

Name

Molecular Microbial Ecology Group

Description

The Molecular Microbial Ecology Group of the University of Alicante is part of the Department of Physiology, Genetics and Microbiology. The group was established in 1999 by Prof. Josefa (Pepa) Antón and its trajectory started addressing different aspects of the microbial ecology of hypersaline environments and the microbiota of marine invertebrates, by using different culture dependent and independent approaches. The group has grown and diversified in four Principal Investigators laboratories, Josefa Anton Botella, Manuel Martinez Garcia, Fernando Santos Sanchez and Ana Belen Martin Cuadrado, with different but interconnected research topics and national and international funded projects with a solid network of collaborations.

Marine environments:

- Diversity and function of microbial marine symbionts

- Vibrio coral pathogens and their viruses

- Marine aquatic microbial ecology and virology

- Micro-diversity of Pelagibacter and their viruses

- Microbial communities of Mar Menor sediments

Hypersaline environments:

- Ecology and evolution of microbes from hypersaline environments and their viruses

- Salinibacter and its viruses as model system

Other systems:

- Microbiology and Virology of drinking water wastewater and spread of antibiotic resistance genes by wastewater microbes

- Animal and Human Microbiome studies

- Biofilms in drinking water systems

General Virology:

- Viruses of the world: from the Antarctic to other remote environments

- Control of virus-host interactions

Microfluidics as a tool in microbial ecology

Publications (last 5 years)

Kutsyr, O., Noailles, A., Martínez-Gil, N., Maestre-Carballa, L., Martinez-Garcia, M., Maneu, V., Cuenca N., & Lax, P. (2021). Short-term high-fat feeding exacerbates degeneration in retinitis pigmentosa by promoting retinal oxidative stress and inflammation. *Proceedings of the National Academy of Sciences*, 118(43).

Rubio-Portillo, E., Martin-Cuadrado, A. B., Ramos-Esplá, A. Á., & Antón, J. (2021).

Metagenomics Unveils *Posidonia oceanica* "Banquettes" as a Potential Source of Novel Bioactive Compounds and Carbohydrate Active Enzymes (CAZymes). *Msystems*, 6(5), e00866-21.

Voolstra CR, Quigley KM, Davies SW, Parkinson JE, Peixoto RS, Aranda M, Baker AC, Barno AR, Barshis DJ, Benzoni F, Bonito V, Bourne DG, Buitrago-López C, Bridge TCL, Chan CX, Combosch DJ, Craggs J, Frommlet JC, Herrera S, Quattrini AM, Röthig T, Reimer JD, Rubio-Portillo E, Suggett DJ, Villela H, Ziegler M and Sweet M. (2021). Consensus guidelines for advancing coral holobiont genome and specimen voucher deposition. *Frontiers in Marine Science*, 1029.

Rubio-Portillo, E., Ramos-Esplá, R., Antón, J. 2021. Shifts in marine invertebrate bacterial assemblages associated with tissue necrosis during a heat wave. *Coral Reefs*, in press

Aldeguer-Riquelme, B., Ramos-Barbero, M.D., Santos, F. and Antón, J. 2021. *Environmental*

dissolved DNA harbours meaningful biological information on microbial community structure. *Environ Microbiol.* <https://doi.org/10.1111/1462-2920.15510>

Kutsyr, O., Maestre-Carballa, L., Lluesma-Gomez, M., Martinez-Garcia, M., Cuenca, N., & Lax, P. (2021). Retinitis pigmentosa is associated with shifts in the gut microbiome. *Scientific reports*, 11(1), 1-11.

De la Cruz-Peña, M.J., Gonzalez-Granado, L. I., Garcia-Heredia, I., Carballa, L. M., & Martinez-Garcia, M. (2021). Minimal Variation of Human Oral Virome and Microbiome in IgA Deficiency Challenges an Irreplaceable IgA Role for Shaping Oral Commensal Microbiota, *Scientific reports* (in press)

Ramos-Barbero, M. D., Viver, T., Zabaleta, A., Senel, E., Gomariz, M., Antigüedad, I., ... & Antón, J. (2021). Ancient saltern metagenomics: tracking changes in microbes and their viruses from the underground to the surface. *Environmental Microbiology*.

