

## *Curriculum Vitae*

**SILVIA BURONI**

### **PERSONAL DATA**

Born 6<sup>th</sup> February 1979, Castel San Giovanni (PC), (Italy).

Nationality: Italian.

#### Office address

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### **EDUCATION**

January 2007 PhD in Genetics and Biomolecular Sciences,  
University of Pavia.

2006 Degree of the “Scuola Avanzata di Formazione Integrata (SAFI)” of Istituto di Studi  
Superiori of the University of Pavia.

November 2003 Qualification to Biologist Profession,  
University of Pavia.

July 2003 Master degree *cum laude* in Biological Sciences,  
University of Pavia.

July 1998 High School Diploma, Scientific Liceum “A. Volta” – Castel San Giovanni (PC).

### **NATIONAL SCIENTIFIC QUALIFICATION**

April 2017 National Scientific Qualification as Associate Professor of Microbiology (SSD:  
BIO/19).

### **PROFESSIONAL POSITIONS**

- 1<sup>st</sup> December 2018 – present Assistant Professor BIO/19 – Microbiology (Ricercatore a Tempo Determinato – tipo B, 1/12/18-30/11/21)
- 2018 Post-Doc researcher at the Department of Biology and Biotechnology “L. Spallanzani” of the University of Pavia on the project “Caratterizzazione di nuovi composti attivi contro *Burkholderia cenocepacia*” (Supervisor: Prof. G. Riccardi).
- 2011-2017 Post-Doc researcher at the Department of Biology and Biotechnology “L. Spallanzani” of the University of Pavia on the projects “Produzione eterologa dell’enzima decaprenil-fosforil-epimerasi di micobatteri per drug design e sviluppo di un nuovo kit diagnostico” and “Produzione eterologa di proteine di *Mycobacterium tuberculosis* e di patogeni della fibrosi cistica, quali bersagli terapeutici” (Supervisor: Prof. G. Riccardi).
- 2006-2011 Post Doc researcher at the Department of Genetics and Microbiology of the University of Pavia on the project “New medicines for tuberculosis” (Supervisor: Prof. G. Riccardi).

- June-August 2007 Research stage at the Laboratory of Microbiology and Immunology of the University of Western Ontario in London Ontario (Canada) (Supervisor: Prof. M. Valvano).
- 2003-2006 PhD student in Genetics and Biomolecular Sciences at the Department of Genetics and Microbiology of the University of Pavia (Supervisor: Prof. E. De Rossi).

## CAREER BREAKS

10 November 2011-19 April 2012: Mandatory Italian maternity leave (5 months).

## ACADEMIC SOCIETY AFFILIATIONS

- Since 2017 Member of the European Society of Clinical Microbiology and Infectious Diseases.
- Since 2007 Member of the SIMGBM (Italian Society of General Microbiology and Microbial Biotechnologies).

## TEACHING EXPERIENCES

- Present Teacher for the courses: “Integrated Laboratory of Experimental Biology, Section 1 (Microbiology)” for Biotechnology degree and “Molecular Microbiology” for Molecular Biology and Genetics degree (in English).
- 2015-2018 Adjunct Professor of the “Integrated Laboratory of Experimental Biology, Section 1” course (Degree in Biotechnologies, University of Pavia) (3 CFU = 36 hours/year).
- 12<sup>th</sup>-15<sup>th</sup> September 2016 Lecturer for the "International summer school: molecular and physiological regulation of medical and environmental microbial biofilms" at the University of Leuven (Belgium). Lesson: “New antivirulence compounds affecting *Burkholderia cenocepacia* quorum sensing and biofilm”.
- Since 2009 Microbiology teaching assistant (“Cultore della Materia”, SSD BIO/19), University of Pavia.
- 2006-2008 Seminars for “General Microbiology and Laboratory” course for Biotechnology students, supervised by Prof. G. Riccardi.
- 2002-2013 Tutor for “General Microbiology” laboratories (Degree in Biotechnology), supervised by Prof. E. De Rossi and Prof. M.R. Pasca.
- 2008-present Lessons for the following courses (see Prof. Riccardi’s declaration in attachment):
  - “General and Medical Microbiology” course, Degree in Biotechnology and in Biological Sciences, University of Pavia.
  - “Molecular Microbiology” course, Degree in Experimental and Applied Biology and Biotechnologies, University of Pavia.
  - “Molecular Microbiology” course, Master Degree in Molecular Biology and Genetics, University of Pavia (in English language).
- 2004-present Supervisor of the laboratory activity of many Degree, Master Degree and PhD students.  
Co-supervisor of the following Degree and Master Degree Theses:
  - “Il quorum sensing in *Pseudomonas aeruginosa*” (Giulia Folini, Degree in Biotechnologies, A.Y. 2017/2018);
  - “Espressione e purificazione del bersaglio di una molecola attiva contro *Burkholderia cenocepacia*” (Veronica Garassino, Degree in Biological Sciences, A.Y. 2016/2017);

