Illuminating host defence against mycobacterial infection: interactions with autophagy and LC3-associated phagocytosis

Muñoz Sánchez, S.

APPENDIX

Acknowledgement

I would like to express my sincere gratitude to Prof. Dr Annemarie Meijer for the opportunity to join her group and for her supervision throughout this project, as well as for her steady encouragement at moments when continuing felt most difficult. I am deeply thankful to Dr Michiel van der Vaart for his kindness, guidance, and thoughtful advice. I also wish to thank Ulrike Nehrdich, fish facility caretaker, for her dedication and assistance, as well as Dr Mónica Varela and Dr Erin Faught for their collaboration and invaluable help in overcoming the many professional and personal challenges encountered during this PhD. I am also grateful to all the members of the Animal Sciences research cluster, professors and students, whose constructive feedback enriched my work. In particular, I thank Wanbin Hu and Patrick van Hage, my paranymphs, for their kindness and for standing by me on this important occasion. I am particularly grateful to the students I had the opportunity to supervise, whose curiosity and enthusiasm reminded me of the joy of scientific discovery. In particular, I thank Myrto Katsipoulaki, whose thoughtful questions and empathy were invaluable during the final stages of this project.

I extend my appreciation to Prof. Dr Miguel Allende and Florencio Espinoza at the University of Chile for their early counsel and support, which helped transform my ambitious goals into reality. I am profoundly thankful to my friends in Chile: Valeria Polanco, Carlos Muñoz, Estephanie García, Felipe Maza, and Nicolás Cumplido for their unwavering encouragement and faith in me, often greater than my own. I am equally grateful to my aunts and cousins, who have always celebrated my achievements with pride and affection.

Finally, my heartfelt gratitude goes to my mother, Leonor Sánchez, and my brother, Edgardo Muñoz, for their unconditional love and for never allowing me to feel guilty for pursuing my path far from home. To Alberto Mosquera, with whom I built a home away from home, I am deeply thankful for his patience and loving care throughout this time. I am also deeply grateful to Olivia Larraín, whose aid and insight helped me find balance and perspective along the way.

This endeavour has reminded me that growth is rarely linear, and that hope, together with courage and kindness, transforms diligence into meaning, a lesson for which I am most grateful.

Curriculum vitae

Salomé Muñoz Sánchez was born in Santiago, Chile, on September 22, 1988. After completing high school at Liceo Carmela Carvajal de Prat in 2007, she was awarded an Academic Excellence Scholarship to pursue a Bachelor's degree in Biotechnology and Molecular Biology Engineering at her alma mater, the Faculty of Science, University of Chile. During her undergraduate studies, she completed a research internship under the supervision of Prof. Dr Miguel L. Allende Connelly, where she was first introduced to the zebrafish model organism, an experience that sparked her enduring interest in developmental biology and immunology. She continued at the University of Chile for her Master's degree, carrying out the project *"Molecular markers associated with differential inflammatory response mechanisms in zebrafish larvae"* at the Centre for Genome Regulation under Prof. Allende's supervision. She then worked as a research assistant in the Laboratory of Developmental Biology, contributing to the FONDECYT project *"Molecular characterisation of neutrophils during inflammation and resolution in vivo."* Alongside her research, she co-managed the fish facility and laboratory. In 2017, she moved from South America to Europe to begin her PhD at Leiden University, after being awarded a Marie Sklodowska-Curie fellowship within the ImageInLife European Training Network (Horizon 2020). Her doctoral research was carried out under the supervision of Prof. Dr Annemarie Meijer, with Dr Michiel van der Vaart as co-promotor. During her PhD, she presented part of her work at the Nordic Autophagy Society (NAS), supervised bachelor's and master's students, and contributed to teaching practical courses in immunobiology and microscopy. This thesis presents the research carried out during her doctoral studies at Leiden University.

List of publications

Manuscripts described in this thesis

Muñoz-Sánchez, S., van der Vaart, M., & Meijer, A. H. (2020). Autophagy and Lc3-Associated Phagocytosis in Zebrafish Models of Bacterial Infections. *Cells*, *9*(11), 2372. https://doi.org/10.3390/cells9112372

Muñoz-Sánchez, S., Varela, M., van der Vaart, M., & Meijer, A. H. (2023). Using Zebrafish to Dissect the Interaction of Mycobacteria with the Autophagic Machinery in Macrophages. *Biology*, *12*(6), 817. https://doi.org/10.3390/biology12060817

Other publications

Cumplido, N., Arratia, G., Desvignes, T., **Muñoz-Sánchez, S.**, Postlethwait, J. H., & Allende, M. L. (2024). *Hox* genes control homocercal caudal fin development and evolution. *Science advances*, *10*(3), eadj5991. https://doi.org/10.1126/sciadv.adj5991

Araujo, M. H., **Muñoz-Sánchez, S.**, Simão, T. L. B. V., Nowik, N., Antunes, S. S., Pinto, S. C., Sorze, D., Boldrin, F., Manganelli, R., Correia Romeiro, N., Lasunskaia, E. B., Verbeek, F. J., Spaink, H. P., & Muzitano, M. F. (2024). Exploring the Antimycobacterial Potential of Podocarpusflavone A from *Kielmeyera membranacea*: In Vitro and In Vivo Insights. *Pharmaceuticals (Basel, Switzerland)*, *17*(12), 1560. https://doi.org/10.3390/ph17121560

Michiel van der Vaart, Adrianna Banducci-Karp, Gabriel Forn-Cuní, Philip M. M. Witt, Joost J. Willemse, **Salomé Muñoz Sánchez**, Rohola Hosseini, Annemarie H. Meijer. DRAM1 requires PI(3,5)P_2 generation by PIKfyve to deliver vesicles and their cargo to endolysosomes. bioRxiv 2020.12.15.422832. https://doi.org/10.1101/2020.12.15.422832

Paredes-Zúñiga, S., Morales, R. A., **Muñoz-Sánchez, S.**, Muñoz-Montecinos, C., Parada, M., Tapia, K., Rubilar, C., Allende, M. L., & Peña, O. A. (2017). CXCL12a/CXCR4b acts to retain neutrophils in caudal hematopoietic tissue and to antagonize recruitment to an injury site in the zebrafish larva. *Immunogenetics*, *69*(5), 341–349. https://doi.org/10.1007/s00251-017-0975-9

Carrillo, S. A., Anguita-Salinas, C., Peña, O. A., Morales, R. A., **Muñoz-Sánchez, S.**, Muñoz-Montecinos, C., Paredes-Zúñiga, S., Tapia, K., & Allende, M. L. (2016). Macrophage Recruitment Contributes to Regeneration of Mechanosensory Hair Cells in the Zebrafish Lateral Line. *Journal of cellular biochemistry*, *117*(8), 1880–1889. https://doi.org/10.1002/jcb.25487