Gabriel Forn-Cuní

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SUMMARY

I am a postdoctoral researcher interested in the involvement of inflammation and autophagy processes in human diseases. I have multidisciplinary expertise in both wet lab research techniques, including molecular biology, histology, microbiology, confocal microscopy, and zebrafish models, as well as in the bioinformatic and programming skills needed for evolutionary and phylogenetic analyses, comparative genomics, and transcriptomics. I have co-authored 30 peer-reviewed publications (11 as first or shared first author, 2 corresponding author) with 782 citations.

EDUCATION

Nov 2011	Dec 2015	PhD: Methodology and Applications of Molecular Biology. University of Vigo.
		Dissertation: The zebrafish as inflammation model (*summa cum laude*).
		Supervision: Prof. Dr. Antonio Figueras Huerta and Dr. Beatriz Novoa García.
Sept 2011	June 2012	MSc: Methodology and Applications of Molecular Biology. University of Vigo.
Sept 2009	June 2011	BSc: Biochemistry. University Rovira i Virgili.
Sept 2007	June 2011	BSc: Biotechnology. University Rovira i Virgili.

RESEARCH EXPERIENCE

Oct 2020 July 2021 Project Leader, Institute of Biology, Leiden University, The Netherlands.
NWO XS project "Targeted Biomolecule Production for Therapeutic Use", in which I designed a bioengineered platform to produce biomolecules of interest in a spatiotemporally restricted target using *Aspergillus* conidia.

Mar 2020 Postdoctoral researcher, Institute of Biology, Leiden University, The Netherlands.
Postdoctoral researcher at the Spaink lab in the IMI project RespiriNTM. Improving the translational potential of zebrafish research by analyzing the pharmacologic dynamics (PK/PD) of *M. avium* antibiotics *in vivo*.

Nov 2017 Nov 2019 MSCA Postdoctoral Fellow, Institute of Biology, Leiden University, The Netherlands.
Postdoctoral fellow for the Marie Skłodowska-Curie COFUND action "LEaDing Fellows" at the Meijer lab.
Studying the mechanisms of autophagic defence against Invasive Aspergillosis using the zebrafish model.

Mar 2016 July 2017 Postdoctoral researcher, Microbiology Department, University of Barcelona
Postdoctoral researcher at the J. Tomás and S. Merino lab. Studying the role and virulence mechanisms of *Aeromonas* LPS biosynthesis and flagellar glycosylation through microscopy, microbiology, and bioinformatics.

Nov 2011 Nov 2014 Research assistant, Immunology and Genomics Group, IIM – CSIC
Research assistant for the EU-FP7 project "Controlling infectious diseases in oysters and mussels in Europe (BIVALIFE)", studying the parameters that may affect mortality outbreaks in bivalve molluscs (Nov 2011 – Nov 2013). Investigating the zebrafish and turbot transcriptomes against the VHS virus under the National-funded project INNATEFISH IMTRA-VAC "Role of the innate immune response in DNA vaccines against VHSV and transference to turbot model" (Nov 2013 – Nov 2014).

Jan 2012 June 2012 MSc Research Intern, Immunology and Genomics Group, IIM – CSIC
We implemented state-of-the-art phylogenetic techniques to study the diversity and evolution of the *c3* family in available fish genomes.

Jan 2010 July 2010 BSc Research Intern, Dept of Biochemistry and Biotechnology, University Rovira i Virgili
The research collaboration involved the use of Hidden Markov Models to the computational analysis of epigenetic factors in human microRNA genes.

GRANTS AND PERSONAL FELLOWSHIPS

Oct 2020	NWO Open Competition Domain Science – XS grant.
Nov 2017	Personal postdoctoral fellowship, H2020 MSCA COFUND "LEaDing Fellows".

