



Antimicrobial Resistance Unit
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BRUNO GONZALEZ-ZORN

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Nationality Spanish / German

Languages Spanish, German, English, French

Education

DVM Complutense University of Madrid. June 1995
PhD.Doctor Europaeus. Complutense University of Madrid. November 2001.
Supervisor : Jose Antonio Vazquez-Boland

Jobs

Researcher (Program Ramón y Cajal) Complutense University of Madrid. 2005-2008

Full Professor. Animal Health Department. Faculty of Veterinary Medicine. Complutense University of Madrid since December 2nd 2018.

Head of the Antimicrobial Resistance Unit.

Supervised PhDs from own independent group

- 2010. Alvaro San Millán. Summa Cum Laude. Award Complutense University for best PhD year
- 2011. Jose A. Escudero García-Calderón. Summa Cum Laude. Award from the National PhD Academy for best PhD 2011.
- 2012. Courage K.S. Saba. Summa Cum Laude.
- 2014. Laura Hidalgo. Summa Cum Laude.
- 2014. Belén Gutiérrez. Summa Cum Laude. Award from the National PhD Academy for best PhD 2014
- 2015. Laura Carrilero Aguado. Summa Cum Laude.
- 2016. Alfonso Santos López. Summa Cum Laude.
- 2017. Daniel Thomas López. Summa Cum Laude.

2017. Andreas Hoefler. Summa Cum Laude
 2017. Rafael Ortega. Summa Cum Laude
 2017. Cristina Martínez. Summa Cum Laude. Award from the National PhD Academy for best PhD 2017
 2019. Cristina Bernabé Balas. Summa Cum Laude
 2019. Gabriel Moyano Ortega.
 2021. Jose Francisco Delgado Blas. Summa Cum Laude

Experience in foreign Institutions

Veterinary School Hannover, Germany	1992	1 month
Veterinary School Hannover, Germany	1993	1 month
Veterinary School Giessen, Germany	1993-1994	12 months
Biozentrum, Universität Würzburg, Germany	1998	3 months
Biozentrum, Universität Würzburg, Germany	1999	3 months
INSERM, Unité de Biochimie.Toulouse, France	2000	3 months
Institut Pasteur, Paris, France	2002-2003	24 months

Research Grants (past 5 years)

Title: Understanding the flux of antimicrobial resistance between humans, animals and the environment: a One Health approach. Entidad Financiadora: OAK Foundation. Comienzo 1-1-2022 Fin : 31-12-2022

Title: Anticipación y prevención de COVID-19 en la Comunidad de Madrid. ANTICIPA-CM. Entidad Financiadora: Comunidad de Madrid. Comienzo : 1-1-2022 Fin: 31-12-2022

Title: Una Europa Seed funding. Entidad Financiadora: Alianza Europea. Comienzo 2021, Fín . IP: González Zorn, Bruno

Title: Cooperación interuniversitaria. La formación como herramienta clave en la lucha contra las infecciones infantiles resistentes a antibióticos en Ghana. Entidad Financiadora: UCM Comienzo 2021, Fín 2021. IP: González Zorn, Bruno

Title: ONE HEALTH EJP. Promoting One Health in Europe through Joint Actions on Foodborne Zoonoses, Antimicrobial Resistance and Emerging Microbiological Hazards. WORLDCOM. Financial Institution: UE. Start: 2020 End: 2023.

Title: ONE HEALTH EJP. Promoting One Health in Europe through Joint Actions on Foodborne Zoonoses, Antimicrobial Resistance and Emerging Microbiological Hazards. FARMED. Financial Institution: UE. Start: 2020 End: 2023.

Title: AVANT- Alternatives to Veterinary ANTImicrobials. Financial Institution: UE. Start: 2020 End: 2024. IP: Bruno González Zorn

Title: Global Antimicrobial resistance Platform for ONE Burden Estimates (GAP-ONE) Financial Institution: JPIAMR. Start: 2018 End: Dec 2021. IP: Bruno González Zorn

Title: Network of European and African Researchers on antimicrobial Resistance (NEAR-AMR) Financial Institution: JPIAMR. Start: 2018 End: Dec 2022. IP: Bruno González Zorn

Title: ONE HEALTH EJP. Promoting One Health in Europe through Joint Actions on Foodborne Zoonoses, Antimicrobial Resistance and Emerging Microbiological Hazards. ARDIG. Financial Institution: UE. Start: 2018 End: 2022. IP: Bruno Gonzalez-Zorn. Funding: 63 M€

Title: Combatting antimicrobial resistance training network. CARTNET: Financial Institution: UE. Start: 2018 Fin:2021. IP: González-Zorn, Bruno. Funding: 219.415,39 €

