

CV Date	15/10/2024
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Part A. PERSONAL INFORMATION

First Name	Miguel		
Family Name	Álvaro Benito		
Sex	Male	Date of Birth	17/02/1982
ID number Social Security, Passport	70242520z		
URL Web			
Email Address	migalv07@ucm.es		
Open Researcher and Contributor ID (ORCID)	0000-0002-6019-3567		

A.1. Current position

Job Title	Atracción de Talento CAM, modalidad 1		
Starting date	2023		
Institution	Universidad Complutense de Madrid		
Department / Centre	Inmunología, Oftamología, ORL / Facultad de Medicina		
Country		Phone Number	
Keywords	Molecular mechanism of disease; Functional biology; Cell biology; Molecular biology; Proteomics		

A.2. Previous positions (Research Career breaks included)

Period	Job Title / Name of Employer / Country
2021 - 2023	Junior Group Leader / Freie Universität Berlin
2013 - 2021	Postdoctoral Research Associate and Lecturer / Freie Universität Berlin
2012 - 2013	Postdoctoral Research Associate and Lecturer / Freie Universität Berlin
2011 - 2011	Postdoctoral Research Associate / Centro de Biología Molecular Severo Ochoa
2008 - 2011	PhD Student. Personal Investigador en Formación, CAM / Centro de Biología Molecular Severo Ochoa
2006 - 2007	Research Associate / Universidad Autónoma de Madrid

A.3. Education

Degree/Master/PhD	University / Country	Year
Biología Molecular	Universidad Autónoma de Madrid	2011
Licenciado en Bioquímica	Universidad Autónoma de Madrid	2005

Part B. CV SUMMARY

I am a Junior Group Leader with a consolidated and independent research line. My investigations address mechanistic and translational aspects of antigen presentation. I am interested on the link between individual's antigen presenting profiles and the corresponding antigen-specific T cell responses, particularly in their impact for clinically-relevant conditions. I currently apply this knowledge to understand personalized immune responses in the context of infections and allo-Hematopoietic Stem Cell Transplantation (allo-HSCT) and Viral responses. During my career I have been responsible for teaching, implementing and organizing lectures, seminars, and practica in different Study programs and countries (Biology, Biochemistry, Food and Technology, Pharmacy). My commitment to train the next generation of researchers is exemplified by the considerable number of works directed. To date, I have supervised 8 MSc and BSc thesis, supervised more than 15 research internships and mentored 3 PhD students. I received both my R3 certificate from the AEI, and PTU from the ANECA. Currently, I am pursuing my Habilitation in Germany.

My scientific productivity reaches 27 items, including two book chapters and 25 papers mainly in Q1 journals (**Multidisciplinary: Nat Comms (IF: 17.9); Immunology: Cell Mol Immunol (IF:22.1), npj Vaccines (IF: 9.4), Front Immunol (IF: 8.7); Chemistry and Biochemistry: Nat Chem Biol (16.9), Angew Chem (IF: 16.8), J Mat Chem B (IF: 7.5), J Biol Chem (IF: 5.4); Genetics: HLA: (IF: 9.2), Front Genet (IF: 4.7). Applied Microbiology: Appl Environ Microb (IF: 4.4), Appl Microbiol Biotech (IF:5.5)**). These publications in journals include 20 research papers, 4 reviews (2 invited), and one commentary (invited). I am first author of 11, and corresponding of 7 of the published documents. This scientific production spans at least three different fields of research: Microbial Biotechnology, Biochemistry, and Immunology, reflecting my multidisciplinary scientific background. Altogether, these research items have been cited over 1900 times (> 70 cites per item) resulting in a h index of 16 (i10 of 21). Not only my research resulted in academic publications but am I co-inventor of two licensed patents (one of them with PCT coverage) and one patent application. Furthermore, I have led the conceptualization, and participated from the implementation of an open-source software for the analysis of immunopeptidomics data (available in: <https://plateau.bcp.fu-berlin.de/>).

