrane-transporters</u>
- 2025 Organizer and member of scientific committee of International Fungal Biology Conference (IFBC), 27-30 September 2025, Chania, Greece

Awards

1985-1986	Onassis Foundation Fellowship for Ph.D studies
1986-1989	EU Action Fellowship for Ph.D. studies
1994-1996	Training and Mobility of Research Post-doc Grant
1996-1997	Training and Mobility of Research Return Grant ERB4001gt951247
2002 -2003	Archimedes E.U. Award (www.cordis.lu/improving/awards/home.htm)
2010-2011	"John S. Latsis" Public Benefit Foundation Research Award
2014-2016	Fondation Santé Research Award
2018-2020	Fondation Santé Research Award
2018-2022	Fondation Santé Research Award
2017-2021	"Stavros Niarchos Foundation" Grant for Research Excellence
2018-	EMBO member election
2018-2019	EMBO short term fellowship
2023	EMBO keynote speaker at European Conference Fungal Genetics, Innsbruck (AU)
2024	EMBO lecture series and EMBO in Rome & Parma (IT),
2024	EMBO keynote speaker at SMYTE, York (UK)
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Sabbaticals

Prof. C. Delidakis lab, IMBB-FORTH, Heraklio Crete, Greece (4 months 2005)

Prof. M Casal lab, University of Minho, Braga, Portugal (6 months, 2009/10)

Prof. R. Percudani, University of Parma, Italy (2 months, 2018/19)

Invited presentations (last 10 years)

- 12th European conference on Fungal Genetics, March 2014, Seville, Spain,
- 1st Proteostasis Meeting, Cost proteostasis action bm1307, 2014, Valencia, Spain,
- •4th International Workshop Expression and Function Membrane Protein, September 2014, Florence, Italy,
- •13th European Fungal Genetics Conference, April, 2016, Paris, France,
- Unconventional Protein and Membrane Traffic, October 2016 Lecce, Italy
- Special Molecular Genetics course on Transporters, BOKU University Vienna, June 2017, Austria.

- 14th European Fungal Genetics Conference, Haifa, April, 2018, Israel.
- EMBO new members meeting, October 2108, Heidelberg, Germany.
- Instituto Gulbenkian (IGC), June 2019, Lisbon, Portugal
- EMBO Workshop on Membrane transporters as essential elements of cellular function and homeostasis, August 2022, Chania, Greece
- EMBO Workshop on The endoplasmic reticulum, October 2022, Lucca, Italy.
- Plenary lecture in 16th European Conference on Fungal Genetics, March 2023, Innsbruck, Austria.
- Lecture at the University of Münster, June 2023, Münster, Germany.
- Lecture at Imperial College, December 2023, London, UK.
- EMBO lecture series and EMBO May 2024, Rome & Parma, Italy.
- EMBO key note speaker at SMYTE 2024, August 2024, York, UK.
- Lecture in University of Manchester, September 2024, Manchester, UK.
- Key note speaker, Molecular Biology of Fungi, September 2024, Kiel, Germany.

Major collaborations

Prof. E. Mikros, *Molecular Dynamics & Rational Drug Design*, School of Pharmacy, NKUA, Greece

Prof. B. Byrne, Crystallography & Structural Biology, Imperial College, London, UK

Prof. A. Cameron, Structural Biology, Warwick University, UK

Prof. C. Scazzocchio, Fungal Genetics, Imperial College, London, UK

Prof. B. Andrè, *Transporters*, Université Libre de Bruxelles, Belgium

Prof. S. Paiva, Transporters and membrane trafficking, University of Minho, Braga, Portugal

Prof. R. Percudani, Biochemical Phylogenetics, University of Parma

Prof. N. Takeshita, PALM microscopy and trafficking, University of Tsukuba, Japan

Prof. A. Politis, HDX exchange structural studies, University of Manchester, UK

Prof. C. Pliotas, EPS-Peldor structural studies, University of Manchester, UK

Prof. P. Ljungdahl, Transporter trafficking, SciLifeLab, Stocholm, Sweden

Dr. A. Pittis, Phylogenetics, glycoproteomics, single nuclei transcriptomics, IMMB (GR) & EMBL (GE)

Prof. E. Sezgin, reconstitution in vesicles, membrane dynamics, SciLifeLab, Stocholm, Sweden

Prof. E. Miller, microsome assays and COPII structure-function, University of Dundee, UK

Prof. C. Gatsogiannis, membrane protein purification & cryoEM, University of Münster, Germany

