

Curriculum vitae



Name: Liliana Isabel Dias Rodrigues
Nationality: Portuguese
Email address: lilianadiasrodrigues@gmail.com
ORCID: 0000-0002-2094-2666
Researcher ID: N-2463-2014

PROFESSIONAL SITUATION

Current Professional status

2018- Researcher at Global Health and Tropical Medicine, Instituto de Higiene e Medicina Tropical, Universidade Nova de Lisboa

Previous Research Activities

- 01/01/2013 - 31/07/2016 Research fellow at Fundación Agencia Aragonesa para la Investigación y Desarrollo (ARAID) and Universidad de Zaragoza, Zaragoza, Spain
- 01/11/2011 - 31/12/2012 Post-Doctoral Researcher, at Universidad de Zaragoza, Spain
- 01/05/2011 - 31/07/2011 Short-term research fellow (supported by European Molecular Biology Society) at Universidad de Zaragoza, Spain.
- 01/03/2010 - 31/05/2010 Short-term research fellow (supported by COST Action BM0701) at Universidad de Zaragoza, Spain.
- 17/10/2006 - 30/11/2006 Short-term fellow (supported by Portuguese Science and Technology Foundation, FCT) at Center for Infectious Diseases and Travel Medicine, University Hospital, Freiburg, Germany.
- 01/03/2006 - 25/10/2010 PhD student at Instituto de Higiene e Medicina Tropical, Universidade Nova de Lisboa, Lisboa, Portugal

EDUCATION AND TRAINING

University education

- 2010 - PhD in Biomedical Sciences, specialization Microbiology, by Universidade Nova de Lisboa. Thesis title: "The role of the efflux mechanisms in multidrug resistance in *M.tuberculosis*".
- 2006 - MSc in Medical Microbiology, by Universidade Nova de Lisboa.

2002 - Degree in Microbial Biology and Genetics by Universidade de Lisboa.

Other Courses

2015 - Laboratory animal course: Category C (persons responsible for directing animal experiments), Universidad de Zaragoza, Spain.

2009 - Leeds Ion Channel Workshop, University of Leeds, U.K.

PUBLICATIONS IN INTERNATIONAL PEER-REVIEWED JOURNALS

1. **Rodrigues L.**, Parish T., Balganesh M., Ainsa J.A. 2017. Antituberculosis drugs: reducing efflux=increasing activity. *Drug Discov. Today.* **22**(3):592-599. <https://www.sciencedirect.com/science/article/pii/S1359644617300107?via%3Dihub>
2. Singh V., Dhar N., Pató J., Kolly G.S., Korduláková J., Forbak M., Evans J.C., Székely R., Rybniker J., Palčeková Z., Zemanová J., Santi I., Signorino-Gelo F., **Rodrigues L.**, Vocat A., Covarrubias A.S., Rengifo M.G., Johnsson K., Mowbray S., Buechler J., Delorme V., Brodin P., Knott G.W., Aínsa J.A, Warner D.F., Kéri G., Mikušová K., McKinney J.D., Cole S.T., Mizrahi V., Hartkoorn R.C. 2017. Identification of Aminopyrimidine. Sulfonamides as Potent Modulators of Wag31-mediated Cell Elongation in Mycobacteria. *Mol. Microbiol.* **103**(1): 13-25. <http://onlinelibrary.wiley.com/doi/10.1111/mmi.13535/abstract;jsessionid=E61EFB90E42F59A3972DEC3714677546.f04t04>
3. **Rodrigues L.**, Viveiros M., Aínsa J.A. 2015 Measuring efflux and permeability in mycobacteria. *Methods Mol. Biol.* **1285**: 227-39. https://link.springer.com/protocol/10.1007%2F978-1-4939-2450-9_13
4. **Rodrigues L.**, Villellas C., Bailo R., Viveiros M., Aínsa J.A. 2013. Role of the Mmr efflux pump in drug resistance in *M. tuberculosis*. *Antimicrob. Agents Chemother.* **57**(2): 751-7. <http://aac.asm.org/content/57/2/751.long>
5. **Rodrigues L.**, Machado D., Couto I., Amaral L., Viveiros M. 2012. Contribution of efflux activity to isoniazid resistance in the *Mycobacterium tuberculosis* complex. *Infect. Genet. Evol.* **12**(4): 695-700. <https://www.sciencedirect.com/science/article/pii/S1567134811002887?via%3Dihub>
6. Machado D., Couto I., Perdigão J., **Rodrigues L.**, Portugal I., Baptista P., Veigas B., Amaral L., Viveiros M. 2012. Contribution of efflux to the emergence of isoniazid and multidrug resistance in *Mycobacterium tuberculosis*. *PLOS ONE.* **7**(4):e34538. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0034538>
7. Amaral L., Martins A., Spengler G., Martins M., **Rodrigues L.**, McCusker M., Ntokou E., Cerca P., Machado L., Viveiros M., Couto I., Fanning S., Kristiansen J., Molnar J. 2012. Structure, genetic regulation, physiology and function of the AcrAB-TolC efflux pump of *Escherichia coli* and *Salmonella*. Chapter 4 (Page no: 44) *In* Antimicrobial drug discovery: emerging strategies. Tegos, A., Mylonakis, E.,

