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Metabolism and lipid mediators as regulators of innate immune cell function: implications for inflammation and immune responses

Almeida, L.

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Curriculum Vitae

Luís Pedro Ferreira de Almeida was born on 7th June 1996 in Lisbon, Portugal. He obtained his highschool diploma at the Escola Secundária de Miraflores (now called Escola Secundária Professor Santana Castilho) in 2014. A few months later he started his bachelor's in Biochemistry at the Faculty of Sciences of the University of Lisbon. He was the only one in a class of >70 Biochemistry students to obtain the maximum possible grade (20 out of 20) in the Bioenergetics and Metabolic Regulation course. After successfully completing his bachelor's in 2017, and not being able to decide between immunology and metabolism, he decided to set a course towards infectious diseases and immunometabolism. That is why, still in 2017, he joined a binational master's programme in infection biology, where he studied for one year at the Catholic University of Córdoba, in Argentina, and for another year, at the Hannover Medical School, in Germany. It was also in Hannover where he did is master's thesis, at the TWINCORE institute, in the lab of Prof. dr. med. Tim Sparwasser, where he studied how proteins from tuberculosis modulated the differentiation and activation of T cells. In 2019 he successfully completed his master's, having defended his thesis with the title "The immunomodulatory properties of *Mycobacterium tuberculosis* secretory proteins". Still in 2019, he started his PhD, as part of a Marie Skłodowska-Curie consortium, in the group of Dr. Bart Everts, at the department of Parasitology (now called LUCID), at the Leiden University Medical Centre. There he studied how metabolism and lipid mediators could regulate the function of macrophages and dendritic cells in the context of infectious diseases and chronic inflammation. The results of his research are described here in this thesis. Luís plans to use the knowledge and skills he obtained during his PhD to continue advancing translational research and finding possible new therapeutic strategies to treat immune-related diseases.

Portfolio

Mandatory courses

- Leiden University Onboarding Programme Inform & Connect 2021
- Basic Methods and Reasoning in Biostatistics 2022
- Responsible Research
  - Research Regulations and Practical Implications in the LUMC 2023
  - Data Management Workshop 2024

Generic/disciplinary courses

- Advanced Course Infection, Immunity and Tolerance 2020
- ArthritisHeal Biostatistics and Bioinformatics Workshop 2021
- Business and Career Development Workshop 2022

Attended lectures, LUMC presentations, participation in meetings

- Rheumatology Workshop 2020
- ArthritisHeal Consortium Final Meeting 2022

Congress attendance and poster or oral presentations

- LIPID MAPS Spring School 2021 2021
- 34th European Macrophage and Dendritic Cell Society 2021
- VIB Translational Immunology Conference 2021 2021
- NVVI Annual Meeting 2021-2022 2022
- 8th European Workshop on Lipid Mediators 2022
- NVVI Annual Meeting 2022 2022
- Joint Belgian-Dutch Immunology Meeting 2023 2023

Traineeship abroad

- Beckman Coulter Secondment (Marseille) 2020

Lecturing, lab assistance, student supervision

- B.Sc. Jochem Grossouw 2022
- Half-Minor HIV Flow-Cytometry Demonstration 2023 2023
- Half-Minor HIV Flow-Cytometry Demonstration 2024 2024

List of Publications

Bacon A*, **Almeida L***, Ghorasaini M, Toes REM, Everts B, Giera M. Comprehensive lipidomic profiling reveals distinct metabolic remodeling during differentiation and polarization of human monocyte-derived macrophages. J Proteome Res. 2026. *Shared first authorship

Almeida L*, Bacon A*, Ghorasaini M, van der Ham AJ, Toes REM, Giera M, Everts B. IgA2 ACPA drives a hyper-inflammatory phenotype in macrophages via ATP synthase and COX2. Eur J Immunol. 2025. *Shared first authorship

Geyer CE, **Almeida L***, Mes L*, […] Everts B, den Dunnen J. Hyper-inflammation by human macrophages induced by SARS-CoV-2 anti-spike IgG is dependent on glucose and fatty acid metabolism. Eur J Immunol. 2025. *Shared second authorship

Naar CM, van Schuijlenburg R, van Meerbeek M, **Almeida L**, van Leeuwen FWB, Roestenberg M. A Trojan horse: Chemical boosting of *Plasmodium falciparum* whole sporozoite vaccine immunogenicity. Biomed Pharmacother. 2025

Almeida L, van Roey R, Patente TA, […] Giera M, Hokke CH, Everts B. High-mannose glycans from *Schistosoma mansoni* eggs are important for priming of Th2 responses via Dectin-2 and prostaglandin E2. Front Immunol. 2024

Heieis GA, Patente TA, **Almeida L**, Vrieling F, Tak T, Perona-Wright G, Maizels RM, Stienstra R, Everts B. Metabolic heterogeneity of tissue-resident macrophages in homeostasis and during helminth infection. Nat. Commun. 2023

Almeida L, Everts B. Fa(c)t checking: How fatty acids shape metabolism and function of macrophages and dendritic cells. Eur J Immunol. 2021

Acknowledgements

While many think a PhD is an individual achievement, those that go through its motions quickly realise that *no man is an island*, and that a PhD cannot be done without the help and support of many.

Bart, thank you for your constant support, both professional and personal, this PhD is not only proof that you helped me evolve as a scientist, but also as a person. As I said several times over the years, I couldn't have asked for a better supervisor, and if there's one thing I'll miss from the PhD, it will definitely be our one-on-one meetings, not just for the nice scientific discussions, but for all the talks, and funny stories.

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Thiago and Graham, the group's two resident postdocs. Thiago, for always being willing to lend a hand with anything, for being the only other Lusophone with whom I could talk in Portuguese (my accent permitting), and for all the talks and jokes about Brazil and Portugal. Graham, for being the only other group member on the macrophage camp, for all the talks going from science to literature and, above all, for having introduced me (and many others) to the wonders of Scotland.

Eline, thank you for the sailing trips, your amazing friendship and inspiration; you made my PhD memorable, and continue to inspire me with your positivity and confidence (except when you deny that macrophages > DCs).

Irene, thank you for the jokes, the conversations, the dinners and *especially* the Iberian delicacies, which helped kill the *saudades* of this expatriated Portuguese.

Natalia, my Gen Z friend. Thank you for all the moments, the interesting talks, the memes and the witty banter.

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