- “Caratterizzazione di mutanti di *Burkholderia cenocepacia* resistenti ad una nuova molecola” (Federica Giardina, Degree in Biological Sciences, A.Y. 2014/2015).
- “Caratterizzazione del meccanismo di resistenza ad un derivato della 2-thiopiridina in *Burkholderia cenocepacia*” (Cinzia Cani, Master Degree in Industrial Biotechnologies, A.Y. 2013/2014);
- “Produzione eterologa in *Escherichia coli* dell'enzima Rv3790 di *Mycobacterium tuberculosis*” (Lorenzo Lagostina, Degree in Biological Sciences, A.Y. 2009/2010);
- “Studio del ruolo dei trasportatori di efflusso RND nella resistenza intrinseca agli antibiotici di *Burkholderia cenocepacia*” (Silvia Bazzini, Master Degree in Industrial Biotechnologies, A.Y. 2008/2009);
- “Produzione eterologa delle proteine Rv3790 e ML0109c di *Mycobacterium tuberculosis* e *Mycobacterium leprae*” (Marco Favazzi, Master Degree in Experimental and Applied Biology, A.Y. 2007/2008).

## RESEARCH ACTIVITY

### 1) Role of RND drug efflux transporters in *Burkholderia cenocepacia* antibiotic resistance

*Burkholderia cenocepacia* is a Gram-negative bacterium that infects the airways of cystic fibrosis (CF) patients. Eradication of this infection is complicated by the intrinsic resistance of this microorganism to different antibiotics. The resistance mechanisms in Gram-negative clinical isolates comprise efflux systems that extrude out of the cells a wide range of unrelated antibiotics. Within a project funded by Italian Cystic Fibrosis Research Foundation, we started to study and characterize drug efflux transporters in *B. cenocepacia* J2315 clinical isolate, highly resistant to several antibiotics. Using a detailed bioinformatic analysis, we discovered in the *B. cenocepacia* J2315 genome 16 genes encoding putative RND efflux pumps. To investigate the contribution of these transporters in drug resistance, different operons encoding the RND were inactivated in *B. cenocepacia* J2315 strain, in collaboration with Prof. Miguel Valvano (Queen's University of Belfast), following a method developed in his laboratory (Buroni *et al.*, 2009. BMC Microbiology 9: 200).

We also performed a transcriptome analysis of *B. cenocepacia* strains and this part of the work was carried out in collaboration with Dr. Eshwar Mahenthiralingam (Cardiff University) and Prof. Renato Fani (University of Florence) (Bazzini *et al.*, 2011. PLoS ONE 6: e18902).

Through knock-out experiments we demonstrated that RND-4 is the most important drug efflux pump in this organism (Buroni *et al.*, 2014. Antimicrob. Agents Chemother. 58: 7424-29). Consequently, in the development of a new drug it will be fundamental to avoid its extrusion by this RND transporter.

