

EMMA REY-JURADO

EDUCATION

PhD., Biology, *Cum laude*, International Mention, University of Barcelona, Barcelona, Spain, 2013.

Thesis: Virulence of drug-resistant Mycobacterium tuberculosis and activity of drug-combinations against drug-resistant and drug-susceptible isolates in ex-vivo and in vivo models

Degree in Biology (Branch: Fundamental Biology, Speciality: Microbiology), Autonomous University of Barcelona, Barcelona, Spain, 2007.

ADDITIONAL EDUCATION

Applying Scientific Skills and Regulatory Intelligence to Early Product Development with reference to US FDA requirement
ERA consulting, Workshop

GOOD CLINICAL PRACTICES (GCP)
CITI PROGRAM

PROFESSIONAL ACTIVITIES AND RESEARCH

Professor Researcher: Universidad del Desarrollo. May 2019-Nowadays.

Research lines: Primary immunodeficiency disorders. Searching for candidate genes related to primary immunodeficiency. Susceptibility to infectious diseases.

Professor: Universidad Santo Tomás. August 2019-December 2019.

In charge of Immunology Course for Biotechnology graduate students.

Scientific editor: Pontificia Universidad Católica de Chile. February-June 2019.

Achievements:

- Submission of original articles in high impact journals.
- Thesis defense presentation of several students.

Responsibilities:

- Write and review original articles to be published on high impact journals.
- Discuss with investigators their research.
- Assist graduate students for their theses exam.

Young researcher: Immunology Laboratory. Pontificia Universidad Católica de Chile. 2015-November 2018.

Research lines: I worked on elucidating the T cell response to human respiratory syncytial virus (hRSV) infection in context of infection and immunization at the Pontificia Universidad Católica de Chile, Immunology Lab.

Achievements:

- Up to seven original articles published in peer-reviewed high impact journals.

- Contribute to better knowledge on host immune response against respiratory syncytial virus and metapneumovirus.
- Postdoctoral CONICYT grant for three years.
- First phase I clinical trial in Chile evaluating a novel vaccine against respiratory syncytial virus.
- Meeting with the FDA for the approbation of a vaccine as an IND.
- Seminars in the Biomedicine area to graduate students.
- Lecture on Immunology at the University of Antofagasta.

Responsibilities:

- Conduct academic and administration of CONICYT POSTDOCTORAL funds as a Responsible Investigator.
- To report immunogenicity results of the Phase I clinical trial of the recombinant BCG vaccine.
- To coordinate laboratory experiments of the Phase I clinical trial of the recombinant BCG vaccine.
- To elaborate documents required for the approbation of a vaccine as a IND by the FDA.
- Mentoring graduate and post-graduate students.
- Collaborator Investigator in FONDEF project contributing to design and implementation of experiments to achieve the project goals.
- Design experiments, execution of experiments and guidance to students.
- Manuscript preparation of the results for publication on scientific journals.

Postdoctoral fellow: Public Health Research Institute (PHRI), New Jersey Medical School (NJMS), Rutgers University, Newark, New Jersey. 2013-2014.

Achievements:

- Contribute to better knowledge of the host-pathogen interactions in *M. tuberculosis*.
- Standardize a model for visualization of lipid bodies inside *M. tuberculosis*-infected macrophages.

Responsibilities:

- Perform experiments and analysis of infected macrophages using fluorescence methodologies such as flow cytometry and confocal microscopy.

Doctoral research: Department of Microbiology, Area of Mycobacteriology, Hospital Clinic of Barcelona.

- Study of the infectivity ability of resistant isolates of *M. tuberculosis* on macrophages and evaluation of the synergistic activity of different drug combinations.
- Study of the combined effect of second line antituberculous regimens versus clinical isolates of multidrug resistant isolates *in vitro* and semi *in vivo* model with human macrophages.

