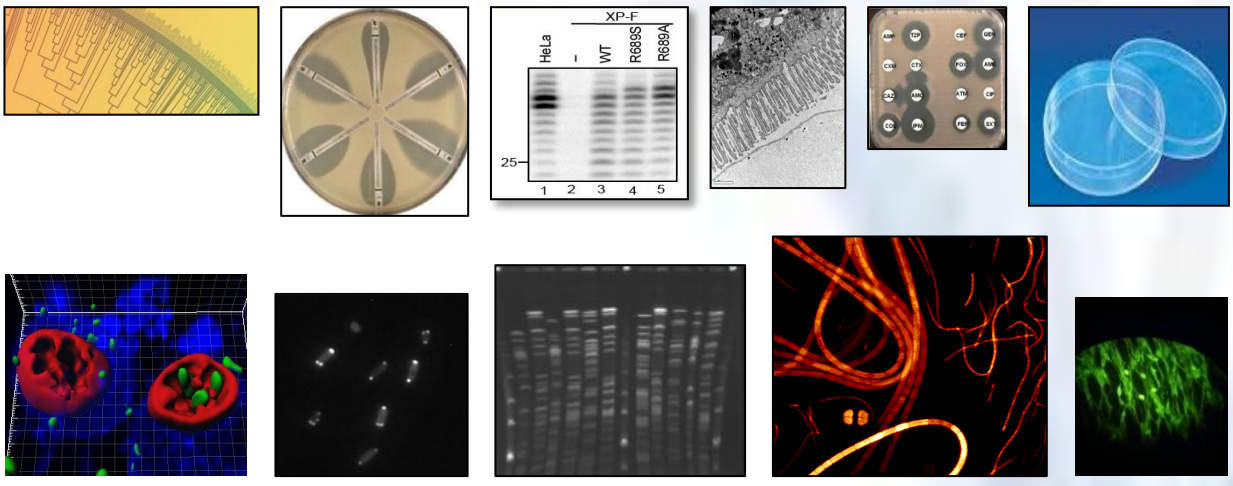
Department of Genetics and Microbiology
Universitat Autònoma de Barcelona

UAB
Universitat Autònoma de Barcelona

2015
ANNUAL SCIENTIFIC REPORT



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Introduction

It is my pleasure to write these lines of introduction of this 2015 Research Report. As this is my first year as Director of the Department, I take the opportunity here to thank the trust of its members and to state that it is my honour and privilege to play this role. I will work with dedication and transparency with the aim of improving the important tasks that have been entrusted to the Department. I would also like to acknowledge the tireless work and dedication of the outgoing Director, Dr. Montserrat Llagostera, who has set the bar very high.

In the period 2010-2015, the Department has not been oblivious to our country economic crisis that has directly and continuously affected the public sector. We have suffered a significant reduction of our budget and have lost potential to hiring non-permanent teachers, increasing the teaching load of the remaining personnel. However, all research indicators show that the level of scientific excellence in our department is, given the adverse circumstances, outstanding. In the period 2010-15, during the crisis, our 11 research groups have published more than 800 articles with a mean impact factor (IF) higher than 4 and with the top 25 publications with a mean IF of 19.7. Many of our articles have been published in high impact journals as Nature, New England Journal of Medicine, Lancet, Nature Medicine, Advanced Materials, American Journal of Human Genetics, Circulation, Blood, Molecular Biology and Evolution, Clinical Infectious Diseases, nano Letters, Genome Research, ACS nano, American Journal of Respiratory and Critical Care Medicine, Nature Communications, Nature Reviews Drug Discovery, Advanced Materials, Gastroenterology, Trends in Biotechnology and Current Opinion in Genetics & Development. The year 2015 was no exception because we made an important quantitative and qualitative step forward: 181 publications with a mean IF of 4.6, increasing to 12.4 if we consider the top 10% publications. The number of doctoral theses has also increased significantly to 24. The only indicator that has declined is the income from competitive grants, a fact partially compensated by a strong increase in revenue and service agreements. Many thanks to all members of the Department to overcome the turbulences and make this collective success possible. I hope that it will help to attract the talent needed for generational renewal.

I conclude with a few words of thanks to Professors Antoni Fontdevila and Oriol Cabré who have retired after many years of service at the UAB. Dr. Fondevila has been a reference in the field of evolutionary genetics and Dr. Cabré was one of the pioneers of molecular genetics at the Department. Our endearing secretary Conchi Sanjuan has also retired from her administrative duties at the Department, leaving us after many years of good work. We will try to transmit everything we have learned from you. It has been a very rewarding privilege to enjoy your presence throughout these years.

Prof. Jordi Surrallés

Director of the Department

Introducció

És per mi un plaer escriure aquestes línies d'introducció de la memòria de recerca de l'any 2015. Com que aquest és el meu primer any com a Director del Departament, voldria aprofitar aquestes línies per agrair la confiança dels seus membres i afirmar que és un honor i un privilegi poder exercir aquest càrrec. Ho faré amb dedicació i transparència amb l'objectiu de poder millorar les important tasques que tenim encomanades al Departament. També agrair la incansable feina i dedicació de la Directora sortint, Dr. Montserrat Llagostera, qui ha deixat el llistó molt alt.

En el període 2010-2015, el Departament no ha estat aliè a la crisis econòmica del nostre país que ha afectat de forma directe i continuada al sector públic. Hem sofert una important reducció del nostre pressupost i hem perdut capacitat de contractació de professorat no permanent, fent que la càrrega docent del professorat augmenti. Malgrat tot, tots els indicadors de recerca indiquen que el nivell d'excel•lència científica del nostre Departament és, donades les circumstàncies, extraordinari. En el període 2010-15, en plena crisis, els 11 grups de recerca hem publicat més de 800 articles amb un índex d'impacte (FI) mig superior a 4 i amb les 25 millors publicacions amb un FI mig de 19,7. Molts dels nostres articles s'han publicat en revistes de molt alt impacte com Nature, New England Journal of Medicine, Lancet, Nature Medicine, Advanced Materials, American Journal of Human Genetics, Circulation, Blood, Molecular Biology and Evolution, Clinical Infectious Diseases, Nano Letters, Genome Research, ACS Nano, American Journal of Respiratory and Critical Care Medicine, Nature Communications, Nature Reviews Drug Discovery, Advanced Materials, Gastroenterology, Trends in Biotechnology i Current Opinion in Genetics & Development. Aquest any 2015 no ha estat una excepció doncs hem fet un important salt quantitatiu i qualitatiu: 181 publicacions amb un FI mig de 4,6 que augmenta a 12,4 si considerem el decil més alt de publicacions. El nombre de tesis doctorals també ha augmentat significativament fins a 24. L'únic indicador que ha disminuït ha estat els diners aconseguits en projectes competitius, fet parcialment compensat per un fort increment en ingressos per convenis i serveis. Moltes gràcies a tots els membres del Departament per sobreposar-se a les turbulències i fer possible aquest èxit col•lectiu. Esperem que serveixi per captar el talent necessari per la renovació generacional que ja hem començat.