Prof. S. Wegner, *reconstitution in LUV/GUVs*, University of Münster, Germany (in **bold** highly relevant to the present proposal)

Contributions to the research community

<u>Supervision</u>: i) 30 PhDs (5 on-going) and Member of the Advisory Committee for 33 more PhDs, ii) 20 MSc students & 86 Diploma (BSc) students, iii) 16 Erasmus training students, Department of Biology, NKUA, Greece & Department of Biology, University of Minho, Braga, Portugal. <u>Teaching</u>: General Microbiology, Molecular Microbiology *(undergraduate courses)* in the Department of Biology, NKUA, Athens, Greece. Several *Master/PhD courses* (Model Microbial Organisms, Fungal Genetics, Plant Molecular Biology, Cell Biology, etc.) in the Department of Biology, National and Kapodistrian University of Athens, in the Departments of Biology of Patras, Heraklio and Ioannina, the Department of Biology of the University of Minho in Braga, (Portugal), and the Department of Biology of BOKU University in Vienna.

<u>Contribution to early career of researchers</u>. Most ex-PhD students (M. Koukaki, S. Amillis, A. Pantazopoulou, S. Goudela (Gkountela), I. Papageorgiou, Z. Erpapazoglou, N.D. Lemuh, A.Vlanti, G. Anosontzis, C. Gournas, E. Krypotou, M. Evangelinos, O. Martzoukou, G. Papadaki, MA Dionysopoulou) moved to excellent labs in Europe or USA, performing high quality basic research as post-docs/researchers o or group leaders (University of Oxford UK, CIB-CSIC Madrid; Institut Jacques Monod-CNRS Universités Paris 7; Uppsala Biomedical Center, UCLA USA; University of Washington USA; University of Chicago, Université Libre de Bruxelles, IMBB-Crete Greece; IIBEA-Athens Greece, NCRS Democritus, Athens Greece). Several of my ex-Diploma students presently perform top research at prestigious Institutions, such as EBML, MRC, Harvard University, Centre for Genomic Regulation, etc. (A. Pittis, V. Bitsikas, K. Kagias, J. Bobonis, G. Rapti).

Other

Departmental responsible for the **Erasmus+ program**, Department of Biology, NKUA Coordinating, Committee of the "Microbial Biotechnology" Master programme, NKUA Advisory/Scientific Board of the Hellenic Institut Pasteur and he European University of Cyprus Reviewer for: *Nature, Nat Com, Science, eLife, J Mol Biol, Mol Microbiol, J Microbiol Mol Gen Gen, FEMS Microbiology Reviews, Fungal Gen Biol*, etc.

Editorial board of Molecular Membrane Biology, Microbial Cell.

Scientific Evaluator of the Greek Ministry of Education (General Secretary of Research, ELIDEK), USDA-USA, the Austrian Science Fund (FWF), The Research Foundation - Flanders (FWO), the Greek Organization of Pharmaceuticals (EOF), etc.