Achievements:

- Four original articles published in peer-reviewed high impact journals.
- Contribute to the knowledge on the antimicrobial resistance in mycobacteria.
- Results obtained in this project provided tools to predict the efficacy of drugs in clinical development phases as well as to test the regimens of antituberculous drugs currently available.
- For developing this project, I initiated a cellular infection model of *M. tuberculosis*. This model is still being used in the lab for testing the effect of different drugs on *M. tuberculosis* growth inside macrophages.

Responsibilities:

- Mentoring graduate students.
- Report results included in the regular grants projects.
- Design and perform experiments.

Visitor researcher: Mycobacteria Division, National Institute for Medical Research, London.

Achievement:

- Develop and standardize quantitative assays for a selected microRNA panel.
- Contribute to better knowledge of microRNA expression in *M. tuberculosis*-infected macrophages.

Responsibilities:

- Isolate RNA and performed quantitative microRNAs by RT-PCR from *M. tuberculosis* infected macrophage cultures.

AWARDS

- Postdoctoral CONICYT grant entitled "Characterization and functional relevance of the T cell receptor repertoire of hRSV-specific T cells expanded in response to hRSV infection in naive and vaccinated mice". 2015
- Award "Pumarola" by the " Societat Catalana de Malalties Infeccioses i Microbiologia Clínica i de la *Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica* (SEIMC)" to develop a project entitled "Study of the infective capacity over macrophages of drug-resistant *Mycobacterium tuberculosis* and evaluation of the synergic activity of different drug combinations. 2008
- LASID fellowship for primary immunodeficiency research. 2020-2022

LIST OF PUBLICATIONS

1. Rey-Jurado E & Maria Cecilia Poli. Functional genetics in inborn errors of immunity. *Future Rare Diseases*. 2021. In press.

2. Abarca K, Rey-Jurado E, Muñoz-Durango N, Vásquez Y, Soto JA, Gálvez NMS, Valdés-Ferrada J, Iturriaga C, Urzúa M, Borzutzky A, Cerda J, Villaroel L, Madrid V, Gonzalez PA, González-Aramundiz JV, Bueno SM, Kalergis AM. Safety and immunogenicity evaluation of recombinant BCG vaccine against respiratory syncytial virus in a randomized, double-blind, placebo-controlled phase I clinical trial. *Eclinical Medicine*. Volume 27, 100517. 2020

3. Rey-Jurado E, Bohmwald K, Gálvez NMS, Becerra D, Porcelli SA, Carreño LJ, Kalergis AM. Contribution of NKT cells to the immune response and pathogenesis triggered by respiratory viruses. *Virulence*. 2020 Dec;11(1):580-593. doi: 10.1080/21505594.2020.1770492.

4. Rey-Jurado E, Bohmwald K, Correa HG, Kalergis AM. TCR Repertoire Characterization for T Cells Expanded in Response to hRSV Infection in Mice Immunized with a Recombinant BCG Vaccine. *Viruses*. 2020 Feb 20;12(2):233. doi: 10.3390/v12020233.

5. Soto JA, Gálvez NMS, Rivera CA, Palavecino CE, Céspedes PF, Rey-Jurado E, Bueno SM, Kalergis AM. Recombinant BCG vaccines reduce pneumovirus-caused airway pathology by inducing protective cellular and humoral immunity. *Frontiers in Immunology* 2018 Dec 6;9:2875.