Voldria concloure amb unes paraules d'agraïment als Professors Oriol Cabré i Antoni Fontdevila que s'han jubilat després de molts anys de servei a la UAB. El Dr. Fondevila ha estat una referència en el camp de la genètica evolutiva i el Dr. Cabré un dels pioners de la genètica molecular al Departament. També s'ha jubilat la Conchi Sanjuan, entranyable administrativa del Departament que ens deixa després de molts anys de bona feina. Procurarem transmetre tot allò que hem après de vosaltres. Ha estat un privilegi molt enriquidor poder gaudir de la vostra presència al llarg d'aquests anys.

Prof. Jordi Surrallés

Director del Departament

The Department

The Department of Genetics and Microbiology (DGM) is in charge of organizing and developing research and teaching in the disciplines included in the areas of Genetics and Microbiology. It is an Interfaculty Department, formed by three Units, two located in the Campus at the Faculty of BioSciences (Genetics Unit and Microbiology Unit Campus) and the third (Medical Microbiology Unit) for integrated teaching and research in the area Clinical Microbiology at the five UAB Hospitals (Sant Pau, Vall d'Hebron, Hospital del Mar, Germans Trias i Pujol and Parc Tauli).

The activity of DGM is fully committed to participate in the unprecedented intellectual adventure of Biology in the XXI century. We work hard to (i) contribute with our ability and commitment to scientific excellence in the research areas of Genetics and Microbiology; (ii) provide quality teaching and education to our students, future researchers, teachers and professionals in these areas; and (iii) contribute to increase the wellbeing of our society through the practical application of our expertise in biomedicine and other industrial sectors such as biotechnology, food, pharmacy and environment, among others

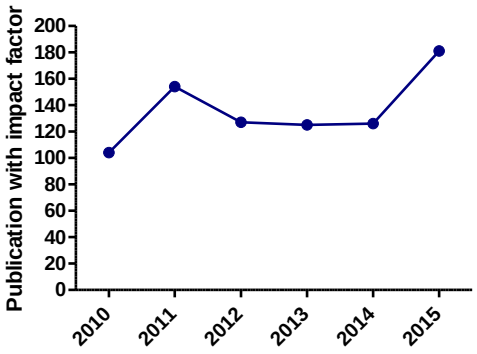
Further info at:
http://www.uab.cat/departament/genetica-microbiologia/

Analysis of Scientific Production (2015)

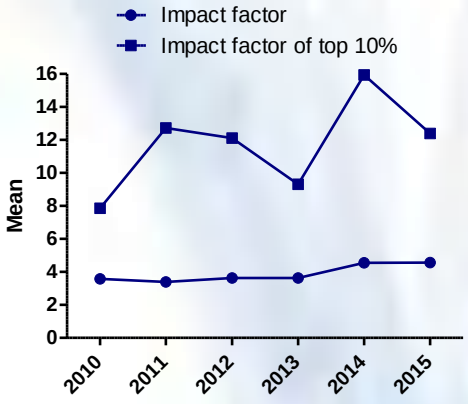
11 research groups	**181** publications	**4.6** impact factor
24 PhD Thesis	**133.100** euros in grants	**357.957** euros invoiced

	2010	2011	2012	2013	2014	2015
Number of publication with impact factor	104	154	127	125	126	181
Total impact factor	372,43	521,38	460,76	454,33	569,71	826,80
Mean impact factor	3,58	3,39	3,63	3,63	4,55	4,57
Mean impact factor of top 10%	7,86	12,73	12,11	9,31	15,94	12,39
PhD thesis defended	21	20	17	17	12	24
Competitive income (grants) in euros	940.412	781.163	962.260	382.874	931.469	133.100
Non-competive income in euros	82.912	184.065	247.820	84.358	80.198	357.958
Total income in euros	1.023.324	965.229	1.210.081	467.232	1.011.667	491.058

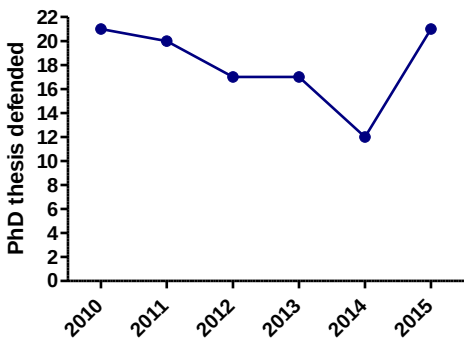
Number of indexed publications



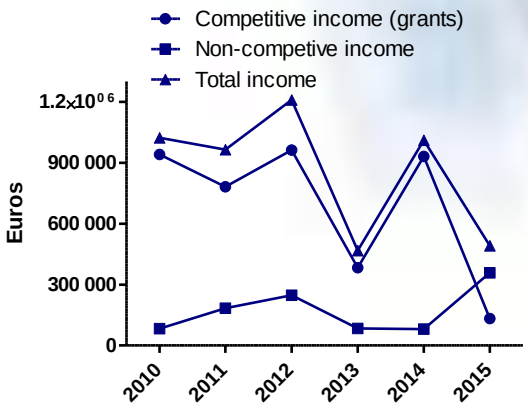
Impact Factors (SCI)



Number of PhD Thesis

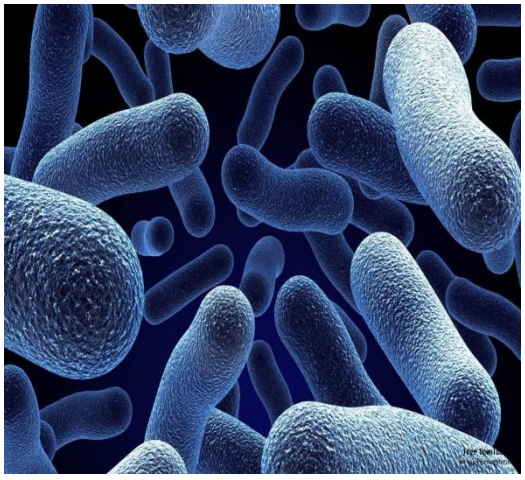


Financial research incomes



Research Groups Performance

2015



Bacterial Pathogenesis and Antimicrobial Group

Members

Dr. Isidre Gibert (PI)
Dr. Xavier Daura(PI)
Dr. Daniel Yero
Dra. Celeste Gómez
Marta Calvet
Roser Marquez
Messiner Gomes
Sònia Martínez-Servat
Oscar Conchillo
Pablo Rodríguez
Carles Mitjans