Guerrero-Beltrán, C., Garcia-Heredia, I., Ceña-Diez, R., Rodriguez-Izquierdo, I., Serramía, M.J., Martinez-Hernandez, F., Manuel Martinez-Garcia, Maria Angeles Muñoz. Martinez-Hernandez, F., Luo, E., Tominaga, K., Ogata, H., Yoshida, T., DeLong, E.F., and Martinez-Garcia, M. (2020) Diel cycling of the cosmopolitan abundant Pelagibacter virus 37-F6: one of the most abundant viruses on earth. *Environ Microbiol Rep* 12: 214–219.

Martinez-Garcia, M., Martinez-Hernandez, F., and Martínez, J.M. (2020) Single-Virus Genomics: Studying Uncultured Viruses, One at a Time. *Encyclopedia of Virology 4th Edition*.

Haro-Moreno, J.M., Rodriguez-Valera, F., Rosselli, R., Martinez-Hernandez, F., Roda-Garcia, J.J., Gomez, M.L., et al. (2020) Ecogenomics of the SAR11 clade. *Environ Microbiol* 22: 1748–1763. Rubio-Portillo¹, Ana B. Martin-Cuadrado, Andrés M. Caraballo-Rodríguez, Forest Rohwer, Pieter C. Dorrestein, Josefa Antón. (2020) Virulence as a side effect of interspecies interaction in *Vibrio* coral pathogens. *mBio*. In press

Joaquín Martínez Martínez, Francisco Martínez-Hernandez, Manuel Martínez-Garcia. (2020) Single-virus genomics and beyond. *Nature Microbiology Reviews*. 18:705–716.

Guerrero-Beltrán, C., Garcia-Heredia, I., Ceña-Diez, R., Rodriguez-Izquierdo, I., Serramía, M.J., Martinez-Hernandez, F., Manuel Martinez-Garcia, Maria Angeles Muñoz. (2020) Cationic dendrimer g2-s16 inhibits herpes simplex type 2 infection and protects mice vaginal microbiome. *Pharmaceutics* 12 (6), 515

Inmaculada Garcia-Heredia, Ananda Shankar Bhattacharjee, Oscar Fornas, Monica Lluesma Gomez, Joaquín Martínez Martínez, Manuel Martínez-Garcia. (2020) Benchmarking of Single-Virus Genomics: a new tool for uncovering the virosphere. *Environmental Microbiology*. <https://doi.org/10.1111/1462-2920.15375>

Mario López-Pérez, Jose M Haro-Moreno, Felipe Hernandes Coutinho, Manuel Martínez-Garcia, Francisco Rodríguez-Valera. (2020) The evolutionary success of the marine bacterium SAR11 analyzed through a metagenomic perspective. *MSystems*. DOI: 10.1128/mSystems.00605-20

Jose M Haro-Moreno, Francisco Rodríguez-Valera, Riccardo Rosselli, Francisco Martínez-Hernandez, Juan J Roda-Garcia, Monica Lluesma Gomez, Oscar Fornas, Manuel Martínez-

Garcia, Mario López-Pérez. (2020) Environmental Microbiology. <https://doi.org/10.1111/1462-2920.14896>

Rubio-Portillo E, Orts D, Llorca E, Fernández C, Antón J, Ferrer C, Gálvez B, Esteban V, Revelles E, Pérez-Martín C, Gómez-Imbernón E, Adsuar J, Piqueras P, Amat B, Franco J, Colom MF. The Domestic Environment and the Lung Mycobiome. *Microorganisms*. 2020 Nov 2;8(11):1717. doi: 10.3390/microorganisms8111717. PMID: 33147738; PMCID: PMC7693370.