PEER-REVIEWED PUBLICATIONS

1. **Forn-Cuní G***, Welvaarts L, Stel FM, van den Hondel CJ, Arentshorst M, Ram AFJ, Meijer AH (2022) Stimulating the autophagic-lysosomal axis enhances host defense against fungal infection in a zebrafish model of Invasive Aspergillosis. *Autophagy*. Accepted – In Print. *Corresponding Author
2. Gazzi T, Brennecke B, Atz K, Korn C, Sykes D, **Forn-Cuní G**, et al. (2022) Detection of Cannabinoid Receptor Type 2 in Native Cells and Zebrafish with a Highly Potent, Cell-Permeable Fluorescent Probe. *Chem. Sci*. 13; 5539-5545.
3. Groenewoud A*, **Forn-Cuní G***, Engels FB, Snaar-Jagalska BE. (2022) XePhIR: the zebrafish xenograft phenotype interactive repository. *Database (Oxford)* 2022 Apr 28; 2022:baac028.
4. Ding Y, Haks MC, **Forn-Cuní G**, He J, Nowik N, Harms AC, et al. (2021) Metabolomic and transcriptomic profiling of adult mice and larval zebrafish leptin mutants reveal a common pattern of changes in metabolites and signaling pathways. *Cell Biosci*. 2021 Jul 7;11(1):126.
5. Keizer EM, Valdes ID, **Forn-Cuní G**, Klijna E, Meijer AH, Hillmand F, et al. (2021) Variation of virulence of five Aspergillus fumigatus isolates in four different infection models. PLoS One. Jul 9;16(7):e0252948
6. Saxena S, Spaink HP, **Forn-Cuní G**. (2021) Drug Resistance in Nontuberculous Mycobacteria: Mechanisms and Models. *Biology* 10(2), 96.
7. **Forn-Cuní G**, Fulton KM, Smith JC, Twine SM, Mendoza-Barberà E, Tomás JM and Merino S. (2021) Polar Flagella Glycosylation in Aeromonas: Genomic Characterization and Involvement of a Specific Glycosyltransferase (Fgi-1) in Heterogeneous Flagella Glycosylation. *Front. Microbiol*. 11:595697.
8. Van Leeuwe TM, Arentshorst M, **Forn-Cuní G**, Geoffrion N, Tsang A, et al. (2020) Deletion of the Aspergillus niger Pro-Protein Processing Protease Gene kexB Results in a pH-Dependent Morphological Transition during Submerged Cultivations and Increases Cell Wall Chitin Content. *Microorganisms* 8: 1918.
9. van Leeuwe TM, Wattjes J, Niehues A, **Forn-Cuní G**, Geoffrion N, Mélida H, et al. (2020) A seven-membered cell wall related transglycosylase gene family in *Aspergillus niger* is relevant for cell wall integrity in cell wall mutants with reduced α-glucan or galactomannan. *The Cell Surface*. Dec 6:100039.
10. Zhang R, Varela M, **Forn-Cuní G,** Torraca V, van der Vaart M, Meijer AH. (2020) Deficiency in the autophagy modulator Dram1 exacerbates pyroptotic cell death of Mycobacteria-infected macrophages. *Cell Death Dis*. Apr 24;11(4):277.
11. **Forn-Cuní G,** Meijer AH, Varela M. (2019) Zebrafish in Inflammasome Research. *Cells* 2019, 8(8), 901
12. Novoa B, Pereiro P, Lopez-Muñoz A, Varela M, **Forn-Cuní G**, Anchelin M, et al. (2019) Rag1 immunodeficiency-induced early aging and senescence in zebrafish are dependent on chronic inflammation and oxidative stress. *Aging Cell*, Jul 26:e13020.
13. Zhang R, Varela M, **Forn-Cuní G**, Wies Vallentgoed, van der Vaart M, Meijer AH. (2019) The selective autophagy receptors Optineurin and p62 are both required for innate host defense against mycobacterial infection. *PLoS Pathog*. 15(2):e1007329.
14. Moreira R, Balseiro P, **Forn-Cuní G**, Milan M, Bargelloni L, Novoa B, et al. (2018) Bivalve immune transcriptomics reveal pathogen sequences underneath and a powerful differential immune response of the Mediterranean mussel (Mytilus galloprovincialis). *Mar Biol* 165:61.
15. Pereiro P, **Forn-Cuní G**, Dios S, Coll J, Figueras A, Novoa B. (2017) Interferon-independent antiviral activity of 25-hydroxycholesterol in a teleost fish. *Antiviral Res* 145:146–159.
16. **Forn-Cuní G,** Merino S, Tomás JM. (2017) Comparative genomics of the *Aeromonadaceae* LPS core oligosaccharide biosynthetic regions. *IJMS*. Feb 28;18(3):E519.
17. **Forn-Cuní G,** Varela M, Pereiro P, Novoa B, Figueras A. (2017) Conserved gene regulation during acute inflammation between zebrafish and mammals. *Sci. Rep*. 7; 14905.
18. Pereiro P, **Forn-Cuní G**, Figueras A, Novoa B. (2016) Pathogen-dependent role of turbot (*Scophthalmus maximus*) interferon-gamma. *Fish Shellfish Immunol*. 59:25-35.
19. Figueras A, Robledo D, Corvelo A, Hermida M, Pereiro P, Rubiolo JA, … **Forn-Cuní G**, … et al. (2016) Whole genome sequencing of turbot (*Scophthalmus maximus*; pleuronectiformes): a fish adapted to demersal life. *DNA Res*. 2016 Mar 6.