Web: http//ibb.uab.cat

Research

The main objective of our research group is the development of new strategies to combat infections by multidrug-resistant (MDR) bacteria. Our team combines a range of experimental and computational techniques for the identification of antimicrobial-target and vaccine-antigen candidates with new modes of action. Specifically, we are engaged in the following types of activities:

- Development of bioinformatic methods for the identification of novel antimicrobial-drug targets, antigens and their epitopes in pathogenic bacteria.
- Experimental validation and characterisation of identified antigens and antimicrobial-drug targets.
- Biomolecular modelling and simulation for the design of synthetic vaccines.
- Target-based virtual screening for antimicrobial-drug discovery.
- Experimental validation of hit antimicrobial compounds.

Publications 2015

- ✓ Conchillo-Solé O, Yero D, Coves X, Huedo P, Martínez-Servat S, Daura X, Gibert I. Draft Genome Sequence of *Stenotrophomonas maltophilia* Strain UV74 Reveals Extensive Variability within Its Genomic Group. Genome Announc. 2015, 3:e00611–15. doi: 10.1128/genomeA.00611-15.

- ✓ Huedo P, Yero D, Martinez-Servat S, Ruyra À, Roher N, Daura X, Gibert I. Decoding the genetic and functional diversity of the DSF quorum-sensing system in *Stenotrophomonas maltophilia*. Front. Microbiol. 2015, 6. doi: 10.3389/fmicb.2015.00761

- ✓ López Hernández Y, Yero D, Pinos-Rodríguez JM, Gibert I. Animals devoid of pulmonary system as infection models in the study of lung bacterial pathogens. Front. Microbiol. 2015, 6. doi: 10.3389/fmicb.2015.00038

- ✓ Martínez P, Huedo P, Martinez-Servat S, Planell R, Ferrer-Navarro M, Daura X, Yero D, Gibert I. *Stenotrophomonas maltophilia* responds to exogenous AHL signals through the LuxR solo SmoR (Smlt1839). Front. Cell. Infect. Microbiol. 2015, 5. doi: 10.3389/fcimb.2015.00041

Basic and Applied Microbiology Group

Members

Dr. Antonio Villaverde (PI)
Dr. Marina Luquín
Dr. Neus Ferrer-Miralles
Dr. Esther Julián
Dr. José Luis Corchero
Dr. Esther Vázquez
Dr. Ugutz Unzueta
Dr. Paolo Saccardo
Dr. Estela Noguera
Rosa Mendoza
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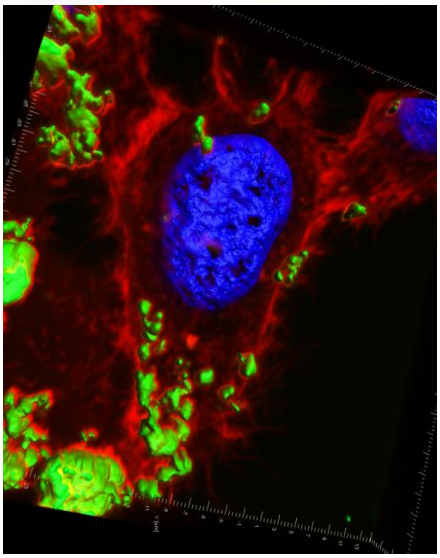
Fabian Rueda
Olivia Cano
Naroa Serna
Laura Sánchez
Sandra Guallar
Marta Llorens
Cristina Sosa

Web: ***http://ibb.uab.cat/ibb/index.php?option=com_wrapper&Itemid=127&lang=english***



Research

We generate nanostructured protein materials for biomedical applications, namely drug delivery, gene therapy, protein replacement and tissue engineering. In this context, we exploit diverse prokaryotic and eukaryotic cell factories for the design and bioproduction of self-assembling proteins. These engineered polypeptides are the basis for the design of smart functional materials displaying mechanical stability, regular geometry and refined properties such as specific cell binding, receptor-mediated internalization, intracellular trafficking and drug delivery. Most of our current collaborative projects are devoted to new nanosized drugs for the treatment of colorectal cancer. In another research line we focus on the study of environmental mycobacteria species as immunostimulatory and immunotherapeutic agents for the treatment of tuberculosis and cancer.

Publications 2015

- ✓ Escarlata Rodríguez-Carmona, Rosa Mendoza, Eugènia Ruiz-Cánovas, Neus Ferrer-Miralles, Ibane Abasolo, Simó Schwartz Jr, Antonio Villaverde and José Luis Corchero. 2015. A novel bio-functional material based on mammalian cell aggresomes. Applied Microbiology and Biotechnology, 99:7079-7088.

- ✓ Antonio Villaverde, José Luis Corchero, Joaquin Seras-Franzoso and Elena Garcia-Fruitós. 2015. Functional protein aggregates: just the tip of the iceberg. Nanomedicine (Lond), 10: 2881-2891.

- ✓ Seras-Franzoso J, Peternel S, Cano-Garrido O, Villaverde A, García-Fruitós E. 2015. Bacterial inclusion body purification. Methods Mol Biol.1258:293-305.

Publications 2015 (cont)

- ✓ Alamo P, Gallardo A, Di Nicolantonio F, Pavón MA, Casanova I, Trias M, Mangues MA, Lopez-Pousa A, Villaverde A, Vázquez E, Bardelli A, Céspedes MV and Mangues R. 2015. Higher metastatic efficiency of KRas G12V than KRas G13D in a colorectal cancer model. FASEB Journal. 29:464-476.

- ✓ Ugutz Unzueta, Maria Giuliani, Antonio Villaverde, Luisa Tutino, Felicitas Vázquez, Giulia Accardi, Filomena Sannino, Rosa Mendoza, Ibane Abasolo, Verónica Toledo-Rubio, Simo Schwartz, Jr., Ermenegilda Parrilli, José L. Corchero and Neus Ferrer-Miralles. 2015. Strategies for the production of difficult-to-express full-length eukaryotic proteins using microbial cell factories: production of human alpha-galactosidase A. Applied Microbiology and Biotechnology, 99:5863-5874.