Eds. <https://www.cabi.org/cabebooks/ebook/20123306543>

8. Spengler G., **Rodrigues L.**, Martins A., Martins M., McCusker M., Cerca .P, Machado L., Costa S.S., Ntokou E., Couto I., Viveiros M., Fanning S., Molnar J., Amaral L. 2012. Genetic response of *Salmonella enterica* serotype Enteritidis to thioridazine rendering the organism resistant to the agent. *Int. J. Antimicrob. Agents* **39**(1): 16-21. [http://www.ijaaonline.com/article/S0924-8579\(11\)00358-X/fulltext](http://www.ijaaonline.com/article/S0924-8579(11)00358-X/fulltext)
9. Viveiros M., Martins M., **Rodrigues L.**, et al. 2012. Inhibitors of Mycobacterial Efflux Pumps as Potential Boosters for Antitubercular Drugs. *Exp. Rev. Anti Infect. Ther.* **10**(9): 983-98. <http://www.tandfonline.com/doi/abs/10.1586/eri.12.89?journalCode=ierz20>
10. **Rodrigues L.**, Ramos J., Couto I., Amaral L., Viveiros M. 2011. Ethidium bromide transport across *Mycobacterium smegmatis* cell-wall: correlation with antibiotic resistance. *BMC Microbiol.* **11**:35. <https://bmcmicrobiol.biomedcentral.com/articles/10.1186/1471-2180-11-35>
11. **Rodrigues L.** Aínsa J.A., Amaral L., Viveiros M. 2011. Inhibition of Drug Efflux in Mycobacteria with Phenothiazines and Other Putative Efflux Inhibitors. *Recent Pat Antiinfect Drug Discov.* **6**(2): 118-27. <http://www.eurekaselect.com/88270/article>
12. Martins A., Spengler G., Martins M., **Rodrigues L.**, Viveiros M., Davin-Regli A., Chevalier J., Couto I., Pagès J.M., Amaral L. 2010. Physiological characterisation of the efflux pump system of antibiotic-susceptible and multidrug-resistant *Enterobacter aerogenes*. *Int J Antimicrob Agents* **36**(4): 313-8. [http://www.ijaaonline.com/article/S0924-8579\(10\)00294-3/fulltext](http://www.ijaaonline.com/article/S0924-8579(10)00294-3/fulltext)
13. Viveiros M., Martins M., Couto I., **Rodrigues L.**, Machado D., Portugal I., Amaral L. 2010. Molecular tools for rapid identification and novel effective therapy against MDRTB/XDRTB infections. *Exp. Rev. Anti Infect. Ther.* **8**(4): 465-480. <http://www.tandfonline.com/doi/abs/10.1586/eri.10.20?journalCode=ierz20>
14. Amaral L., Martins A., Molnar J., Kristiansen J.E., Martins M., Viveiros M., **Rodrigues L.**, Spengler G., Couto I., Ramos J., Dastidar S., Fanning S., McCusker M., Pages J.M. 2010. Phenothiazines, bacterial efflux pumps and targeting the macrophage for enhanced killing of intracellular XDRTB. *IN VIVO* **24**(4): 409-24. <http://iv.iarjournals.org/content/24/4/409.long>
15. Viveiros M., **Rodrigues L.**, Martins M., Couto I., Spengler G., Martins A., Amaral L. 2010. Evaluation of efflux activity of bacteria by a semi-automated fluorometric system. *Methods Mol Biol.* **642**: 159-72. https://link.springer.com/protocol/10.1007%2F978-1-60327-279-7_12
16. Martins A., Iversen C., **Rodrigues L.**, Spengler G., Ramos J., Kern W.V., Couto I., Viveiros M., Fanning S., Pages J.M., Amaral L. 2009. An AcrAB-mediated multidrug-resistant phenotype is maintained following restoration of wild-type activities by efflux pump genes and their regulators. *Int. J. Antimicrob. Agents* **34**(6): 602-4. [http://www.ijaaonline.com/article/S0924-8579\(09\)00354-9/fulltext](http://www.ijaaonline.com/article/S0924-8579(09)00354-9/fulltext)
17. Spengler G., Martins A., Schelz Z., **Rodrigues L.**, Aagaard L., Martins M., Costa S.S., Couto I., Viveiros M., Fanning S., Kristiansen J.E., Molnar J., Amaral L. 2009. Characterisation of intrinsic efflux activity of *Enterococcus faecalis* ATCC29212 by a semi-automated ethidium bromide method. *In Vivo* **23**(1): 81-7. <http://iv.iarjournals.org/content/23/1/81.long>