- 6. Rey-Jurado E**, Pizarro-Ortega MS, Kalergis AM. Insights on the crosstalk between dendritic cells and helper T cells in novel genetic etiology for mendelian susceptible mycobacterial disease. *Cellular and Molecular Immunology* 2018 15(12):1091-1094
- 7.** Muñoz-Durango N, Pizarro-Ortega MS, **Rey-Jurado E**, Díaz FE, Bueno SM, Kalergis AM. Patterns of antibody response during natural hRSV infection: insights for the development of new antibody-based therapies. *Expert Opin Investig Drugs*. 2018 Sep;27(9):721-731.
- 8. Rey-Jurado E**, Tapia F, Muñoz-Durango N, Lay M, Carreño L, Riedel CA, Susan M Bueno, Genzel I, Kalergis AM. Assessing the Importance of Domestic Vaccine Manufacturing Centers: An Overview of Immunization Programs, Vaccine Manufacture and Distribution. *Front. Immunol.*, 2018 Jan 18;9:26
- 9.** Canedo-Marroquín G, Acevedo-Acevedo O, **Rey-Jurado E**, Saavedra JM, Lay MK, Bueno SM, Riedel CA, Kalergis AM. Modulation of Host Immunity by Human Respiratory Syncytial Virus Virulence Factors: A Synergic Inhibition of Both Innate and Adaptive Immunity. *Front Cell Infect Microbiol*. 2017 Aug 16;7:367.
- 10. Rey-Jurado E**, Soto J, Gálvez N, Kalergis AM. A safe and efficient BCG vectored vaccine to prevent the disease caused by the human Respiratory Syncytial Virus. *Hum Vaccin Immunother*. 2017 Sep 2;13(9):2092-2097.
- 11. Rey-Jurado E**, Kalergis AM. Immunological Features of Respiratory Syncytial Virus-Caused Pneumonia-Implications for Vaccine Design. *Int J Mol Sci*. 2017 Mar 4;18(3).
- 12.** Céspedes PF, **Rey-Jurado E**, Espinoza JA, Rivera CA, Canedo-Marroquín G, Bueno SM and Kalergis AM. A single, low dose of a cGMP recombinant BCG vaccine elicits protective T cell immunity against the human respiratory syncytial virus infection and prevents lung pathology in mice. *Vaccine*. 2017 35(5):757-766
- 13.** Bohmwald K, Espinoza JA, **Rey-Jurado E**, Gómez RS, González PA, Bueno SM, Riedel CA, Kalergis AM. Human Respiratory Syncytial Virus: Infection and Pathology. *Semin Respir Crit Care Med*. 2016 Aug;37(4):522-37
- 14.** López-Gavín A, Tudó G, **Rey-Jurado E**, Vergara A, Hurtado JC, Gonzalez-Martín J. In vitro time-kill curves study of three antituberculous combinations against *Mycobacterium tuberculosis* clinical isolates. *Int J Antimicrob Agents*. 2016 Jan;47(1):97-100.
- 15. Rey-Jurado E**, Riedel CA, González PA, Bueno SM, Kalergis AM. Contribution of autophagy to antiviral immunity. *FEBS Lett*. 2015 Nov 14;589(22):3461-70.
- 16. Rey-Jurado E.**, Tudó G., Soy D. and González-Martín J. Activity and interactions of Levofloxacin, Linezolid, Ethambutol and Amikacin in three-drug combinations against *M. tuberculosis* isolates in a human macrophage model. *Int J Antimicrob Agents* 2013; 42 (6): 524-30.
- 17.** Moure R., Tudó G., Medina R., Vicente E., Caldito JM., Codina MG., Coll P., Espanol M., González-Martín J., **Rey-Jurado E.**, Salvadó M., Tórtola MT. and Alcaide F. Detection of streptomycin and quinolone resistance in *Mycobacterium tuberculosis* by a low-density DNA array. *Tuberculosis (Edinb)* 2013; 93(5):508-14.

18. Rey-Jurado E., Tudó G., Puig de la Bellacasa J., Espasa M. and González-Martín J. *In vitro* effect of three-drug combinations of antituberculous agents against multidrug-resistant *Mycobacterium tuberculosis* isolates. *Int J Antimicrob Agents*. 2013; 41: 278-280.

19. Rey-Jurado E., Tudó G., Martínez JA. and González-Martín J. Synergistic effect of two combinations of antituberculous drugs against *Mycobacterium tuberculosis*. *Tuberculosis* (Edinb). 2012 May; 92(3):260-3.

20. Rey-Jurado E., Tudó G., Borrell B., Alcaide F., Coll P., Martín-Casabona N., Mick V., Montemayor M., Salvadó M., Vicente E., González-Martín J. Impaired fitness of *Mycobacterium tuberculosis* resistant isolates in a cell culture model of murine macrophages. *J Antimicrob Chemother* 2011; 66: 2277–2280.