- ✓ Joaquin Seras-Franzoso, Witold I. Tatkiewicz, Esther Vazquez, Elena García-Fruitós, Imma Ratera, Jaume Veciana, and Antonio Villaverde. 2015. Integrating mechanical and biological control of cell proliferation through bioinspired multi-effector multi-effector materials. Nanomedicine (Lond), 10: 873–891.

- ✓ Hugo Peluffo, Ugutz Unzueta, Luciana Negro, Zhikun Xu, Esther Váquez, Neus Ferrer-Miralles and Antonio Villaverde. 2015. BBB-targeting, protein-based nanomedicines for drug and nucleic acid delivery to the CNS. Biotechnological Advances, 33: 277-287.

- ✓ Unzueta U, Céspedes MV, Ferrer-Miralles N, Vazquez E, Mangues R., Villaverde A. 2015. Towards Protein-Based Viral Mimetics for Cancer Therapies. Trends in Biotechnology, 33: 253-258.

- ✓ Uwe Mamat; Kathleen Wilke; David Bramhill; Andra B Schromm; Buko Lindner; Thomas A Kohl; José L Corchero; Antonio Villaverde; Lana Schaffer; Steven R Head; Chad Souvignier; Timothy C Meredith; Ronald W Woodard. 2015. Detoxifying Escherichia coli for endotoxin-free production of recombinant proteins. Microbial Cell Factories 14:57.

- ✓ Zhikun Xu, María Virtudes Céspedes, Ugutz Unzueta, Patricia Álamo, Mireia Pesarrodona, Ramón Mangues, Esther Vázquez, Antonio Villaverde, Neus Ferrer-Miralles. 2015. Targeting low density lipoprotein receptors with protein-only nanoparticles. Journal of Nanoparticle Research 17 (3), 1-14.

- ✓ Zhikun Xu, Ugutz Unzueta, Mónica Roldán, Ramón Mangues, Alejandro Sánchez-Chardi, Neus Ferrer-Miralles, Antonio Villaverde and Esther Vázquez. Formulating tumor-homing peptides as regular nanoparticles enhances receptor-mediated cell penetrability. 2015. Materials Letters. 154: 140–143.

- ✓ Fabián Rueda, María Virtudes Céspedes, Oscar Conchillo, Alejandro Sanchez-Chardi, Joaquin Seras-Franzoso, Rafael Cubarsi, Alberto Gallardo, Mireia Pesarrodona, Neus Ferrer-Miralles, Xavier Daura, Esther Vázquez, Elena García-Fruitós, Ramón Mangues, Ugutz Unzueta, Antonio Villaverde. 2015. Bottom-up instructive quality control in the biofabrication of smart protein materials. Advanced Materials, 27, 7816–7822.

- ✓ Neus Ferrer-Miralles, Escarlata Rodríguez-Carmona, José Luis Corchero, Elena García-Fruitós, Esther Vázquez, Antonio Villaverde. 2015. Engineering protein self-assembling in protein-based nanomedicines for drug delivery and gene therapy. Critical Reviews on Biotechnology 35: 209-221.

- ✓ Pesarrodona, M., Unzueta, U., Vázquez, E. 2015. Dialysis: A characterization method of aggregation tendency. Springer Protocols, Humana Press, NY , 1258 : 321- 330.

- ✓ Baelo A, Levato R, Julián E, Crespo A, Astola J, Gavaldà J, Engel E, Mateos-Timoneda MA, and Torrents E. 2015. Disassembling bacterial extracellular matrix with DNase-coated nanoparticles to enhance antibiotic delivery in biofilm infections. Journal of Controlled Release. 209: 150-158.

- ✓ Julián E, Baelo A, Gavaldà J, and Torrents E. 2015. Methyl-Hydroxylamine as an Efficacious Antibacterial Agent That Targets the Ribonucleotide Reductase Enzyme. PLoS ONE 10(3): e0122049.

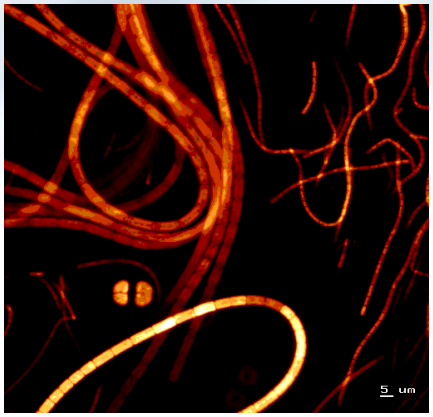
- ✓ Rech G, Vilaplana C, Velasco J, Pluvinet R, Santín S, Prat C, Julián E, Alcaide F, Comas I, Sumoy L, Cardona PJ 2015. Draft Genome Sequences of Mycobacterium setense Type Strain DSM-45070 and the Nonpathogenic Strain Manresensis, Isolated from the Bank of the Cardener River in Manresa, Catalonia, Spain. Genome Announcements. Genome Announc. 2015 Feb 5;3(1). pii: e01485-14.

- ✓ Barniol-Xicota M, Escandell A, Valverde E, Julián E, Torrents E, Vázquez S. 2015. Antibacterial activity of novel benzopolycyclic amines. Bioorganic & Medicinal Chemistry. 23: 290–296.

Environmental Microbiology Group

Members

Dr. Olga Sánchez (PI)
Dr. Isabel Esteve
Dr. Núria Gaju
Dr. Marc Llirós
Dr. Maira Martínez
Dr. Jordi Mas
Dr. Antoni Solé
Laia Millach
Eloi Parladé
Ferran Pujol
Cristina Sosa
Núria Tomás
Núria Vigués



Research

The scientific activity of the group relates to applied areas in the field of Environmental Microbiology, such as the study of the role of microorganisms in the bioremediation of contaminants like metals or drugs in natural ecosystems, as well as the development of electrochemical sensors for the measurement of toxicity in waters. We also investigate the metabolic pathways of bacteria in marine environments able to detoxify toxic substances as mercury.