18. Spengler G., Viveiros M., Martins M., **Rodrigues L.**, Martins A., Molnar J., Couto I., Amaral L. 2009. Demonstration of the activity of the P-glycoprotein by a semi-automated fluorometric method. *Anticancer Res.* **29**(6): 2173-7. <http://ar.iijournals.org/content/29/6/2173.long>
19. Paixão L., **Rodrigues L.**, Couto I., Martins M., Fernandes P., de Carvalho C.C., Monteiro G.A., Sansonetty F., Amaral L., Viveiros M. 2009. Fluorometric determination of ethidium bromide efflux kinetics in *Escherichia coli*. *J. Biol. Eng.* **3**: 18. <https://jbioleng.biomedcentral.com/articles/10.1186/1754-1611-3-18>
20. Couto I., Machado D., Viveiros M., **Rodrigues L.**, Amaral L. 2009. Identification of Nontuberculous Mycobacteria in Clinical Samples Using Molecular Methods: a Three-Year Study. *Clin. Microb. Infect.* **16**(8): 1161-64. [http://www.clinicalmicrobiologyandinfection.com/article/S1198-743X\(14\)64211-7/fulltext](http://www.clinicalmicrobiologyandinfection.com/article/S1198-743X(14)64211-7/fulltext)
21. Martins A., Spengler G., **Rodrigues L.**, Viveiros M., Ramos J., Martins M., Couto I., Fanning S., Pagès J.M., Bolla J.M., Molnar J., Amaral L. 2009. pH Modulation of efflux pump activity of multi-drug resistant *Escherichia coli*: protection during its passage and eventual colonization of the colon. *PLOS ONE* **4**(8): e6656. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0006656>
22. **Rodrigues L.**, Sampaio D., Couto I., Machado D., Kern W.V., Amaral L., Viveiros M. 2009. The role of efflux pumps in macrolide resistance in *Mycobacterium avium* complex. *Int. J. Antimicrob. Agents* **34**(6): 529-33 [http://www.ijaaonline.com/article/S0924-8579\(09\)00365-3/fulltext](http://www.ijaaonline.com/article/S0924-8579(09)00365-3/fulltext)
23. Viveiros M., Martins A., Paixão L., **L. Rodrigues L.**, Martins M., Couto I., Fähnrich E., Kern W.V., Amaral L. 2008. Demonstration of intrinsic efflux activity of *E. coli* K-12 AG100 by an automated ethidium bromide method. *Int. J. Antimicrob. Agents* **31**(5): 458-462. [http://www.ijaaonline.com/article/S0924-8579\(08\)00032-0/fulltext](http://www.ijaaonline.com/article/S0924-8579(08)00032-0/fulltext)
24. Viveiros M., Martins M., Couto I., **Rodrigues L.**, Martins A., Kristiansen J.E., Molnar J., Amaral L. 2008. New methods for the identification of efflux mediated MDR bacteria, genetic assessment of regulators and efflux pump constituents, characterization of efflux systems and screening for inhibitors of efflux pumps. *Curr. Drug Target.* **9**(9):760-78. <http://www.eurekaselect.com/67594/article>
25. **Rodrigues L.**, Wagner D, Viveiros M., Sampaio D., Couto I., Vavra M., Kern W.V., Amaral L. 2008. Thioridazine and chlorpromazine inhibition of ethidium bromide efflux in *Mycobacterium avium* and *Mycobacterium smegmatis*. *J. Antimicrob. Chemother.* **61**(5):1076-82. <https://academic.oup.com/jac/article/61/5/1076/848043>
26. Viveiros M., Dupont M., **Rodrigues L.**, Couto I., Davin-Regli A., Martins M., Pagès J.M., Amaral L. 2007. Antibiotic Stress, Genetic Response and Altered Permeability of *E. coli*. *PLOS ONE* **2**(4):e365. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0000365>
27. Viveiros M., Leandro C., **Rodrigues L.**, Almeida J., Bettencourt R., Couto I., Carrilho L., Diogo J., Fonseca A., Lito L., Lopes J., Pacheco T., Pessanha M., Quirim J., Sancho L., Salfinger M., Amaral L. 2005. Direct application of the INNO-LiPA Rif.TB assay for the rapid identification of *Mycobacterium tuberculosis* complex strains and detection of rifampin resistance in 360 smear positive respiratory