21. Tudó G., **Rey E.**, Borrell S., Alcaide F., Codina G., Coll P., Martín-Casabona N., Montemayor M., Moure R., Orcau A., Salvado M., Vicente E., González-Martín J. Characterisation of streptomycin-resistant mutations in *Mycobacterium tuberculosis* clinical isolates in the area of Barcelona. *J Antimicrob Chemother*. 2010; 65(11):2341-6.

22. Borrell S., Espanol M., Orcau A., Tudó G., March F., Cayla J.A., Jansa J.M., Alcaide F., Martín-Casabona N., Salvadó M., Martinez J. A., Vidal R., Sanchez F., Altet N., **Rey E.**, Coll P. and González-Martín J. Tuberculosis transmission patterns among Spanish-born and foreign-born populations in the city of Barcelona. *Clinical Microbiology and Infection*. 2010;16(6):568-74.

COMUNICATIONS TO INTERNATIONAL AND NATIONAL CONGRESSES

Poster. Rey-Jurado E, Noguera L, Jarur V Rebolledo-Jaramillo B, Encina G, Yuan B, Posey J, P. Vogel T, Forbes LR, Nicholas SK, Rider NL, Watkin LB, Mace EM, Cahill G, Reyes A, King A, Lagos M, Talesnik E, Borzutzky A, González B, Vinet AM, Inostroza J, Llorente M, Aird A, Norambuena X, Quezada A, Barría R, Navarrete CL, Ladino M, Orellana J, Grumach AS, Coban-Akdemir ZH, Jhangiani SN, Gibbs R, Repetto G, Lupski JR, Chinn IK, Orange JS and Poli MC. First genomic characterization of a Chilean Cohort with primary immunodeficiency diseases and immune dysregulation. European Society for Immunodeficiencies, ESID 2020, Online meeting.

Oral presentation. Rey-Jurado E, Bohmwald K, Gálvez N, Becerra D, Carreño LC, Kalergis AM. Role of CD1d receptor in the pathology caused by the human respiratory syncytial virus and the human metapneumovirus. FOCIS 2018, San Francisco, 20-23 June, 2018.

Poster. Abarca K, Rey-Jurado E, Muñoz-Durango N, Vázquez Y, Iturriaga C, Marcela Urzúa M, Borzutzky A, Valdés J, Soto JA, Gálvez NMS, Madrid V, Bueno SM, Alexis M Kalergis. Phase I clinical trial for a recombinant BCG expressing the nucleoprotein of the human respiratory syncytial virus (hRSV) in healthy adults. FOCIS 2018, San Francisco, 20-23 June, 2018.

Poster. Soto J, Gálvez N, Rivera C, Palavecino C, Céspedes P, Rey-Jurado E, Bueno S and Kalergis AM. Antibodies Secretion Promoted by a Recombinant BCG Strain Induces a Protective Immune Response Against Human Respiratory Viruses. FOCIS 2018, San Francisco, 20-23 June, 2018.

Oral presentation. Rey-Jurado E, Bohmwald K, Gálvez N, Becerra D, Carreño LC, Kalergis AM. Contribution of CD1d to immune responses and pathogenesis in mouse models of human respiratory syncytial virus and the human metapneumovirus infections. ALAI 2018, Cancún, México, 14-18 Mayo 2018.

Oral presentation. Rey-Jurado E, Bohmwald K, Gálvez N, Becerra D, Carreño LC, Kalergis AM. Contribution of Natural Killer T cells to the pathology caused by the Respiratory Syncytial Virus and the Metapneumovirus. SOMICH 2017, La Serena, 14-17 November.

Poster. Rey-Jurado E, Bohmwald K, Gálvez N, Becerra D, Carreño LC, Kalergis AM. Contribution of Natural Killer T cells to the pathology caused by the Respiratory Syncytial Virus and the Metapneumovirus. FOCIS 2017, Chicago, 14-17 June.