20. Varela M, **Forn-Cuní G**, Dios S, Figueras A, Novoa B. (2015) Proinflammatory Caspase A Activation and an Antiviral State Are Induced by a Zebrafish Perforin after Possible Cellular and Functional Diversification from a Myeloid Ancestor. *J Innate Immun*. 2015 Jun 18.
21. **Forn-Cuní G**, Varela M, Fernández-Rodríguez CM, Figueras A, Novoa B. (2105) Liver immune responses to inflammatory stimuli in a diet-induced obesity model of zebrafish. *J Endocrinol*. 2015 Feb;224(2):159–70.
22. Romero A, **Forn-Cuní G**, Moreira R, Milan M, Bargelloni L, Figueras A, et al. (2014) An immune-enriched oligo-microarray analysis of gene expression in Manila clam (*Venerupis philippinarum*) haemocytes after a *Perkinsus olseni* challenge. *Fish Shellfish Immunol*. 2014 Dec 30.
23. Varela M, Diaz-Rosales P, Pereiro P, **Forn-Cuní G**, Costa MM, Dios S, et al. (2014) Interferon-Induced Genes of the Expanded IFIT Family Show Conserved Antiviral Activities in Non-Mammalian Species. *PLoS ONE*. 2014 Jun 20;9(6):e100015.
24. **Forn-Cuní G**, Reis ES, Dios S, Posada D, Lambris JD, Figueras A, et al. (2014) The Evolution and Appearance of C3 Duplications in Fish Originate an Exclusive Teleost *c3* Gene Form with Anti-Inflammatory Activity. *PLoS ONE*. 2014 Jun 13;9(6):e99673.
25. Romero A, Costa M, **Forn-Cuní G**, Balseiro P, Chamorro R, Dios S, et al. (2014) Occurrence, seasonality and infectivity of *Vibrio* strains in natural populations of mussels *Mytilus galloprovincialis*. *Dis Aquat Org*. 2014 Feb 19;108(2):149–63.
26. Costa MM, Saraceni PR, **Forn-Cuní G**, Dios S, Romero A, Figueras A, et al. (2013) IL-22 is a key player in the regulation of inflammation in fish and involves innate immune cells and PI3K signaling. *Dev Comp Immunol*. 2013 Dec 1;41(4):746–55.
27. Pereiro P, Balseiro P, Romero A, Dios S, **Forn-Cuní G**, Fuste B, et al. (2012) High-throughput sequence analysis of turbot (*Scophthalmus maximus*) transcriptome using 454-pyrosequencing for the discovery of antiviral immune genes. *PLoS ONE*. 2012;7(5):e35369.

Preprints:

1. van der vaart M, Baducci-Karp A, **Forn-Cuní G**, Witt PMM, Willemse JJ, Muñoz-Sanchéz S, Hosseini R, Meijer AH. DRAM1 requires PI(3,5)P2 generation by PIKfyve to deliver vesicles and their cargo to endolysosomes. *bioRxiv*. Doi: 10.1101/2020.12.15.422832

BOOK CHAPTERS AND SCIENTIFIC ANNOUNCEMENTS

1. **Forn-Cuní G**, Tavakkoliamol Z, Tomás JM. (2018) Plesiomonas (Chapter 35). In *Handbook of Foodborne Diseases*. Edited by Dongyou Liu. Taylor and Francis CRC Press.
2. **Forn-Cuní G**, Tomás JM, Merino S. (2016) Genome sequence of A. *hydrophila* AH-1 (Serotype O11). *Genome Announc*. 1;4(5):e00920-16.
3. **Forn-Cuní G**, Tomás JM, Merino S. (2016) Genome sequence of A. *hydrophila* AH-3 (Serotype O34). *Genome Announc*. 1;4(5):e00919-16.