I was awarded as PI a John Hansen Research Grant by the Deutsche Knochenmarkspende Stiftung Leben Spenden (DKMS-SLS) in 2021. This prestigious and international grant is granted yearly and world-wide to four young researchers to advance our knowledge on different aspects of hematological malignancies. Coming from a basic-research environment this grant highlights my interest and capacity to bridging the gap between basic molecular and mechanistic insights to their impact on biomedical research. Throughout my career I have participated as researcher in more than 10 research projects financed via competitive calls. In 2022 I was awarded with a Type 1 Atracción de Talento research contract and project from the Comunidad Autónoma de Madrid to work in the Department of Immunology, Ophthalmology and ENT of the school of Medicine of the Universidad Complutense de Madrid. I am ascribed to the I+12 Biomedical Research Institute and recently, I have been selected as PI to carry on with this research on the "Proyectos de Investigación de la Agencia Española en Salud" through the ISCIII on its program PI2024. This project will begin on the first quarter of 2025 and will provide continuity to the research initiated on my previous institutions, including relevant international collaborations. My current work at these institutions will elaborate on my interest on linking genetic and molecular insights to health and disease conditions in humans.

Part C. RELEVANT ACCOMPLISHMENTS

C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (n° x / n° y): position / total authors. If applicable, indicate the number of citations

- 1 Scientific paper.** Miriam Bertazzon; Almudena Hurtado-Picó; Carlos Plaza-Sirvent; et al; Christian Freund. 2024. The nuclear GYF protein CD2BP2/U5-52K is required for T cell homeostasis. *Frontiers in Immunology*. 15, pp.1415839. <https://doi.org/10.3389/fimmu.2024.1415839>
- 2 Scientific paper.** Esam T Abualrous; Sebastian Stolzenberg; Jana Sticht; et al; Christian Freund; (13/16) Miguel Álvaro-Benito. 2023. MHC-II dynamics are maintained in HLA-DR allotypes to ensure catalyzed peptide exchange. *Nature Chemical Biology*. 19-10, pp.1196-1204. Google Scholar (5) <https://doi.org/10.1038/s41589-023-01316-3>
- 3 Scientific paper.** (1/1) Miguel Álvaro-Benito (AC). 2022. Natural variation of ncHLAII molecules: challenges and perspectives. *Cellular and Molecular Immunology*. 19-12, pp.1432-1434. <https://doi.org/10.1038/s41423-022-00910-0>