Poster. Céspedes, P., Rey-Jurado, E., Espinoza, J., Rivera, C., Bueno, S., and Kalergis A. A single, low dose of a current Good Manufacturing Practice (cGMP) recombinant BCG vaccine confers protection against human respiratory syncytial virus (hRSV) infection and lung pathology in mice. FOCIS 2016, Boston June 22-25, 2016.

Poster. Rey E., Tudó G., González-Martín J. Synergism of linezolid, levofloxacin and amikacin combination against multidrug-resistant and drug-susceptible isolates of *M. tuberculosis*. *21th European Society of Clinical Microbiology and Infectious Diseases (ESCMID)*. Milan, Italy 7-10 May 2011.

Oral presentation. Rey E., Tudó G. Caracterización, diagnóstico y estudio de la capacidad de infección de aislados de *Mycobacterium tuberculosis* resistentes a los fármacos. *V Jornadas de la Red Española de Investigación en Patología Infecciosa (REIPI)*. Barcelona, November 2010.

Poster. Rey E., Tudó G., Borrell S., Alcaide F., Codina G., Coll P., Martín N., Mick V., Montemayor M., Salvadó M., Vicente E., González J. Intracellular penetration capacity of *Mycobacterium tuberculosis* drug-resistant isolates using a murine macrophage model. Intracellular penetration capacity of *Mycobacterium tuberculosis* drug-resistant isolates using a murine macrophage model. *20th European Society of Clinical Microbiology and Infectious Diseases (ESCMID)*. Wien, Austria 10-13 April 2010.

Poster. Rey E., Tudó G., Borrell S. and Gonzalez J. Synergistic activity of three antituberculous drug combinations against clinical isolates of *Mycobacterium tuberculosis* resistant to different drugs. *20th European Society of Clinical Microbiology and Infectious Diseases (ESCMID)*. Wien, Austria 10-13 April 2010

Oral presentation. Rey E. Estudio de la capacidad infectiva sobre macrófagos de aislados clínicos de *Mycobacterium tuberculosis* resistentes a los fármacos de primera línea y evaluación de la actividad sinérgica de diversas combinaciones de fármacos. *Jornadas Societat Catalana de Malalties Infeccioses i Microbiologia Clínica. Sant Fruitós del Bages*, Barcelona 20-21 November 2009.

Poster. Rey E., Tudó G. and González-Martín J. Synergistic activity of two antituberculous drug combinations against clinical isolates of *Mycobacterium tuberculosis* resistant to isoniazid. *30th Annual Congress of the European Society of Mycobacteriology (ESM)*. Porto, Portugal, July 2009

Poster. Moure R., Andreu A., Coll P., Fernández R., Martín-Casabona N., Mick V., Montemayor M., Ortíz E., Rey E., Salvadó M., Tudó G., Alcaide F. Análisis epidemiológico de los mecanismos moleculares más frecuentemente implicados en la resistencia al etambutol y su relación con la multirresistencia en *Mycobacterium tuberculosis*. *XIII Reunión de la Sociedad de Enfermedades Infecciosas y Microbiología Clínica (SEIMC)*, Sevilla, Spain, Juny 2009.

Poster. Moure R., Andreu A., Castelblanco E., Coll P., Fernández R., Martín-Casabona N., Mick V., Montemayor M., Rey E., Salvadó M., Tudó G., Alcaide F. High frequency of *embB* codon 406 mutations in ethambutol-resistant isolates of *Mycobacterium tuberculosis*. *ICAAC/IDSA 46th Annual Meeting*, Washington DC, 25th-28th October 2008.

Poster. Borrell S., Thorne N., Mortimer C., Espanyol M., Rey E., Gonzalez-Martin J., Coll P., Gharbia S. and Arnold C. Comparison of four colour IS6110-fAFLP with the classic IS6110 RFLP on the ability to detect recent transmission in the city of Barcelona, Spain. *11th Conference in Genomics and Proteomics of Human Pathogens. Use of New Technologies to Further Understand the Biology of Transient and Host-Derived Human Pathogens*, London, 26th-27th June 2008.