### 2) Identification of new drugs and novel targets for *Burkholderia cenocepacia*

The development of novel antibiotics remains a major issue for the treatment of infectious lung disease, such as that in CF.

The current research involves the synthesis of new molecules effective against *B. cenocepacia*. We found that a pyridine compound (11026103) and a benzothiadiazol compound (10126109) are very active and we identified a mechanism of resistance, which relies on the extrusion by RND-4 and RND-9 transporters (Scoffone *et al.*, 2014. Antimicrob. Agents Chemother. 58: 2415-17; Scoffone *et al.*, 2015. Front. Microbiol. 6: 815). 10126109 is active against clinical isolates and other members of the *B. cepacia* complex (Bcc), as well as against other Gram-negative and -positive bacteria. We recently identified the mechanism of action, which relies on the inhibition of the activity of FtsZ cell division. In collaboration with Dr. V. Makarov (Russian Academy of Sciences, Moscow, Russia) we would like to synthesize new derivatives that are not recognized by the pumps

as a substrate. New inhalable formulations of the latter compound are being developed in collaboration with Prof. F. Ungaro (Naples University). The *in vivo* efficacy of this compound is currently under investigation in collaboration with Dr. A. Bragonzi (San Raffaele Hospital, Milan). Moreover, the characterization of the quorum sensing enzymes of *B. cenocepacia*, as target of anti-virulence compounds, could represent a new promising therapeutic approach. The two enzymes CepI and DfsA have been obtained in recombinant form and, for the latter the crystal structure has been resolved (Spadaro *et al.* 2016. *Biochemistry* 55: 3241-50). The activity assay of both enzymes has been assessed, allowing the screening of potential inhibitors. These screen led to new compounds active *in vitro* against CepI, which are able to dramatically decrease the virulence of the bacteria in an *in vivo* *C. elegans* model (Scoffone *et al.*, 2016. *Sci. Rep.* 6: 32487).

3) Identification of targets for new drugs in *Mycobacterium tuberculosis* and development of a diagnostic kit for Mycobacteria identification.

Tuberculosis remains the leading cause of mortality due to a bacterial pathogen, *Mycobacterium tuberculosis*. Moreover, *M. tuberculosis* strains that are resistant to an increasing number of second-line drugs used to treat multidrug-resistant tuberculosis (MDR-TB, XDR-TB) are becoming a threat to public health worldwide. Consequently, there is an urgent necessity of new TB drugs. This research is part of a big project "New medicines for tuberculosis" funded by EC-VI Framework Program and "More medicines for tuberculosis" funded by EC-VII FP for the development of new drugs against tuberculosis. Within these projects, our group identified the cellular target of benzothiazinones, the enzyme DprE1 (Makarov *et al.*, 2009. *Science* 324: 801-4, paper cited as one out of the 10 key articles published in 2009 by *Nature Medicines* 15: 1349). The drug is now in Phase II, human clinical-trials. In the following years, the heterologous production of DprE1 in *E. coli* was achieved and the results of this work were published in *Science Translational Medicine* (Neres *et al.*, 2012. *Science Translational Medicine* 4:150ra121). The paper has been highlighted on *Science Translational Medicine* (4:150fs33).

By selling the patent on DprE1 as target of the benzothiazinones (PCT/EP2008/001088) to "Sentinel Diagnostics", our laboratory established a collaboration to develop a new and efficient diagnostic kit to identify different mycobacterial strains.

**INVITED SPEAKER AT THE FOLLOWING INTERNATIONAL CONGRESSES:**

1. 41st European Cystic Fibrosis Conference, Belgrade (Serbia), 6th-9th June 2018. **Buroni S.** Efflux pumps and resistance mechanisms in cystic fibrosis pathogens.
2. Developing Antibiotic Alternatives - A discussion of new approaches to overcoming antimicrobial resistance, online congress, 8th-10th November 2016. **Buroni S.** New perspectives to fight *Burkholderia cenocepacia*, a very dangerous Cystic Fibrosis pathogen.
3. 11th More Medicine for Tuberculosis Consortium Meeting, Pavia (Italy), 11th-12th January 2016. **Buroni S.** New medicines for *Burkholderia cenocepacia*: a neglected infection in Cystic Fibrosis patients. Barry Furr memorial lecture.