MENTORING EXPERIENCE

Supervision of bachelor, master, and junior PhD students, including:

1. Co-direction of MSc Degree Thesis: “Evaluating zebrafish larvae as a model for cannabinoid receptor 2 research” by Bas Vooijs. From Cells to Organisms MSc, Institute of Biology, Leiden University.
2. Co-direction of MSc Degree Thesis: “A zebrafish model to study relapse and bacterial behavior of bacteria from the *Mycobacterium avium* complex” by Saloni Saxena. Molecular Genetics and Biotechnology MSc, Institute of Biology, Leiden University.
3. Co-direction of MSc Degree Thesis: “The role of *Dram1* in host defence against A. *fumigatus*” by Florence Stel. Molecular Genetics and Biotechnology MSc, Institute of Biology, Leiden University.
4. Co-direction of MSc Degree Thesis: “The role of immunosuppressants in the host-defence against Invasive Aspergillosis in the zebrafish model” by Lieke Welvaarts. From Cells to Organisms MSc, Institute of Biology, Leiden University.
5. Co-direction of MSc Degree Thesis: “Estudio de la producción de α-glucano superficial en Aeromonas” by Genoveva Arques Verdú. Advanced Microbiology Master, Universitat de Barcelona.

SELECTED INVITED SEMINARS AND TALKS

1. Enhancing antifungal innate immunity against A. *fumigatus* by stimulating the host autophagy machinery. April 2018. Internal Seminar. Erasmus MC, The Netherlands.
2. Should we trust the zebrafish as a model for human inflammatory diseases? March 2018. Invited Seminar. "In the Spotlight" Biology Seminars Leiden.
3. Enhancing innate immunity against Invasive Aspergillosis by stimulating the host autophagic defence. February 2018. IBL Animal Science and Health Cluster Meeting. Leiden University, The Netherlands.
4. The zebrafish as a research animal model. Nov 2016. Invited Seminar, Advanced Microbiology Master, Universitat de Barcelona, Barcelona.
5. Role of the polar flagellum and its glycosylation in gastroenteric *Aeromonas hydrophila* AH-3 strain virulence and immune stimulation. July 2016. Invited Seminar, Leiden University, Leiden.

ORGANIZATION OF INTERNATIONAL SCIENTIFIC MEETINGS

June 2013 First International Conference of Fish and Shellfish Immunology, Vigo, Spain.

SELECTED PRESENTATIONS AT INTERNATIONAL SCIENTIFIC MEETINGS

1. Poster: "Real-time in vivo visualization of autophagic defence against Invasive Aspergillosis". 3rd Nordic Autophagy Conference. Utrecht, The Netherlands, 22th – 24th May **2019**.
2. Talk: "Role of the polar flagellum and its glycosylation in gastroenteric *Aeromonas hydrophila* AH-3 strain virulence and immune stimulation". The 11th Zebrafish Disease Models Conference. Leiden, The Netherlands, 10th – 13th June **2018**.
3. Talk: "Comparative of the *Aeromonadaceae* core oligosaccharide biosynthetic regions". 12th International Symposium on *Aeromonas* & *Plesiomonas*. Mexico City, Mexico. 23th – 23th June **2017**.
4. Poster: "Effect of obesity in the transcriptomic liver response to an inflammatory stimulus using a zebrafish (*Danio rerio*) diet-induced obesity model". XXXIX Congreso de la Asociación Española para el estudio del Hígado. Madrid, Spain. 19 – 21th February **2014**.
5. Poster: "Complement C3 isoforms show differential pro-inflammatory potential in zebrafish". 8th European Zebrafish Meeting. Barcelona, Spain. 9 – 13th July **2013**.

SPECIALISED TRAINING

2016 Animal Experimentation Course – Function C. Organized by "Animalaria Formación y Gestión, SL".

2014 Genomics and Bioinformatics Workshop 2014. Organized by "The Marie Curie ITN Project FishForPharma (PITN-GA–2011–289209)" in ZF-Screens BV. Leiden, 2014.

2013 Workshop Omics Technologies: NGS, RNA-seq & ChIP-Seq. Organized by "Campus do Mar" in Universidade de Vigo, Spain.

2012 Microarray Design and Analysis. Group of Evolutive Immunology, Universitat Autònoma de Barcelona, Spain.

SELECTED SCIENTIFIC COMMUNICATION AND OUTREACH

- Maintenance of the blog bitsandgen.es, in which I share information and code snippets regarding bioinformatics and evolutionary analysis on the zebrafish model.
- Build and maintenance of XePhIR: The (Zebrafish) Xenograft Phenotype Interactive Repository, an online database for describing how human cancer behaves when engrafted in zebrafish embryos.
- Raincloud-shiny: Raincloud-shiny is a Shiny-powered web GUI interface to create RainCloudPlots: https://gabrifc.shinyapps.io/raincloudplots/