Title: Combatiendo los determinantes genéticos de pan-resistencia a aminoglucósidos. COMPAS. Financial Institution: MINECO. Start: 2015; End: 2018. IP: González-Zorn, Bruno. Funding: 185.000 €

Title: Tecnologías Avanzadas en Vigilancia Sanitaria. TAVS-CM. Financial Institution: Comunidad de Madrid. Start: 17/10/2014; End: 30/9/2018. IP: González-Zorn, Bruno. Funding: 263.414,40€

Title: Ecology from Farm to Fork Of Microbial Drug Resistance and Transmission. EFFORT. Financial Institution: European Commission. Start: 2013; End: 2018. IP: González-Zorn, Bruno. Funding: 11M €

Title: Initial Training Network- TRAIN-ASAP- Novel Antimicrobial Strategies in Animals and Persons. Financial Institution: European Commission. Start: 2012; End: 2016. IP: González-Zorn, Bruno. Funding: 2M €

Title: Multiple Framework Service Contract expertise in the field of impact assessment of Food Safety and Health. Financial Institution: Comisión Europea. Start: 2012; End: 2016. IP: González-Zorn B.

Title: Evolution and Transfer of Antimicrobial Resistance. EvoTAR. Financial Institution: European Commission. Start: 2012; End: 2015. IP: González-Zorn, Bruno. Funding: 12M €

More than 200 talks and invited seminars

Scientific and Editorial evaluation and management

Advisor of the EU Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn

Member of the Scientific Advisory Board of JPI AMR (2014-2018)

Member of Editorial Board of Genes, Frontiers in Microbiology, Intl J. of Antibiotics, World Journal of Clinical Infectious Diseases, Scientific and Science Jet.

Regularly review of numerous scientific multidisciplinary and specialized journals.

Evaluations of Scientific Projects for the EU, Spanish Ministry of Health, Spanish Ministry of Science, The Royal Society, Wellcome Trust, French Ministry of Agriculture, Chinese Government, Swedish Government, Government of Argentina, Government of Rumania, Government of Sweden, Government of China.

President of the Group for Molecular Microbiology of the Spanish Society for Microbiology

Founding member of The Voice of Researchers organization, EU

Scientific Advisory Board of the Program JPIAMR, EU

OMS advisor

Selected Publications (past 5 years)

Delgado-Blas JF, Ovejero CM, Abadia Patiño L, Gonzalez-Zorn B. Coexistence of *mcr-1* and *bla*NDM-1 in *Escherichia coli* from Venezuela. *Antimicrob Agents Chemother*. 2016

Ovejero Cristina, Delgado-Blas Jose, Calero-Caceres William, Muniesa Maite, Gonzalez-Zorn Bruno. Spread of *mcr-1* carrying *Enterobacteriaceae* in sewage water from Spain. *Journal of Antimicrobial Chemotherapy*. 2017

Alfonso Santos-López, Cristina Bernabe-Balas, Manuel Ares-Arroyo, Rafael Ortega-Huedo, Andreas Hoefler, Alvaro San Millán, Bruno Gonzalez-Zorn. A naturally occurring SNP in plasmid pB1000 produces a reversible increase in antibiotic resistance. *Antimicrobial Agents and Chemotherapy*. 2017

Cristina M. Ovejero, Jose Antonio Escudero, Daniel Thomas-López, Andreas Hoefler, Gabriel Moyano, Natalia Montero, Carmen Martín Espada, Bruno Gonzalez-Zorn. Highly Tigecycline-Resistant *Klebsiella pneumoniae* Sequence Type 11 (ST11) and ST147 Isolates from Companion Animals. *Antimicrob. Agents Chemother*. 2017 June doi:10.1128/AAC.02640-16

Dahdouh E, Gómez-Gil R, Sand S, Gonzalez-Zorn B, Daoud Z, Mingorance J, Suárez M. A novel mutation in *pmrB* mediates colistin resistance during therapy of *Acinetobacter baumannii*. *Int J Antimicrob Agents*. 2017 Jun;49(6):727-733. doi: 10.1016/j.ijantimicag.2017.01.031.