• Recent selected publications

- 1. Broutzakis G, Pyrris Y, Akrani A, Mikros E, Diallinas G, Gatsogiannis C. High-resolution structures of the UapA elevator-type purine transporter rationalize the importance of the cytosolic N-terminus in trafficking and transport activity. Nat Commun 2024 (submitted).
- Sagia GM, Georgiou P, Chamilos G, Diallinas G, Dimou S. Neosynthesized polar and nonpolar plasma membrane cargoes follow distinct trafficking routes in Aspergillus nidulans. BioRxiv 2024.04.24.590866; doi: <u>https://doi.org/10.1101/2024.04.24.590866</u> (and under minor revision in EMBO R).
- Zantza I, Pyrris Y, Raniolo S, Papadaki GF, Lambrinidis G, Limongelli V, Diallinas G, Mikros E. Uracil/H⁺ symport by FurE refines aspects of the rocking-bundle mechanism of APC-type transporters. J Mol Biol. 2023 Aug 4:168226. doi: 10.1016/j.jmb.2023.168226.
- Dionysopoulou M, Yan N, Wang B, Pliotas C, Diallinas G. Genetic and cellular characterization of MscS-like putative channels in the filamentous fungus Aspergillus nidulans. Channels (Austin). 2022 Dec;16(1):148-158. doi: 10.1080/19336950.2022.2098661.
- 5. Dimakis D, Pyrris Y, Diallinas G. Transmembrane helices 5 and 12 control transport dynamics, substrate affinity, and specificity in the elevator-type UapA transporter. Genetics. 2022 Aug 30;222(1):iyac107. doi: 10.1093/genetics/iyac107.
- Dimou S, Dionysopoulou M, Sagia GM, Diallinas G. Golgi-Bypass Is a Major Unconventional Route for Translocation to the Plasma Membrane of Non-Apical Membrane Cargoes in Aspergillus nidulans. Front Cell Dev Biol. 2022 Apr 7;10:852028. doi: 10.3389/fcell.2022.852028.
- Barata-Antunes C, Talaia G, Broutzakis G, Ribas D, De Beule P, Casal M, Stefan CJ, Diallinas G, Paiva S. Interactions of cytosolic tails in the Jen1 carboxylate transporter are critical for trafficking and transport activity. J Cell Sci. 2022 May 15;135(10):jcs260059. doi: 10.1242/jcs.260059.
- Dimou S, Georgiou X, Sarantidi E, Diallinas G, Anagnostopoulos AK. Profile of Membrane Cargo Trafficking Proteins and Transporters Expressed under N Source Derepressing Conditions in Aspergillus nidulans. J Fungi (Basel). 2021 Jul 14;7(7):560. doi: 10.3390/jof7070560.
- 9. Diallinas G. Transporter Specificity: A Tale of Loosened Elevator-Sliding. Trends Biochem Sci. 2021 Sep;46(9):708-717. doi: 10.1016/j.tibs.2021.03.007.
- Kourkoulou A, Zantza I, Foti K, Mikros E, Diallinas G. Context-dependent Cryptic Roles of Specific Residues in Substrate Selectivity of the UapA Purine Transporter. J Mol Biol. 2021 Aug 6;433(16):166814. doi:10.1016/j.jmb.2021.166814.
- 11. Dimou S, Martzoukou O, Dionysopoulou M, Bouris V, Amillis S, Diallinas G. Translocation of nutrient transporters to cell membrane via Golgi bypass in Aspergillus nidulans. EMBO Rep. 2020 Jul 3;21(7):e49929. doi: 10.15252/embr.201949929.
- Kourkoulou A, Grevias P, Lambrinidis G, Pyle E, Dionysopoulou M, Politis A, Mikros E, Byrne B, Diallinas G. Specific Residues in a Purine Transporter Are Critical for Dimerization, ER Exit, and Function. Genetics. 2019 Dec;213(4):1357-1372. doi: 10.1534/genetics.119.302566.
- 13. Diallinas G, Martzoukou O. Transporter membrane traffic and function: lessons from a mould. FEBS J. 2019 Dec;286(24):4861-4875.doi: 10.1111/febs.15078.