Publications 2015

- ✓ Alonso A, Vigués N, Rodriguez-Rodríguez R, Borrisé X, Muñoz M, Muraviev D.N, Mas J, Muñoz-Berbel X. Activity-tunelable nanocomposites based on dissolution and in situ recrystallization of nanoparticles on ion exchange resins. RSC Advances 2015, 5: 89971-89975.
- ✓ Bonilla N, Vida C, Martínez-Alonso M, Landa BB, Gaju N, Cazorla FM, de Vicente A. Organic amendments to avocado crops induce suppressiveness and influence the composition and activity of soil microbial communities. Applied and Environmental Microbiology 2015, 81: 3405-3418.
- ✓ Brosel-Oliu S, Abramova N, Bratov A, Vigués N, Mas J, Muñoz X. Sensitivity and response time of polyethyleneimine modified impedimetric transducer for bacteria detection. Electroanalysis 27(3): 656-662..
- ✓ Ferrera I, Mas J, Taberna E, Sanz J, Sánchez O. Biological support media influence the bacterial community responsible for biofouling in two reverse osmosis water reclamation demonstration plants. Biofouling 2015, 31:173-180.
- ✓ Martín-González L, Hatijah Mortan S, Rosell M, Parladé E, Martínez-Alonso M, Gaju N, Caminal G, Adrian L, Marco-Urrea E. Stable carbon isotope fractionation during 1,2-dichloropropane-to-propene transformation by an enrichment culture containing *Dehalogenimonas* strains and a *dcpA* gene. Environmental Science and Technology 2015, 49: 8666-8674.
- ✓ Millach L, Solé Millach L, Solé A, Esteve, I. Role of *Geitlerinema* sp. DE2011 and *Scenedesmus* sp. DE2009 as bioindicators and immobilizers of chromium in a contaminated natural environment. BioMed Research International 2015, Article ID 519769, 11 pages, doi:10.1155/2015/519769.
- ✓ Pujol-Vila F, Vigués N, Díaz-González M, Muñoz-Berbel X, Mas J. Fast and sensitive optical toxicity bioassay based on dual wavelength analysis of bacterial ferricyanide reduction kinetics. Biosensors and bioelectronics 67: 272-279.

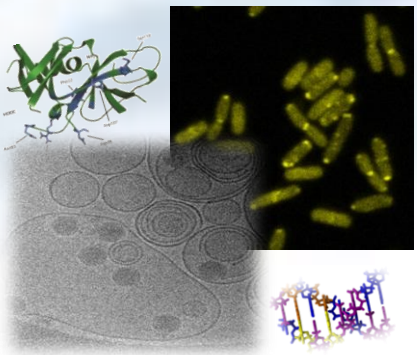
Publications 2015 (cont)

- ✓ Sanahuja D, Giménez-Gómez P, Vigués N, Ackermann TN, Guerrero-Navarro AE, Pujol-Vila F, Sacristán J, Santamaria N, Sánchez-Contreras M, Díaz-González M, Mas J, Muñoz-Berbel X. Microbial trench-based optofluidic system for reagentless determination of phenolic compounds. Lab on a chip 15: 1717-1726.
- ✓ Sánchez O (ed). Bioremediation of wastewater. Factors and treatments. Apple Academic Press 2015.
- ✓ Sánchez O, Garrido L, Arencibia Aguilar LF, Mas J, Palacios-Díaz MP. Molecular characterization of biofilms developing in drip irrigation systems operating with reclaimed water in Gran Canaria (Spain). In: Drip irrigation: Technology, management and efficiency. Steele AH (ed). Nova Science Publishers 2015.
- ✓ Sidrach-Cardona R, Sánchez O, Garrido L, Mas J, Bécares E. Molecular characterization of microbial communities in constructed wetlands: the effect of plant species, organic matter and hydraulic design. In: Wastewater treatment: processes, management, strategies and environmental/health impacts, Barrett LM (ed). Nova Science Publishers 2015, pp 45-67.

Molecular Microbiology Group

Members

Dr. Jordi Barbé (PI)
Dr. Montserrat Llagostera
Dr. Susana Campoy
Dr. Jesús Aranda
Dr. M. Pilar Cortés
Joan Colom
Oihane Irazoki
Jennifer Otero
María Pérez Varela
Miquel Sánchez
Jordi Corral
Joan Ruiz
Susana Escribano



Research

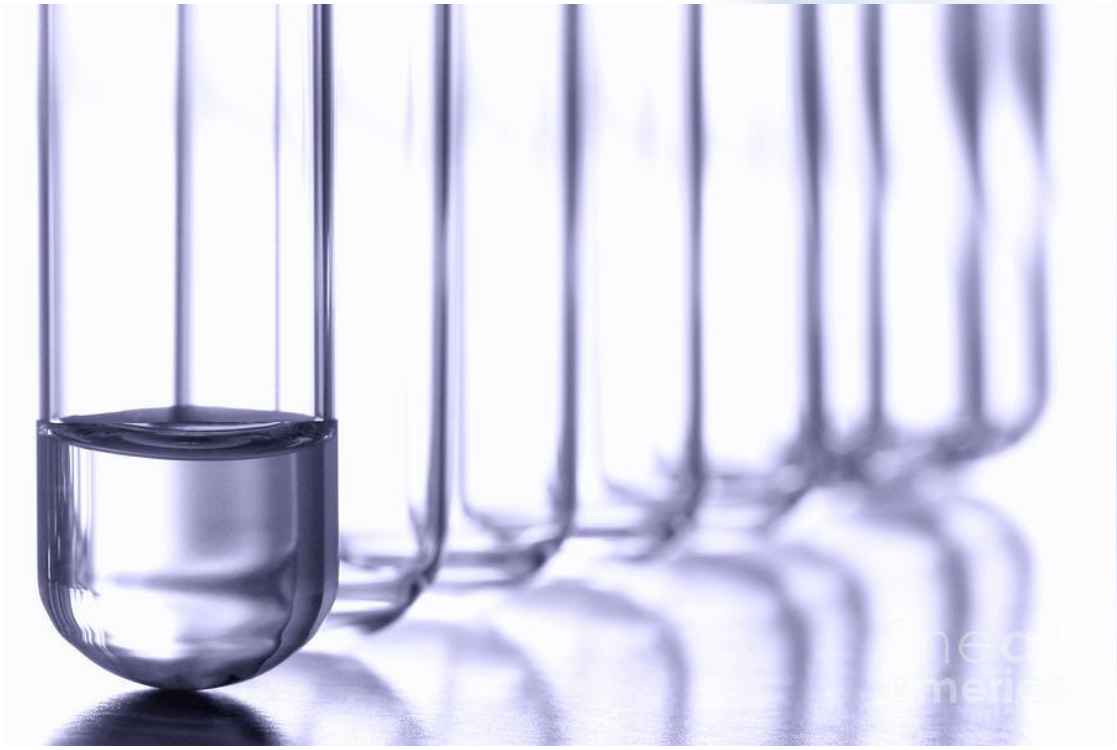
Research is focused in the following three topics: i) DNA repair (SOS system) and mechanisms of bacterial pathogenesis; ii) Design of vaccine for animal pathogens; iii) Mechanisms of antibiotic resistance and bacteriophage therapy.