- 4 **Scientific paper.** Jan Bierlmeier; (2/7) Miguel Álvaro-Benito; Maren Scheffler; Kristina Sturm; Luisa Rehkopf; Christian Freund; Dirk Schwarzer. 2021. Sortase mediated multi-fragment assemblies by ligation site switching. *Angewandte Chemie International Edition*. 60-e202109032. Google Scholar (9) <https://doi.org/10.1002/anie.202109032>
- 5 **Scientific paper.** Felix Reisbeck; Stefanie Wedepohl; Ann-Cathrin Schmitt; Jens Dervede; (5/7) Miguel Álvaro-Benito (AC); Christian Freund; Rainer Haag. 2021. Synthesis and Functionalization of dendritic Polyglycerol-based Nanogels: Application in T cell Activation. *Journal of Material Chemistry B*. 10-1, pp.96-106. Google Scholar (8) <https://doi.org/10.1039/d1tb02144c>
- 6 **Scientific paper.** Jana Sticht; (2/3) Miguel Álvaro-Benito; Stefan Konigorski. 2021. Type 1 Diabetes and the HLA Region: Genetic Association Besides Classical HLA Class II Genes. *Frontiers in Genetics*. 12-683946. Google Scholar (20) <https://doi.org/10.3389/fgene.2021.683946>
- 7 **Scientific paper.** Friederike Ebner; Eliot Morrison; Miriam Bertazzon; Ankur Midha; Susanne Hartmann; Christian Freund; (7/7) Miguel Álvaro-Benito (AC). 2020. CD4+ Th immunogenicity of the *Ascaris* spp. secreted products. *npj Vaccines*. Springer Nature. 5-25. Google Scholar (9) <https://doi.org/10.1038/s41541-020-0171-z>
- 8 **Scientific paper.** (1/7) Miguel Álvaro-Benito (AC); Eliot Morrison; Friederike Ebner; Esam T Abualrous; Marie Urbicht; Marek Wieczorek; Christian Freund. 2020. Distinct editing functions of natural HLA-DM allotypes impact antigen presentation and CD4+ T cell activation. *Cellular and Molecular Immunology*. Nature publishing group. Google Scholar (21) <https://doi.org/10.1038/s41423-018-0181-1>
- 9 **Scientific paper.** Eliot Morrison; Tatjana Wegner; Ernesto Andrés Zuchetti; et al; Christian Freund; (4/10) Miguel Álvaro-Benito. 2020. Dynamic palmitoylation events following T-cell receptor signaling. *Communications Biology*. 3-1, pp.368. Google Scholar (20) <https://doi.org/10.1038/s42003-020-1063-5>.
- 10 **Scientific paper.** Austin M Graves; Francesca Viridis; Eliot Morrison; (4/8) Miguel Álvaro-Benito; Aly A Khan; Christian Freund; Tatyana Golovkina; Lisa K Denzin. 2020. Human Hepatitis B Viral Infection Outcomes Are Linked to Naturally Occurring Variants of HLA-DOA That Have Altered Function. *Journal of Immunology*. 205-4, pp.923-935. Google Scholar (11) <https://doi.org/10.4049/jimmunol.2000476>
- 11 **Scientific paper.** (1/5) Miguel Álvaro-Benito; Eliot Morrison; Esam T Abualrous; Benno Kuroopka; Christian Freund. 2018. Quantification of HLA-DM-dependent major histocompatibility complex of class II immunopeptidomes by the peptide landscape antigenic epitope alignment utility. *Frontiers in Immunology*. Frontiers. 9-872. Google Scholar (39) <https://doi.org/10.3389/fimmu.2018.00872>
- 12 **Book chapter.** (1/4) Miguel Alvaro-Benito (AC); Friederike Ebner; Miriam Bertazzon; Eliot Morrison. 2023. CD4+ T Cell Epitope Identification from Complex Parasite Antigen Mixtures. *Methods Molecular Biology*. 2673, pp.89-109. https://doi.org/10.1007/978-1-0716-3239-0_6
- 13 **Review.** Miguel Alvaro-Benito; Christian Freund. 2020. Revisiting the editing function of non classical MHCII molecules. *HLA*. Wiley. 96-4, pp.415-429. <https://doi.org/10.1111/tan.14007>
- 14 **Review.** Marek Wieczorek; Esam T Abualrous; Jana Sticht; Miguel Álvaro Benito; Sebastian Stolzenberg; Frank Noe; Christian Freund. 2017. Major Histocompatibility Complex (MHC) Class I and MHC Class II Proteins: Conformational Plasticity in Antigen Presentation. *Frontiers in Immunology*. Frontiers. 8-292, pp.1-16. ISSN 1664-3224.
- 15 **Analysis-Review.** Bettina Budeus; Miguel Álvaro-Benito; Pietro Crivello. 2024. HLA-DM and HLA-DO interplay for the peptide editing of HLA class II in healthy tissues and leukemia. *Best Practice & Research Clinical Haematology*. 37-2, pp.101561. <https://doi.org/10.1016/j.beha.2024.101561>

C.2. Conferences and meetings

- 1 Paula de Diego; Franziska Budig; Jakob Holzapfel; Victor Fernandez de Lima; Eliot Morrison; Miguel Álvaro-Benito. HLA II genetic and functional diversity, what's new?. *Sociedad Española de Bioquímica y Biología Molecular*. Sociedad Española de Bioquímica Biología Molecular (SEBBM). 2024. Spain.