**SPEAKER AT THE FOLLOWING NATIONAL AND INTERNATIONAL CONGRESSES (UPON SELECTION):**

1. 2nd Joint Annual Symposium of the Departments of Biology and Biotechnology, Molecular Medicine and CNR Institute of Molecular Genetics, Pavia (Italy), 20th-22nd June 2018. **Buroni S.**, Chiarelli L. R., Scoffone V. C., Trespidi G., Sammartino J. C., De Rossi E., Pasca M. R., Riccardi G. New compounds and new approaches to fight infectious diseases.
2. International *Burkholderia cepacia* Working Group-21st Annual Meeting, Dublin (Ireland), 2nd-5th May 2018. Scoffone V., Chiarelli L., Fumagalli M., Forneris F., Trespidi G., stelitano

- G., Makarov V., Riccardi G., **Buroni S.** Deciphering the mechanism of action of Diketopiperazine inhibitors of the *Burkholderia cenocepacia* quorum sensing synthase CepI.
3. 1st Joint Annual Symposium of the Departments of Biology and Biotechnology, Molecular Medicine and CNR Institute of Molecular Genetics, Pavia (Italy), 14th-15th February 2017. **Buroni S.**, Scoffone V., Chiarelli L., De Rossi E., Riccardi G. New approaches to fight *Burkholderia cenocepacia*, a very dangerous Cystic Fibrosis pathogen.
  4. International *Burkholderia cepacia* Working Group-20th Annual Meeting, Columbus (Ohio, USA), 27th-30th April 2016. **Buroni S.**, Brackman G., Scoffone V.C., Chiarelli L.R., Azzalin A., Israyilova A., Makarov V., Coenye T., Riccardi G. new antivirulence compounds affecting *Burkholderia cenocepacia* quorum sensing *in vitro* and *in vivo*.
  5. International *Burkholderia cepacia* Working Group-20th Annual Meeting, Columbus (Ohio, USA), 27-30 Aprile 2016. **Buroni S.**, Gislason A.S., Scoffone V.C., Stietz M.S., Chiarelli L.R., Azzalin A., Makarov V., Cardona S.T., Riccardi G. A new promising bactericidal compound against *Burkholderia cenocepacia*.
  6. International *Burkholderia cepacia* Working Group-18th Annual Meeting, Nimes (France), 9th-12th April 2014. **Buroni S.**, Scoffone V.C., Spadaro F., Makarov V., Riccardi G. New drugs and new targets to fight *Burkholderia cenocepacia*.
  7. International *Burkholderia cepacia* Working Group-15th Annual Meeting, Prague, 13th-16th April 2011. **Buroni S.**, Bazzini S., Udine C., Sass A., Pasca M.R., Longo F., Emiliani G., Fondi M., Perrin E., Decorosi F., Viti C., Giovannetti L., Leoni L., Fani R., Mahenthiralingam E., De Rossi E., Riccardi G. The role of RND efflux transporters in *Burkholderia cenocepacia* life.
  8. Cortona Procarioti 2010, Cortona (AR), 14th-15th April 2010. **Buroni S.**, Manina G., Pasca M.R., Ribeiro A.L., Degiacomi G., De Rossi E., Riccardi G. Decaprenylphosphoryl- $\beta$ -D-ribose 2'-epimerase from *Mycobacterium tuberculosis* is a magic drug target. Best presentation award.
  9. XXVIII SIMGBM National Meeting. Spoleto, Chiostrò San Nicolò, 11th-13th June 2009. Manina G., Bellinzoni M., Pasca M.R., Mikusova K., Milano A., Makarov V., **Buroni S.**, Ribeiro A.L., Lucarelli A.P., De Rossi E., Cole S.T., Alzari P.M., Riccardi G. Role in benzothiazinone resistance of nitroreductase NfnB of *Mycobacterium smegmatis*.
  10. 9th FISV Congress. Riva del Garda (TN), 26th-29th September 2007. **Buroni S.**, Manina G., Riccardi G., and De Rossi E. Identification of the cellular target of the potential antitubercular drug BM 212.
  11. Second Conference on New Frontiers in Microbiology and Infection. Villars-sur-Ollon (Switzerland), 8th-12th October, 2006. **Buroni S.**, Manina G., Guglierame P., Pasca M.R., Riccardi G., and De Rossi E. LfrR is a repressor that regulates expression of the efflux pump LfrA in *Mycobacterium smegmatis*.