Publications 2015

- ✓ Brandão D, Liébana S, Campoy C, Cortés MP, Alegret S, Pividori MI. 2015. Simultaneous electrochemical magnetogenosensing of foodborne bacteria based on triple-tagging multiplex amplification. Biosensors and Bioelectronics. 74: 652-659.
- ✓ Brandão D, Liébana S, Campoy S, Alegret S, Isabel Pividori M.2015. Immunomagnetic separation of Salmonella with tailored magnetic micro and nanocarriers. A comparative study.Talanta. 143:198-204.
- ✓ Colom J, Cano-Sarabia M, Otero J, Cortés P, Maspoch D, Llagostera M. 2015. Liposome-encapsulated bacteriophages for enhanced oral phage therapy against *Salmonella*. Applied and Environmental Microbiology. 81: 4841-4849.
- ✓ Cortés P, Spricigo DA, Bardina C, Llagostera M. 2015. Remarkable diversity of Salmonella bacteriophages in swine and poultry. FEMS Microbiology Letters. 362: 1-7.
- ✓ García-Pedrazuela M, Frutos JM, Muñoz-Egea MC, Alcaide F, Tórtola T, Vitoria A, Cortés P, Esteban J. 2015. Polyclonality among clinical strains of nonpigmented rapidly growing mycobacteria: phenotypic and genotypic differences and their potential implications. Clinical Microbiology and Infection. 21: 348.e1-348.e4. DOI:10.1016/J.CMI.2014.12.004
- ✓ Henry R, Crane B, Powell D, Deveson Lucas D, Li Z, Aranda J, Harrison P, Nation RL, Adler B, Harper M, Boyce JD, Li J. 2015. The transcriptomic response of *Acinetobacter baumannii* to colistin and doripenem alone and in combination in an in vitro pharmacokinetics/pharmacodynamics model. J Antimicrob Chemother. 70(5):1303-13.
- ✓ Jara LM, Cortés P, Bou G, Barbé J, Aranda J. 2015. Differential roles of antimicrobials in the acquisition of drug resistance through the activation of the SOS response in *Acinetobacter baumannii*. Antimicrobial Agents and Chemotherapy. 59(7):4318-20.

Publications 2015 (cont)

- ✓ Jara LM, Pérez-Varela M, Corral J, Arch M, Cortés P, Bou G, Aranda J, Barbé J. 2015. Novobiocin inhibits the antimicrobial resistance acquired through DNA damage3 induced mutagenesis in *Acinetobacter baumannii*. Antimicrobial Agents and Chemotherapy. 59: 4318-4320.
- ✓ Rago L, Monpart N, Cortés P, Baeza JA, Guisasola A. 2015. Performance of microbial electrolysis cells with bioanodes grown at different external resistances. Water Science & Technology. DOI: 10.2166/wst.2015.418.
- ✓ Rago L, Ruiz Y, Baeza JA, Guisasola A, Cortés P. 2015. Microbial community analysis in a long-term membrane-less microbial electrolysis cell with hydrogen and methane production. Bioelectrochemistry. 106: 359-368.
- ✓ Sanchez-Alberola N, Campoy S, Emerson D, Barbé J, Erill I. 2015. An SOS Regulon under control of a noncanonical LexA-Binding motif in the Betaproteobacteria. J Bacteriol. 197(16):2622-30.



VHIR Research Group of Microbiology

Members

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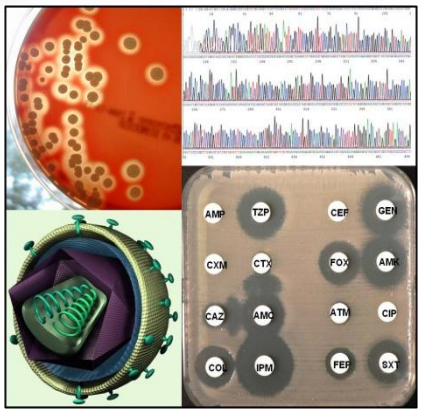

Research

The Research Group of Microbiology at Vall d'Hebron Research Institute (VHIR) focuses on the study of the microbiology aspects involved in the infectious diseases aimed at improving developing basic, translational and clinical research that could improve the outcomes of patients with infectious diseases. We work with special interest in studying the mechanisms involved in antimicrobial resistance, the sexually transmitted infectious diseases, the study of viral and fungal infection in immunocompromised patients, the microbial mechanisms involved in pathogenicity as well as microbial epidemiology

Publications 2015

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Infectious Diseases and Clinical Microbiology Group

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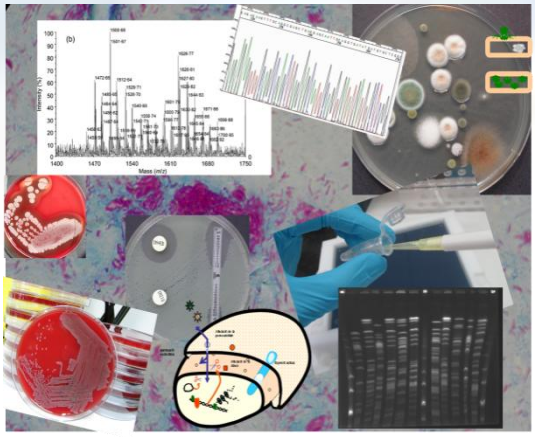

Research

This is a multi-disciplinary group of researchers from the Department of Microbiology and, the Infectious Diseases Unit at Hospital Santa Creu i Sant Pau. Our research lines focus on two main interrelated areas. The first of these is antimicrobial resistance. This area includes the study of molecular epidemiology (population and clonality studies in bacteria, mycobacteria, fungi and viruses), molecular bases of bacterial resistance to antibiotics, vectors that convey resistance genes (plasmids, transposons, integrons, phages), and the use of molecular techniques in diagnosis of infectious diseases. The second area emphasizes research related to bacteraemia and endocarditis, nosocomial infections, prosthetic joint infections, central nervous system infections, and tuberculosis.

Publications 2015

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Publications 2015 (cont)

As a membres of the sutdy groups.