Rahman M, Prasad KN, Gupta S, Singh S, Singh A, Pathak A, Gupta KK, Ahmad S, Gonzalez-Zorn B. Prevalence and Molecular Characterization of New Delhi Metallo-Beta-Lactamases in Multidrug-Resistant *Pseudomonas aeruginosa* and *Acinetobacter baumannii* from India. *Microb Drug Resist*. 2017 Oct 23. doi: 10.1089/mdr.2017.0078

Singh S, Pathak A, Kumar A, Rahman M, Singh A, Gonzalez-Zorn B, Prasad KN. Emergence of Chromosome-Borne Colistin Resistance Gene *mcr-1* in Clinical Isolates of *Klebsiella pneumoniae* from India. *Antimicrob Agents Chemother*. 2018 Jan 25;62(2). pii: e01885-17. doi: 10.1128/AAC.01885-17. Print 2018 Feb

Lanza VF, Baquero F, Martínez JL, Ramos-Ruiz R, Gonzalez-Zorn B, Andremont A, Sánchez-Valenzuela A, Ehrlich SD, Kennedy S, Ruppé E, van Schaik W, Willems RJ, de la Cruz F, Coque TM. In-depth resistome analysis by targeted metagenomics. *Microbiome*. 2018 Jan 15;6(1):11. doi: 10.1186/s40168-017-0387-y.

Rozwandowicz M, Brouwer MSM, Fischer J, Wagenaar JA, Gonzalez-Zorn B, Guerra B, Mevius DJ, Hordijk J. Plasmids carrying antimicrobial resistance genes in *Enterobacteriaceae*. *J Antimicrob Chemother*. 2018 Jan 23. doi: 10.1093/jac/dkx488.

Hadziabdic S, Fischer J, Malorny B, Borowiak M, Guerra B, Kaesbohrer A, Gonzalez-Zorn B, Szabo I. In vivo Transfer and Microevolution of Avian Native *IncA/C2bla*NDM-1-Carrying Plasmid pRH-1238 during a Broiler Chicken Infection Study. *Antimicrob Agents Chemother*. 2018 March 27;62(4). Pii: e02128-17. Doi: 10.1128/AAC.02128-17

Ares-Arroyo M, Bernabe-Balas C, Santos-Lopez A, Baquero MR, Prasad KN, Cid D, Martin-Espada C, San Millan A, Gonzalez-Zorn B. PCR-Based Analysis of *ColE1* Plasmids in

Clinical Isolates and Metagenomic Samples Reveals Their Importance as Gene Capture Platforms. *Front Microbiol.* 2018 March

Bado I, Papa-Ezdra R, Delgado-Blas JF, Gaudio M, Gutiérrez C, Cordeiro NF, García-Fulguerias V, Araújo Pirez L, Seija V, Medina JC, Rieppi G, Gonzalez-Zorn B, Vignoli R. Molecular characterization of carbapenem-resistant *Acinetobacter baumannii* in the Intensive Care Unit of Uruguay's University Hospital identifies the first *rmtC* gene in the species. *Microb Drug Resist.* 2018 Jun 19. Doi: 10.1089/mdr.2017.033

Valderrama MJ, Gonzalez-Zorn B, de Pablo PC, Díez-Orejas R, Fernández-Acero T, Gil-Serna J, de Juan L, Martín H, Molina M, Navarro-García F, Patiño B, Pla J, Prieto D, Rodríguez C, Román E, Sanz-Santamaría AB, de Silóniz MI, Suárez M, Vázquez C, Cid VJ. Educating in antimicrobial resistance awareness: adaptation of the Small World Initiative program to service-learning. *FEMS Microbiol Lett.* 2018 Sep 1; 365(17). Doi: 10.1093/femsle/fny161

Munk P et al. EFFORT Group. Abundance and diversity of the faecal resistome in slaughter pigs and broilers in nine European countries. *Nat Microbiol.* 2018 Aug 21. Doi: 10.1038/s41564-018-021-4

Van Gompel L, et al. EFFORT Group. The antimicrobial resistome in relation to antimicrobial use and biosecurity in pig farming, a metagenome-wide association study in nine European countries. *J Antimicrob Chemother.* 2019 Jan 14. [Epub ahead of print]

Luiken REC et al. EFFORT Group. Associations between antimicrobial use and the faecal resistome on broiler farms from nine European countries. *J Antimicrob Chemother.* 2019 Sep 1;74(9):2596-2604. Doi: 10.1093/jac/dkz235

Hadziabdic S., Fischer J., Borowiak M., Malorny B., Juraschek K., Kasbohrer A., Guerra B., Deneke C., Gonzalez-Zorn B. and Szabo I. The bla NDM-1 carrying IncA/C2 plasmid underlies structural alterations and co-integrate formation in vivo. *Antimicrobial Agents and Chemotherapy*, 63(8). 2019. (A). ISSN: 0066-4804. Impact factor: 4.904. Category: Pharmacology & Pharmacy, Quartile: 1, Position: 28 of 270. DOI: 10.1128/AAC.00380-19.