## AWARDS

- Grant for the 4th Congress of European Microbiologists FEMS 2011, Geneva (CH), 2011.
- Selected and granted by Cariplo Foundation to be one of the 10 Italians out of 600 people attending the 60th Meeting of Nobel Laureates, Lindau (DE), 2010.
- Best presentation award: Cortona Procarioti, Cortona (AR), 2010.
- Award for the results achieved in the “New Medicines for Tuberculosis” project for the expression and purification of DprE1 drug target, II annual report FPVI, Manchester (UK), 2010.
- Best poster award: XXXIX Congresso Nazionale AMCLI, Rimini, 2010.
- Paper cited as one out of the 10 key articles published in 2009 by Nature Medicines (15: 1349): Makarov V, *et al.*, 2009. Science 324:801-804.
- Paper highlighted on Science Translational Medicine (4:150fs33): Neres J, *et al.*, 2012. Science Translational Medicine 4: 150ra121.

- Grant for the International *B. cepacia* Working Group meeting, Ca' Tron, Roncade (TV), 2008.

## FUNDING

November 2017 – October 2019: PI of a peer-reviewed Blue Sky Research Grant (BSR1718555) from the University of Pavia (85000 €) for the project “*Burkholderia cenocepacia* divisome as a new target to hit a rare cystic fibrosis pathogen”.

## PARTICIPATION TO NATIONAL AND INTERNATIONAL PROJECTS

- From 01-11-2017 to present: PI of the project “*Burkholderia cenocepacia* divisome as a new target to hit a rare cystic fibrosis pathogen”. Blue Sky Research, University of Pavia.
  - Collaborations: Dr. G. Manina, Institut Pasteur (France); Prof. F. Forneris, University of Pavia (Italy).

### Publications related to the project:

1. **Buroni S**, Scoffone VC, Fumagalli M, Makarov V, Trespidi G, De Rossi E, Forneris F, Riccardi G, Chiarelli LR. Investigating the mechanism of action of diketopiperazines inhibitors of the *Burkholderia cenocepacia* quorum sensing synthase CepI: a site directed mutagenesis study. *Front Pharmacol*. 2018. In Press.
  2. Hogan AM, Scoffone VC, Makarov V, Gislason AS, Tesfu H, Stietz MS, Brassinga AKC, Domaratzki M, Li X, Azzalin A, Biggiogera M, Riabova O, Monakhova N, Chiarelli LR, Riccardi G, **Buroni S\***, Cardona ST\* (\*corresponding authors). Competitive fitness of essential gene knockdowns reveals a broad spectrum antibacterial inhibitor of the cell division protein FtsZ. *Antimicrob Agents Chemother*. 2018. Under review.
- From 01-04-2017 to present: Participant to the project "New inhalable compounds against the CF pathogen *Burkholderia cenocepacia*". Cystic Fibrosis Foundation 2017 (PI: Prof. G. Riccardi).
    - Collaborations: Dr. V. Makarov, Bakh Institute of Biochemistry Moscow (Russia), Prof. F. Ungaro, University of Naples (Italy); Dr. A. Bragonzi, San Raffaele hospital Milan (Italy); Prof. S.T. Cardona, Manitoba University (Winnipeg, Canada); Prof. F. Forneris, University of Pavia (Italy).