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Viver T, Conrad RE, Orellana LH, Urdiain M, González-Pastor JE, Hatt JK, Amann R, Antón J, Konstantinidis KT, Rosselló-Móra R. Distinct ecotypes within a natural haloarchaeal population enable adaptation to changing environmental conditions without causing population sweeps. *ISME J*. 2020 Dec 20. doi: 10.1038/s41396-020-00842-5. Epub ahead of print. PMID: 33342997.

Santos, F., Ramos-Barbero, M.D., Antón, J. 2020. Metagenomes of archaeal viruses in hypersaline environments. *Encyclopedia of Virology 4th Edition*.

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Roux, S., Adriaenssens, E.M., Dutilh, B.E., Koonin, E. V, Kropinski, A.M., Krupovic, M., et al. (2019) Minimum information about an uncultivated virus genome (MIUViG). *Nat Biotechnol* 37: 29–37.

Martinez-Hernandez, F., Garcia-Heredia, I., Lluesma Gomez, M., Maestre-Carballa, L., Martínez Martínez, J., and Martinez-Garcia, M. (2019) Droplet Digital PCR for Estimating Absolute Abundances of Widespread Pelagibacter Viruses. *Front Microbiol* 10: 1226.

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Maestre-Carballa, L., Lluesma Gomez, M., Angla Navarro, A., Garcia-Heredia, I., Martinez-Hernandez, F., and Martinez-Garcia, M. (2019) Insights into the antibiotic resistance dissemination in a wastewater effluent microbiome: bacteria, viruses and vesicles matter. *Environ Microbiol* 1462-2920.14758.

Ramos-Barbero MD, Martin-Cuadrado AB, Viver T, Santos F, Martinez-Garcia M, Antón J. Recovering microbial genomes from metagenomes in hypersaline environments: The Good, the Bad and the Ugly. *Syst Appl Microbiol*. 2019;42(1):30-40.

Martin-Cuadrado AB, Senel E, Martínez-García M, et al. Prokaryotic and viral community of the

sulfate-rich crust from Peñahueca ephemeral lake, an astrobiology analogue. *Environ Microbiol.* 2019;21(10):3577-3600. doi:10.1111/1462-2920.14680

Rubio-Portillo, E., Villamor, E., Fernandez-Gonzalez, V., Antón, J., Sanchez-Jerez, P. 2019. Exploring changes in bacterial communities to assess the influence of fish farming on marine sediments. *Aquaculture* 506: 459-464

Pedro González-Torres, Francisco Rodríguez-Mateos, Josefa Antón, Toni Gabaldón . 2019. Impact of Homologous Recombination on the Evolution of Prokaryotic Core Genomes *mBio* DOI: 10.1128/mBio.02494-18

Edwards et al. 2019. Global phylogeography and ancient evolution of the widespread human gut virus crAssphage . *Nature Microbiology* doi: 10.1038/s41564-019-0494-6.

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Viver, T., Orellana, L. H., Díaz, S., Urdiain, M., Ramos-Barbero, M. D., González-Pastor, J. E., Oren, A., Hatt, J.K., Amann, R., Antón, J., Konstantinidis, K. T. and Rosselló-Móra, R. (2019). Predominance of deterministic microbial community dynamics in salterns exposed to different light intensities. *Environmental Microbiology*,21: 4300-4315.

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Garcia, S.L., Stevens, S.L.R., Crary, B., Martinez-Garcia, M., Stepanauskas, R., Woyke, T., et al. (2018) Contrasting patterns of genome-level diversity across distinct co-occurring bacterial populations. *ISME J* 12: 742–755.

Rubio-Portillo, E., Kersting, D. K., Linares, C., Ramos-Esplá, A. Á., Antón, J. Biogeographic differences in the microbiome and pathobiome of the coral *Cladocora caespitosa* in the Western Mediterranean Sea. (2018). *Frontiers in Microbiology*, 9.

De La Cruz Peña, M.J., Martinez-Hernandez, F., Garcia-Heredia, I., Gomez, M.L., Fornas, Ò., and Martinez-Garcia, M. (2018) Deciphering the human virome with single-virus genomics and metagenomics. *Viruses* 10:.