specimens from an area of high incidence of multi-drug resistant tuberculosis. *J. Clin. Microb.* **43**(9):4880-84. <http://jcm.asm.org/content/43/9/4880.long>

PRESENTATIONS IN CONGRESSES

Oral presentations

1. **Rodrigues L.** Targeting multidrug efflux pumps in *Mycobacterium tuberculosis*. MycoSpain 2013 - Bilbo TB. Bilbao, Spain.
2. **Rodrigues L.** Testing new compounds against *M. tuberculosis*. MycoSpain 2012. Madrid, Spain.
3. Begoña G., **Rodrigues L.**; *et al.* Novel compounds active against *Mycobacterium tuberculosis*: testing competitive inhibitors of type II dehydroquinase. V International Conference BIFI 2012. Zaragoza, Spain.
4. **Rodrigues L.** Contribution of the Mmr efflux pump to antimicrobial resistance in *M. tuberculosis*: construction of a *mmr* knockout mutant by allelic exchange. Cost Action BM0701 meeting. Bremen, Germany, 2010.
5. **Rodrigues L.** Characterization of efflux pumps of mycobacteria by real-time RT-PCR and a semi-automated fluorometric method. Cost action BM0701. Dublin, Ireland, 2009.
6. **Rodrigues L.**, *et al.* Contribution of efflux pump activity for macrolide resistance in *M. avium* complex. 30th Annual Congress of the European Society of Mycobacteriology. Porto, Portugal, 2009.
7. **Rodrigues L.** Efflux pumps in *Escherichia coli* and *Mycobacterium* sp.: Methods to assess their importance in multidrug resistance. URIA Mycobacterium Workshop. Lisboa, Portugal, 2009.