Dupouy V., Abdelli M., Moyano G., Arpailange N., Bibbal D., Cadiergues MC., Lopez-Pulin D., Sayah-Jeanne S., de Gunzburg J., Saint-Lu N., Gonzalez-Zorn B., Andremont A. and Bousquet-Melou A. Prevalence of Beta-Lactam and Quinolone/Fluoroquinolone Resistance in Enterobacteriaceae From Dogs in France and Spain-Characterization of ESBL/pAmpC Isolates, Genes, and Conjugative Plasmids. *Frontiers in veterinary science*, 279(6):1-10. 2019. (A). ISSN: 2297-1769. Impact factor: 2.245. Category: Veterinary Sciences, Quartile: 1, Position: 19 of 142. DOI: 10.3389/fvets.2019.00279.

Rozwandowicz M., Brouwer MSM., Mughini-Gras L., Wagenaar J., Gonzalez-Zorn B., Mevius DJ. and Hordijk J. Successful Host Adaptation of IncK2 Plasmids. *Frontiers in Microbiology*, 10:2384. 2019. (A). ISSN: 1664-302X. Impact factor: 4.236. Category: Microbiology, Quartile: 1, Position: 34 of 136. DOI: 10.3389/fmicb.2019.02384

Ortega-Huedo R., Cuesta M., Hoefler A. and Gonzalez-Zorn B. Econometric ARIMA methodology to elucidate the evolution of trends in nosocomial antimicrobial resistance rates in the European Union. *International Journal of Antimicrobial Agents*, 55(1):105800. 2020. (A). ISSN: 0924-8579. Impact factor 2019: 4.621. Category: Pharmacology & Pharmacy, Quartile: 1, Position: 39 of 270. DOI: 10.1016/j.ijantimicag.2019.09.004

Zivanovic J., Kouroussis E., Kohl JB., Adhikari B., Bursac B., Schott-Roux S., Petrovic D., Miljkovic JL., Thomas-Lopez D., Jung Y., Miler M., Mitchell S., Milosevic V., Gomes JE.,

Benhar M., Gonzalez-Zorn B., Ivanovic-Burmazovic I., Torregrossa R., Mitchell JR., Whiteman M., Schwarz G., Snyder SH., Paul BD., Carroll KS. and Filipovic MR. Selective Persulfide Detection Reveals Evolutionarily Conserved Antiaging Effects of S-Sulphydration. *Cell metabolism*, S1550-4131(19)30562-5. 2020. (A). ISSN: 1550-4131. Impact factor 2019: 21.567. Category: Endocrinology & Metabolism, Quartile: 1, Position: 3 of 143. DOI: 10.1016/j.cmet.2019.10.007

Garcia-Vello P., Gonzalez-Zorn B. and Setsoafia-Saba CK. Antibiotic resistance patterns in human, animal, food and environmental isolates in Ghana: a review. *The Pan African medical journal*, 12;35:37. 2020. (A). ISSN: 1937-8688. New Journal. Impact factor not available. DOI: 10.11604/pamj.2020.35.37.18323.

Sevilla E., Marin C., Delgado-Blas JF., Gonzalez-Zorn B., Vega S., Kuijper E., Bolea R. and Mainar-Jaime RC. Wild griffon vultures (*Gyps fulvus*) fed at supplementary feeding stations: Potential carriers of pig pathogens and pig-derived antimicrobial resistance?. *Transboundary and Emerging Diseases*, 67(3):1295-1305. 2020. (A). ISSN: 1865-1674. Impact factor 2019: 4.188. Category: Infectious Diseases, Quartile: 1, Position: 22 of 93. DOI: 10.1111/tbed.13470.

Rodriguez-Campoo R., Serna Bernaldo C., Ares M., Matamoros BR., Delgado-Blas JF., Montero N., Bernabe-Balas C., Wedel EF., Mendez IS., Muniesa M. and Gonzalez-Zorn B. Extensive antimicrobial resistance mobilization via multicopy plasmid encapsidation mediated by temperate phages. *The Journal of Antimicrobial Chemotherapy*, 75(11):3173-3180. 2020. (A). ISSN: 0305-7453. Impact factor 2019: 5.439. Category: Infectious Diseases, Quartile: 1, Position: 10 of 93. DOI: 10.1093/jac/dkaa311.

Sevilla E., Vico JP., Delgado-Blas JF., Gonzalez-Zorn B., Marin CM., Uruen C., Martin-Burriel I., Bolea R. and Mainar-Jaime RC. Resistance to colistin and production of extended-spectrum Beta-lactamases and/or AmpC enzymes in *Salmonella* isolates collected from healthy pigs in Northwest Spain in two periods: 2008-2009 and 2018. *International Journal of Food Microbiology*, 108967. 2020. (A). ISSN: 0168-1605. Impact factor 2019: 4.187. Category: Food science & technology, Quartile: 1, Position: 23 of 139. DOI: 10.1016/j.ijfoodmicro.2020.108967.