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Pujato, S.A., Guglielmotti, D.M., Martínez-García, M., Quiberoni, A., and Mojica, F.J.M. (2017) *Leuconostoc mesenteroides* and *Leuconostoc pseudomesenteroides* bacteriophages: Genomics and cross-species host ranges. *Int J Food Microbiol* 257:.

León, M.J.; Aldeguer-Riquelme, B.; Antón, J.; Sánchez-Porro, C.; Ventosa, A. 2017. *Spiribacter aquaticus* sp. nov., a novel member of the genus *Spiribacter* isolated from a saltern. *International Journal of Systematic and Evolutionary Microbiology*

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Recent funded projects

METAFLUIDICS

PI: Josefa Antón Botella. European Commission

Tackling complex paradigms in marine virology: what are we missing with current viral metagenomics

PI: Manuel Martinez-Garcia. JGI/Caltech

Optimization of Single-virus genomics pipeline (BIGELOWLABORATORY1-16I)

PI: Manuel Martinez-Garcia. Gordon and Betty Moore Foundation

Cell to Ecosystem: Understanding Methane and Associated Nutrient Cycling by Sediment Hosted Syntrophic Consortia and Their Viral Predators (CALTECH-DE-SC0020373)

PI: Manuel Martinez-Garcia. Dr. Victoria Orphan (CALTECH)

MICROMATES

PI: Josefa Antón y Fernando Santos

Ministerio de Economía, Industria y Competitividad

Tackling complex paradigms in marine virology: from community- to individual-based multi-omic viral approaches (VIROSEA)

PI: Manuel Martinez-Garcia

Ministerio de Economía, Industria y Competitividad

PhD Theses (5 years)

Title: ESTUDIO DE LAS VIROSFERAS DE SALINIBACTER RUBER Y HALOQUADRATUM WALSBYI

Doctorate: Villamor Serrano, Judith

Supervisors: Josefa Antón and Fernando Santos

University: Universitat d'Alacant

Centre: Escola de Doctorat

Programme: DOCTORAT EN BIOLOGIA EXPERIMENTAL I APLICADA

Date: 07/05/2021

Title: ECO-METAGENÓMICA DE VIRUS EN AMBIENTES HIPERSALINOS

Doctorate Ramos Barbero, María Dolores

Supervisors: Josefa Antón and Mnaue Martínez-García

University: Universitat d'Alacant

Centre: Escola de Doctorat

Programme: DOCTORAT EN BIOLOGIA EXPERIMENTAL I APLICADA

Date: 27/09/2019

Title: STUDY OF THE MARINE VIROSPHERE USING SINGLE-VIRUS GENOMICS

Supervisor: Manuel Martínez-García

Doctorate: Francisco, Martínez-Hernández,

University: Universitat d'Alacant

Centre: Escola de Doctorat

Programme: DOCTORAT EN BIOLOGIA EXPERIMENTAL I APLICADA

Date: 12/09/2019

Title: TAXA NOVELTY, RESISTANCE AND RESILIENCE OF HALOPHILIC MICROBIAL COMMUNITIES OF SOLAR SALTERNS TO ENVIRONMENTAL CHANGES

Doctorate: Tomeu Viver Pizà

Supervisors: Ramon Rosselló-Móra and Josefa Antón

University: Universitat de les Illes Balears

Centre: Biología

Programme: Environmental Microbiology and Biotechnology

Date: 05/06/2019

Title: ESTUDIO DE LOS MECANISMOS DE DIVERSIFICACIÓN INTRAESPECÍFICA EN SALINIBACTER RUBER

Doctorate: González Torres, Pedro Iñaki

Supervisors: Josefa Antón and Toni Gabaldón

University: Universitat d'Alacant

Centre: Centre d'Estudis de Doctorat i Posgrau

Programme: DOCTORAT EN BIOLOGIA EXPERIMENTAL I APLICADA

Date: 01/02/2016

Webpage

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