Posters (selection of the most relevant)

1. Fuentes D., Villellas C., Vitoria MA, Samper S., Aínsa JA, **Rodrigues L.** A simple method based on a reliable genetic marker for identification of *Mycobacterium tuberculosis* Beijing genotype. 24th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID). Barcelona, Spain, 10-13 May 2014.
2. **Rodrigues L.**, *et al.* Contribución de la bomba de eflujo Mmr a la resistencia a fármacos en *M. tuberculosis*. IX Reunión del Grupo de Microbiología Molecular. Palma de Mallorca, Spain, 14/11/2012.
3. **Rodrigues L.**, *et al.* Is the Mmr Efflux Pump of *M. tuberculosis* Involved in Isoniazid Resistance? Tuberculosis 2012: Biology, pathogenesis, intervention, strategies. París, France, 11/09/2012.
4. Machado D., **Rodrigues L.**, *et al.* The emergence of clarithromycin resistance in *Mycobacterium avium* complex. 22nd European Congress of Clinical Microbiology and Infectious Diseases. London, United Kingdom, 31/03/2012.
5. Machado D., Couto I., **Rodrigues L.**, *et al.* Efflux activity in *Mycobacterium tuberculosis* as an intrinsic mechanism of resistance to isoniazid. 32th Annual Congress of the European Society of Mycobacteriology. Lübeck, Germany, 26/06/2011.
6. **Rodrigues L.**, *et al.* Ethidium bromide transport across *Mycobacterium smegmatis* cell-wall: correlation with antibiotic resistance. Gordon Research Conference on Multi-Drug Efflux Systems: From Molecular Mechanisms to Pharmacological Modulation. Les Diablerets, Switzerland, 12/06/2011.

7. Machado D., Couto I., **Rodrigues L.**, *et al.* Phenotypic adaptation to isoniazid in *Mycobacterium tuberculosis*: The contribution for the emergence of multidrug resistant tuberculosis. 21th European Congress of Clinical Microbiology and Infectious Diseases and 27th International Congress of Chemotherapy (ICC). Milan, Italy, 07/05/2011.
8. **Rodrigues L.**, *et al.* Contribution of efflux activity to isoniazid resistance in *Mycobacterium tuberculosis* complex. 21th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID) and 27th International Congress of Chemotherapy (ICC). Milan, Italy, 07/05/2011.
9. **Rodrigues L.**, *et al.* Contribution of efflux activity to isoniazid resistance in *Mycobacterium tuberculosis* complex. 462th WE Heraeus Seminar: Transport across membranes: multiple drug resistance, mechanism and new tools, Jacobs University of Bremen. Bremen, Germany, 04/07/2010.
10. Ramos J., **Rodrigues L.**, Couto I., Amaral L., Viveiros M. The effect of efflux pumps inhibitors on the transport of ethidium bromide and antimicrobials across *Mycobacterium smegmatis* cell wall. Microbiotec09. Vilamoura, Portugal, 28/11/2009.
11. **Rodrigues L.**, *et al.* The role played by efflux pumps in macrolide resistance in *Mycobacterium avium* complex. Microbiotec09. Vilamoura, Portugal, 28/11/2009.
12. Ramos J., **Rodrigues L.**, *et al.* Methods for assessment of ethidium bromide transport across *Mycobacterium smegmatis* cell wall. 30th Annual Congress of the European Society of Mycobacteriology. Porto, Portugal, 07/07/2009.
13. **Rodrigues L.**, *et al.* Intrinsic drug resistance of *M. avium*-*M. intracellulare* complex: the role played by efflux pumps. 18th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID). Barcelona, Spain, 19/04/2008
14. **Rodrigues L.**, *et al.* Antibiotic Stress, Genetic Response and Altered Permeability of *E. coli*. Summer School, Jacobs University of Bremen, Bremen, Germany, 08/07/2007.