- 14. Dimou S, Kourkoulou A, Amillis S, Percudani R, Diallinas G. The peroxisomal SspA protein is redundant for purine utilization but essential for peroxisome localization in septal pores in Aspergillus nidulans. Fungal Genet Biol. 2019 Nov;132:103259. doi: 10.1016/j.fgb.2019.103259.
- 15. Papadaki GF, Lambrinidis G, Zamanos A, Mikros E, Diallinas G. Cytosolic N- and C-Termini of the Aspergillus nidulans FurE Transporter Contain Distinct Elements that Regulate by Long-Range Effects Function and Specificity. J Mol Biol. 2019 Sep 6;431(19):3827-3844. doi: 10.1016/j.jmb.2019.07.013.
- 16. Mikros E, Diallinas G. Tales of tails in transporters. Open Biol. 2019 Jun 28;9(6):190083. doi: 10.1098/rsob.190083.
- 17. Martzoukou O, Diallinas G, Amillis S. Secretory Vesicle Polar Sorting, Endosome Recycling and Cytoskeleton Organization Require the AP-1 Complex in Aspergillus nidulans. Genetics. 2018 Aug;209(4):1121-1138. doi: 10.1534/genetics.118.301240.
- Kourkoulou A, Pittis AA, Diallinas G. Evolution of substrate specificity in the Nucleobase-Ascorbate Transporter (NAT) protein family. Microb Cell. 2018 Mar 22;5(6):280-292. doi: 10.15698/mic2018.06.636.
- Pyle E, Kalli AC, Amillis S, Hall Z, Lau AM, Hanyaloglu AC, Diallinas G, Byrne B, Politis A. Structural Lipids Enable the Formation of Functional Oligomers of the Eukaryotic Purine Symporter UapA. Cell Chem Biol. 2018 Jul 19;25(7):840-848.e4. doi: 10.1016/j.chembiol.2018.03.011.
- Papadaki GF, Amillis S, Diallinas G. Substrate Specificity of the FurE Transporter Is Determined by Cytoplasmic Terminal Domain Interactions. Genetics. 2017 Dec;207(4):1387-1400. doi: 10.1534/genetics.117.300327.
- 21. Talaia G, Gournas C, Saliba E, Barata-Antunes C, Casal M, André B, Diallinas G, Paiva S. The α-Arrestin Bul1p Mediates Lactate Transporter Endocytosis in Response to Alkalinization and Distinct Physiological Signals. J Mol Biol. 2017 Nov 24;429(23):3678-3695. doi: 10.1016/j.jmb.2017.09.014
- 22. Diallinas G. Transceptors as a functional link of transporters and receptors. Microb Cell. 2017 Mar 1;4(3):69-73. doi: 10.15698/mic2017.03.560.
- 23. Martzoukou O, Amillis S, Zervakou A, Christoforidis S, Diallinas G. The AP-2 complex has a specialized clathrin-independent role in apical endocytosis and polar growth in fungi. Elife. 2017 Feb 21;6:e20083. doi: 10.7554/eLife.20083.
- 24. Sioupouli G, Lambrinidis G, Mikros E, Amillis S, Diallinas G. Cryptic purine transporters in Aspergillus nidulans reveal the role of specific residues in the evolution of specificity in the NCS1 family. Mol Microbiol. 2017 Jan;103(2):319-332. doi: 10.1111/mmi.13559
- 25. Diallinas G. Dissection of Transporter Function: From Genetics to Structure. Trends Genet. 2016 Sep;32(9):576-590. doi: 10.1016/j.tig.2016.06.003.
- 26. Alguel Y, Amillis S, Leung J, Lambrinidis G, Capaldi S, Scull NJ, Craven G, Iwata S, Armstrong A, Mikros E, Diallinas G, Cameron AD, Byrne B. Structure of eukaryotic purine/H(+) symporter UapA suggests a role for homodimerization in transport activity. Nat Commun. 2016 Apr 18;7:11336. doi: 10.1038/ncomms11336.
- 27. Evangelinos M, Martzoukou O, Chorozian K, Amillis S, Diallinas G. BsdA(Bsd2)dependent vacuolar turnover of a misfolded version of the UapA transporter along the secretory pathway: prominent role of selective autophagy. Mol Microbiol. 2016 Jun;100(5):893-911. doi: 10.1111/mmi.13358

- Martzoukou O, Karachaliou M, Yalelis V, Leung J, Byrne B, Amillis S, Diallinas G. Oligomerization of the UapA Purine Transporter Is Critical for ER- Exit, Plasma Membrane Localization and Turnover. J Mol Biol. 2015 Aug 14;427(16):2679-96. doi: 10.1016/j.jmb.2015.05.021.
- 29. Kankipati HN, Rubio-Texeira M, Castermans D, Diallinas G, Thevelein JM. Sul1 and Sul2 sulfate transceptors signal to protein kinase A upon exit of sulfur starvation. J Biol Chem. 2015 Apr 17;290(16):10430-46. doi: 10.1074/jbc.M114.629022.
- 30. Krypotou E, Evangelidis T, Bobonis J, Pittis AA, Gabaldón T, Scazzocchio C, Mikros E, Diallinas G. Origin, diversification and substrate specificity in the family of NCS1/FUR transporters. Mol Microbiol. 2015 Jun;96(5):927-50. doi:= 10.1111/mmi.12982.
- 31. Diallinas G. Understanding transporter specificity and the discrete appearance of channellike gating domains in transporters. Front Pharmacol. 2014 Sep 12;5:207. doi: 10.3389/fphar.2014.00207.
- 32. Krypotou E, Lambrinidis G, Evangelidis T, Mikros E, Diallinas G. Modelling, substrate docking and mutational analysis identify residues essential for function and specificity of the major fungal purine transporter AzgA. Mol Microbiol. 2014 Jul;93(1):129-45. doi: 10.1111/mmi.12646.
- *A PubMed link to the entire bibliography of the investigator* <u>https://pubmed.ncbi.nlm.nih.gov/?term=diallinas+g&sort=date</u>
- Existing funding
- 1. H.F.R.I. Research Projects to support Faculty Members and Researchers (March 2022-February 2025)
- 2. H.F.R.I. "Science and Society" Action "Always strive for excellence Theodoros Papazoglou" (January 2025-August 2025)
- Pending grant applications
- 1. H.F.R.I. procurement of High Value Research Equipment (2024-2026) 500,000 euros
- 2. "Trust you Stars"-ЕПЕАЕК-(2024-2025)
- 3. ERC advanced grant 2025-2030