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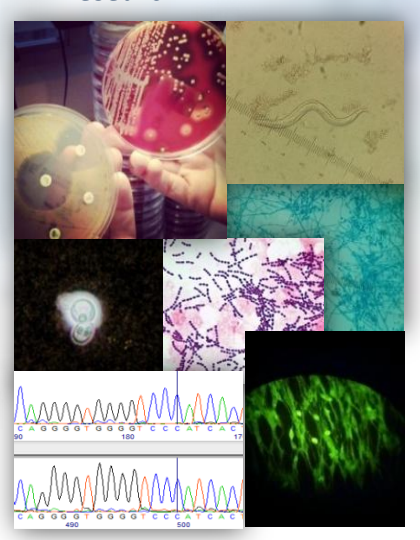
Research



Our Group, led by Prof. Vicente Ausina, MD, PhD, Head of the Microbiology Service at Hospital Unviersitari Germans Trias i Pujol, is involved in several Spanish research networks including REIPI, RESITRA, CIBERES and CIBERESP and is focused in the development, standardization and clinical evaluation of microbiological, immunological and molecular techniques in the diagnosis of infectious diseases. Part of the Group is also devoted to the development of experimental models in infectious pathology, the study of the molecular mechanisms of antimicrobial resistance, and on the assessment of the antimicrobial activity of new drugs. Our historical focus is on respiratory pathogens, especially Mycobacterium tuberculosis and opportunistic mycobacteria. Additionally, other research lines leaded by different group members, such as molecular virology, pathogenesis of viral infection, immunology of inflammation and new bacterial anti-inflammatory molecules, as well as epidemiology and public health of communicable diseases, have acquired more relevance over the last decade.

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Zoonoses and HIV Study Group

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Research

The WHO defines zoonosis as "any disease naturally transmitted from animals to humans or vice versa." The research team began working on this line in 1980, coinciding with a significant increase of cases of February Botonous Mediterranean FBM (Rickettsia conorii). Currently the research team covers all fields: veterinary diagnosis, epidemiological, clinical and therapeutic. The main diagnostic difficulty is that most etiological agents are intracellular. This hampers the diagnosis. We have worked on the application of serological tests and culture technique "shell-vial." Currently we are working on a new line of research on molecular techniques. On the other hand, we also carry out research into HIV/AIDS, particularly immunological studies in HIV+ patients older than 50 years, we collaborate with national and international cohorts and participate in clinical trials.

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Genome Instability and DNA Repair Group

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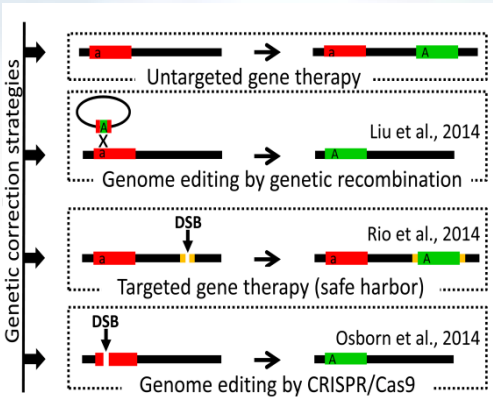

Research

Our research interests are cancer-prone genetic syndromes with defective DNA repair with special focus in Fanconi anemia. We also investigate the genetics of familiar cancer syndromes and perform therapeutic research including gene and cell therapy approaches and cell-based drug screening platforms. A long term goal is to understand the mechanisms that maintain genome stability and protect us from disease, cancer, and ageing.

Publications 2015

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Research

Our research field is Evolutionary Biology, a complex historical process that accounts for the current Biodiversity on earth. We seek to understand the mechanisms that generate diversity patterns at several levels: geographical, phenotypical, chromosomal and nucleotide level. Our multidisciplinary team includes researchers with diverse expertise that use different but complementary approaches: from experimental and field work to bioinformatics and modelization. Besides, our experimental work makes use of two different species as model systems: Drosophila and humans. We are engaged in projects of comparative genomics in Drosophila, adaptation of Drosophila populations to global climate change, genome-wide analyses of nucleotide and structural variability in a large set of Drosophila lines, modelization of the genotype-phenotype map, and functional and evolutionary impact of inversions in the human genome.

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✓Simões P, Fragata I, Lopes-Cunha M, Lima M, Kellen B, Bárbaro M, Santos M, Matos M. 2015. Wing trait-inversion associations in Drosophila subobscura can be generalized within continents, but may change through time. J Evol Biol. 28 (12):2163–2174.

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Group of Mutagenesis

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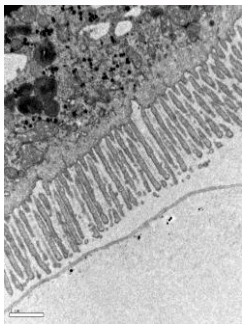

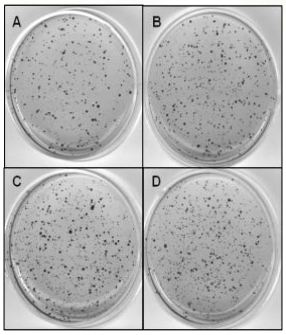

Research

Our team works on the following topics: (i) Molecular mechanisms involved in the genotoxicity/carcinogenicity of arsenic, using long-term exposures and environmental relevant doses; (ii) In vitro and in vivo models to determine the genotoxic/ carcinogenic risk of nanomaterial exposures and their uptake through intestinal barriers; (iii) Genomic instability in patients suffering from chronic renal pathologies, and procedures to ameliorate genotoxic risk; and (iv) Genetic basis of thyroid cancer and molecular description of candidate genes .

Publications 2015

- ✓ Demir E., H. Akça, D. Burgucu, O. Tokgün, F. Turna, S. Aksakal, G. Vales, A. Creus, R. Marcos. Genotoxic and cell-transforming effects of titanium dioxide nanoparticles. *Environmental Research,* 136: 300-308 (2015).
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- ✓ Carmona E.R., B. Escobar, G. Vales, R. Marcos. Genotoxic testing of titanium dioxide anatase nanoparticles using the wing-spot test and the comet assay in *Drosophila. Mutation Research (GTEM),* 778: 12-21 (2015).

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- ✓ Rodriguez-Ribera L., Z. Corredor, S.B. Sandoval, E. Coll, I. Silva, J.M.L. Díaz, J.E. Ballarin, S. Pastor, R. Marcos. Radiosensibility in patients suffering from chronic kidney disease. *International Journal of Radiation Biology*, 91: 172-178 (2015).