- 2 Pietro Crivello; Miguel Alvaro-Benito; Bettina Budeus. Differential expression of HLA-DM and HLA-DO genes in normal cells, tissues and leukemia: a review of public data. 37th European Immunogenetics and Histocompatibility Conference. EFI. 2024. Switzerland.
- 3 Antigen processing constraints and immunodominance of CD4+ T cell responses to SARS-CoV-2. Connecting basic mechanisms of antigen presentation to translational research. Freie Universität Berlin. 2023.
- 4 Insights on immunodominance patterns of CD4+ T cell responses to SARS-CoV-2. 2nd St. Nicholas Mass Spectrometry Symposium. Charite. 2022.
- 5 Personalized Antigen Presentation Profiles and Immunodominant CD4+ T cell responses: from mechanistic insights to translational applications. Invited Seminar Department of Immunology, Ophthalmology and ENT. Universidad Complutense de Madrid. 2022.
- 6 Miguel Alvaro Benito; Victor Fernandez de Lima; Eliot Morrison. Natural variation of non-classical HLA class II: Should we care?. EFI Congress 2022. European Federation of Immunogenetics. 2022.

C.3. Research projects and contracts

- 1 **Project.** Personalized CD4+ T cell responses to virus of zoonotic potential. Miguel Álvaro-Benito. (Universidad Complutense de Madrid). 01/07/2023-30/06/2028. 337.500 €.
- 2 **Project.** Beyond the classics: functional profiling of nHLAII genetic variation. Miguel Alvaro Benito. (Freie Universität Berlin). 01/07/2021-30/06/2024. 240.000 €.
- 3 **Project.** Investigating Chaperone functions conferring Resistance to Viral Infection via Correlative FLIM- FRET/Superresolution microscopy and Advanced Immunopeptidomics. Miguel Álvaro-Benito. (Freie Universitaet Berlin - SupraFab). 01/10/2022-31/12/2023. 25.000 €.
- 4 **Project.** SARSImmexpansion-Characterization and therapeutic expansion of protective effector and memory T cells response to SARS-CoV2. Monika C Brunner-Weinzierl. (Freie Universität Berlin). 01/01/2020-30/06/2022. 450.000 €.
- 5 **Project.** Orientation-specific Antibodies against peptide-MHCII complexes. Christian Freund. (Freie Universität Berlin). 01/01/2019-31/12/2019. 25.000 €.
- 6 **Project.** Modular tripartite vaccines. Leif E Sander. (Freie Univeristät Berlin). 01/01/2017-31/12/2018. 150.000 €.
- 7 **Project.** Personalized Peptide Editing profiles for MHC class II antigen presentation: Impact of HLA-DM variation on alloreactive models of Hematopoietic Stem Cell Transplantation (PEp2HT). Instituto de Salud Carlos III. Miguel Álvaro-Benito. (Universidad Complutense de Madrid). From 30/01/2025. 210.000 €.
- 8 **Contract.** Methods for staining of antigen-specific T cells Miguel Alvaro Benito. From 02/09/2019.
- 9 **Contract.** Impact of SPL-707 in antigen presentation Ursula Bodendorf. From 01/08/2019.

C.4. Activities of technology / knowledge transfer and results exploitation

- 1 Christian Freund; Miguel Álvaro Benito; Dirk Schwarzer. fr003. Multi-fragment assembly of peptides for the visualization, stimulation or destruction of T cells Germany. 2019. Freie Universität Berlin.
- 2 Maria Fernandez Lobato; Miguel Alvaro Benito. ES. P0200930929. Genetically modified fructofuranosidase for 6-kestose prebiotic production Spain. 2010. Fundación Genoma España.
- 3 Maria Fernandez Lobato; Miguel Alvaro Benito; Miguel de Abreu; Lucia Fernandez Arrojo; Francisco J. Plou. 200503195 PCT-ES2006/000693. New fructofuranosidase activity for the 6-kestose prebiotic obtention Spain. 2008. Fundación Genoma España.