Morel CM., Alm RA., Ardal C., Bandera A., Bruno GM., Carrara E., Colombo GL., de Kraker MEA., Essack S., Frost I., Gonzalez-Zorn B., Goossens H., Guardabassi L., Harbarth S., Jorgensen PS., Kanj SS., Kostyanev T., Laxminarayan R., Leonard F., Hara GL., Mendelson M., Mikulska M., Mutters NT., Outtersson K., Rodriguez-Bano J., Tacconelli E., Scudeller L. and GAP-ONE network. A one health framework to estimate the cost of antimicrobial resistance. *Antimicrobial Resistance and Infection Control*, 9(1):187. 2020. (A). ISSN: 2047-2994. Impact factor 2019: 3.594. Category: Public, Environmental & Occupational Health, Quartile: 1, Position: 37 of 193. DOI: 10.1186/s13756-020-00822-6.

Gonzalez-Zorn B. Antibiotic use in the COVID-19 crisis in Spain. *Clinical Microbiology and Infection* : the official publication of the European Society of Clinical Microbiology and Infectious Diseases. In Press. (A). ISSN: 1198-743X. Impact factor 2019: 7.117. Category: Infectious Diseases, Quartile: 1, Position: 4 of 92. DOI: 10.1016/j.cmi.2020.09.055.

Luiken REC et al. EFFORT Group. Farm dust resistomes and bacterial microbiomes in European poultry and pig farms. *Environ Int*. 2020 Oct;143:105971. Doi: 10.1016/j.envint.2020.105971

Jose F. Delgado-Blas, Cristina M.Ovejero, Sophia David, Natalia Montero, William Calero-Caceres, M.Pilar Garcillan-Barcia, Fernando de la Cruz, Maite Muniesa, David M. Aanensen and Bruno Gonzalez-Zorn. Population genomics and antimicrobial resistance dynamics of

Escherichia coli in wastewater and river environments. *Commun boil.* 2021 April 12;4(1):457. Doi: 10.1038/s42003-021-01949-x

Leekitcharoenphon P, Johansson MHK, Munk P, Malorny B, Skarżyńska M, Wadepohl K, Moyano G, Hesp A, Veldman KT, Bossers A; EFFORT Consortium, Zajac M, Wasyl D, Sanders P, Gonzalez-Zorn B, Brouwer MSM, Wagenaar JA, Heederik DJJ, Mevius D, Aarestrup FM. Genomic evolution of antimicrobial resistance in *Escherichia coli*. *Sci Rep.* 2021 Jul 23;11(1):15108. doi: 10.1038/s41598-021-93970-7. PMID: 34301966; PMCID: PMC8302606.

Horie M, Yang D, Joosten P, Munk P, Wadepohl K, Chauvin C, Moyano G, Skarżyńska M, Dewulf J, Aarestrup FM, Blaha T, Sanders P, Gonzalez-Zorn B, Wasyl D, Wagenaar JA, Heederik D, Mevius D, Schmitt H, Smit LAM, Van Gompel L. Risk Factors for Antimicrobial Resistance in Turkey Farms: A Cross-Sectional Study in Three European Countries. *Antibiotics (Basel).* 2021 Jul 6;10(7):820. doi: 10.3390/antibiotics10070820. PMID: 34356741; PMCID: PMC8300668.

Palencia-Gándara C, Getino M, Moyano G, Redondo S, Fernández-López R, González-Zorn B, de la Cruz F. Conjugation Inhibitors Effectively Prevent Plasmid Transmission in Natural Environments. *mBio.* 2021 Aug 31;12(4):e0127721. doi: 10.1128/mBio.01277-21. Epub 2021 Aug 24. PMID: 34425705.

Ares-Arroyo M, Rocha EPC, Gonzalez-Zorn B. Evolution of ColE1-like plasmids across γ -Proteobacteria: From bacteriocin production to antimicrobial resistance. *PLoS Genet.* 2021 Nov 30;17(11):e1009919. Doi: 10.1371/journal.pgen.1009919

Prices and Awards

Different Fellowships from National, European and American Institutions.

Spanish Society of Microbiology. Biennial Award for young researcher. 2011.

National Antimicrobial Resistance Award, Spanish Ministry of Health. 2018.

1st Omega Group Animal Nutrition Award. Royal Academy of Veterinary Sciences of Spain. 2021.