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- ✓ Arribas J., J. Castellví, R. Marcos, C. Zafón. A. Velázquez. Expression of YY1 in differentiated thyroid cancer. *Endocrine Pathology,* 26: 111-118 (2015).

- ✓ Figlioli G., B. Chen, R. Elisei, C. Romei, C. Campo, M. Cipollini, A. Cristaudo, F. Bambi, E. Paolicchi, P. Hoffmann, S. Herms, M. Kalemba, D. Kula, S. Pastor, R. Marcos, A. Velázquez, B. Jarząb, S. Landi, K. Hemminki, F. Gemignani, A. Försti. Novel genetic variants in differentiated thyroid cancer and assessment of the cumulative risk. *Scientific Reports,* 5: 8922 (2015).

- ✓ Alaraby M., B. Annangi, A. Hernández, A. Creus, R. Marcos. A comprehensive study of the harmful effects of zinc oxide nanoparticles using *Drosophila melanogaster* as an *in vivo* model. *Journal of Hazardous Materials,* 296: 166-174 (2015).

- ✓ Maisanaba S., A.I. Prieto, M. Puerto, D. Gutiérrez-Praena, E. Demir, R. Marcos, A.M. Cameán. *In vitro* genotoxicity testing of carvacrol and thymol using the micronucleus and the mouse lymphoma assays. *Mutation Research (GTEM),* 784-785: 37-44 (2015).

- ✓ Mancikova, V., R. Cruz, L. Inglada-Pérez, C. Fernández-Rozadilla, I. Landa, J. Cameselle-Teijeiro, C. Celeiro, S. Pastor, A. Velázquez, R. Marcos, V. Andía, C. Álvarez-Escolá, A. Meoro, F. Schiavi, G. Opocher, I. Quintela, J. Ansede-Bermejo, C. Ruiz-Ponte, P. Santisteban, M. Robledo, A. Carracedo. Thyroid cancer GWAS identifies 10q26.12 and 6q14.1 as novel susceptibility loci and reveals genetic heterogeneity among populations. *International Journal of Cancer,* 137: 1870-1878 (2015).

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- ✓ Bach J., J. Peremartí, B. Annangi, R. Marcos, A. Hernández. Reduced cellular DNA repair capacity after environmentally relevant arsenic exposures. Influence of *Ogg1* defects. *Mutation Research (FMMM),* 779: 144-151 (2015).

- ✓ Carmona E.R., C. Inostroza-Blancheteau, L. Rubio, R. Marcos. Genotoxic effects of copper oxide nanoparticles in *Drosophila melanogaster. Mutation Research (GTEM),* 791: 1-11 (2015).

- ✓ Arribas J., E.M. Giménez, R. Marcos, A. Velázquez. Novel antiapoptotic effect of TBX15: overexpression of TBX15 reduces apoptosis in thyroid cancer cells. *Apoptosis,* 20: 1338-1346 (2015).

- ✓ Mellado-García P., S. Maisanaba, M. Puerto, M. Llana-Ruiz-Cabello, A.I. Prieto, R. Marcos, S. Pichardo, A.M. Cameán. Genotoxicity assessment of propyl thiosulfinate oxide, an organosulfur compound from *Allium* extract, intended to food active packaging. *Food and Chemical Toxicology,* 86: 365-373 (2015)

PhD Thesis 2015

1. Acurio Armas, Andrea Elizabeth. "Coevolutionary analysis of the transposon Galileo in the genus Drosophila“
2. Barrón Aduriz, Maite Garazi. "Patrones de variación nucleotídica y cartográfica de los bloques de selección ligada en el genoma de Drosophila melanogaster“
3. Ramià Jesús, Miquel. "Visualisation, description and analysis of the genome variation of a natural population of Drosophila melanogaster“
4. Bach Griera, Jordi. "Estudi in vitro del paper del dany oxidatiu com a mecanisme d'acció en la carcinogènesi associada a l'arsènic“
5. Rodríguez Ribera, Lara. "Genetic damage and their modulation in patients with chronic kidney disease“
6. Arribas Arranz, Jéssica. "Los factores de transcripción TBX e YY1 en cáncer. Función y regulación de TBX15. Expresión de YY1 en cáncer de tiroides“
7. Bogliolo, Massimo. "Secuenciación del exoma en anemia de Fanconi: Del diagnóstico al descubrimiento de un nuevo gen“
8. Raluca, Voda. "Biodiversity and comparative phylogeography of western mediterranean butterflies“
9. Martí Carrizosa, Mar. "Candida Parapsilosis, C. Orthopsilosis y C. Metapsilosis: Epidemiología de las candidemias, patrones de sensibilidad y mecanismos de resistencia a las equinocandidas“
10. Girmé Vila, Gisela. "Caracterització microbiològica i enzimàtica de la llet d'euga gestant. Avaluació de les propietats probiòtiques, antimicrobianes i preservadors“
11. Bello Ortí, Bernardo. "Haemophilus parasuis host.pathogen interactions in the respiratory tract“
12. Torrents Sallent, Albert. "Disseny, simulació i prototipatge de dispositius per la detecció de matèria orgànica en mostres d'aigua“
13. Noguera Ortega, Estela. “Improving bladder cancer treatments: A new formulation containing an environmental mycobacterium“
14. García Arroyo, Laura. "Epidemiologia de les infeccions respiratòries víriques a l'hospital de la Santa Creu i Sant Pau: Estudi retrospectiu de 17 anys i avaluació de dos mètodes moleculars pel diagnòstic virològic“
15. Jordana Lluch, Elena. "New technologies for the molecular diagnosis of sepsis“
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17. Toledo Brambilla, Cecilia Helena. "Estudio de la formación de cuerdas microscópicas en el género Mycobacterium y su implicación en la virulencia de Mycobacterium abscessus“
18. Saccardo, Paolo. "Development of artificial viruses for nanomedicine and gene therapy“
19. Zhikun, Xu. "Desing of protein nanoparticles for cell targeting and bood brain barrier crossing“
20. Codony Iglesias, Francesc. "Microbial dynamics in drinking water systems“
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22. Pino, Flavio. "Development of nanomaterials for environmental monitoring“
23. Rodríguez Pérez, Eduardo. "Study of cow subclinical hypocalcemia and development of new tools for its diagnostic and prevention“
24. Ramírez Vázquez, Esther. "Analysis of the bacteriophage P22 viral spread within bacterial populations and its characterization as immunobiosensor"

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