PARTICIPATION IN R&D&I PROJECTS

As Head Researcher

2014-2015 “Study of the activity of efflux pumps of *Mycobacterium tuberculosis* in a *Escherichia coli* model” Universidad de Zaragoza. Funded by Universidad de Zaragoza (Spain).

As a team member

2014-2016 “Biomedical applications of AS-48: a protein with broad spectrum antimicrobial activity” Universidad de Zaragoza. P.I. José Aínsa. Funded by Ministry of Economy and Competitivity (Spain).

2011-2016 “MM4TB/More medicines for tuberculosis.” Universidad de Zaragoza, P.I. José Aínsa. Funded by European Union.

2012-2015 “Type-II NADH-menaquinone oxidoreductase (NDH-2) and the respiratory chain of *M. tuberculosis*: new therapeutic targets to fight tuberculosis”. IHMT/UNL. P.I. Isabel Couto. Funded by FCT, Portugal.

2010-2013 “Enhancing the killing of intracellular multi-drug resistant tuberculosis (MDRTB) by human

macrophages: a new chemotherapeutic strategy to fight MDRTB". IHMT/UNL. P.I. Leonard Amaral. Funded by FCT, Portugal.

"Helper compounds against multidrug resistant bacteria: revealing their mechanism of action". IHMT/UNL. P.I. Miguel Viveiros. Funded by FCT, Portugal.

2008-2011

"Mutational and physiological dynamics of drug resistance in *M. tuberculosis*: the emergence of Multi-Drug Resistant Tuberculosis". IHMT/UNL. P.I. Miguel Viveiros. Funded by FCT, Portugal.

2007-2010

"Efflux pumps in drug resistance of *M. tuberculosis*: Molecular characterization of the efflux mechanism and use of efflux inhibitors as new anti-tubercular compounds". IHMT/UNL. P.I. Miguel Viveiros. Funded by FCT, Portugal.

PARTICIPATION IN R&D&I CONTRACTS WITH COMPANIES

As Head Researcher

2014 - "Characterization of compounds active against mycobacteria" at Universidad de
2015 Zaragoza. Funded by SOCIEDADE TECNICO-MEDICINAL, S.A. (TECNIMEDE), Portugal.

PRIZES AND AWARDS

2012 - Meeting Attendance Grant awarded by Federation of European Microbiology Societies (FEMS) to attend the conference Tuberculosis 2012 at Institute Pasteur in Paris, France.

2011- Short-term fellowship awarded by the European Molecular Biology Society to visit the Universidad de Zaragoza, Zaragoza, Spain.

2011 - Meeting Attendance Grant awarded by FEMS to attend ECCMID 2011 at Milan, Italy.

2010 - Short-term scientific mission (STSM) support grant from COST Action BM0701 (Antibiotic Transport and Efflux: New Strategies to combat bacterial resistance) to visit the Universidad de Zaragoza, Zaragoza, Spain.

SUPERVISING AND MENTORING ACTIVITIES

2014-2015 Co-supervised one undergraduate student (4th year Biotechnology) from Universidad de Zaragoza.

2013-2014 Co-supervised one MSc student (MSc in Cellular and Molecular Biology) and one undergraduate student (4th year Biotechnology) from Universidad de Zaragoza.

OTHER ACADEMIC ACTIVITIES

- 2016 Member of the jury of one MSc thesis (Universidade Nova de Lisboa, Portugal).
- 2015 Member of the jury of one PhD thesis (Universidad de Zaragoza).
- 2013 Member of the jury of one MSc thesis (Universidade Nova de Lisboa, Portugal) and one PhD thesis (Universidad de Zaragoza).