### Publications related to the project:

1. **Buroni S**, Scoffone VC, Fumagalli M, Makarov V, Trespidi G, De Rossi E, Forneris F, Riccardi G, Chiarelli LR. Investigating the mechanism of action of diketopiperazines inhibitors of the *Burkholderia cenocepacia* quorum sensing synthase CepI: a site directed mutagenesis study. *Front Pharmacol*. 2018. In Press.
  2. Hogan AM, Scoffone VC, Makarov V, Gislason AS, Tesfu H, Stietz MS, Brassinga AKC, Domaratzki M, Li X, Azzalin A, Biggiogera M, Riabova O, Monakhova N, Chiarelli LR, Riccardi G, **Buroni S\***, Cardona ST\* (\*corresponding authors). Competitive fitness of essential gene knockdowns reveals a broad spectrum antibacterial inhibitor of the cell division protein FtsZ. *Antimicrob Agents Chemother*. 2018. Under review.
- From 01-09-2015 to 31-08-2017: Participant to the project "Inhalable formulations of new molecules effective against *Burkholderia cenocepacia*: from *in vitro* to *in vivo* applications". Fondazione per la Ricerca sulla Fibrosi cistica 2015 (PI: Prof. G. Riccardi).
    - Collaborations: Prof. T. Coenye, Gent University (Belgium), Dr. V. Makarov, Bakh Institute of Biochemistry Moscow (Russia), Prof. F. Ungaro, University of Naples (Italy); Dr. A. Bragonzi, San Raffaele hospital Milan (Italy).

- Oral communications by **S. Buroni** to present the results achieved within the project to the XIV Convention of Italian Cystic Fibrosis Researchers (Garda, 24<sup>th</sup>-26<sup>th</sup> November 2016) and to the XV Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 26<sup>th</sup>-28<sup>th</sup> October 2017).

Publications related to the project:

1. Spadaro F, Scoffone VC, Chiarelli LR, Fumagalli M, **Buroni S**, Riccardi G, Forneris F. The Crystal Structure of *Burkholderia cenocepacia* DfsA Provides Insights into Substrate Recognition and Quorum Sensing Fatty Acid Biosynthesis. *Biochemistry*. 2016; 55(23):3241-3250.
  2. Scoffone VC, Chiarelli LR, Makarov V, Brackman G, Israyilova A, Azzalin A, Forneris F, Riabova O, Savina S, Coenye T, Riccardi G, **Buroni S**. Discovery of new diketopiperazines inhibiting *Burkholderia cenocepacia* quorum sensing *in vitro* and *in vivo*. *Sci Rep*. 2016; 6:32487.
- From 01-09-2012 to 31-08-2014: Participant to the project "A very promising drug against *Burkholderia cenocepacia*". Fondazione per la Ricerca sulla Fibrosi cistica 2012 (PI: Prof. G. Riccardi).
    - Collaborations: Prof. R. Fani, University of Florence (Italy); Prof. T. Coenye, Gent University (Belgium); Dr. V. Makarov, Bakh Institute of Biochemistry Moscow (Russia).
    - Oral communications by **S. Buroni** to present the results achieved within the project to the X Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 29<sup>th</sup> November-1<sup>st</sup> December 2012), to the XI Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 28<sup>th</sup>-30<sup>th</sup> November 2013) and to the XII Convention of Italian Cystic Fibrosis Researchers (Garda, Italy 27<sup>th</sup>-29<sup>th</sup> November 2014).

Publications related to the project:

1. Udine C, Brackman G, Bazzini S, **Buroni S**, Van Acker H, Pasca MR, Riccardi G, Coenye T. Phenotypic and genotypic characterisation of *Burkholderia cenocepacia* J2315 mutants affected in homoserine lactone and diffusible signal factor-based quorum sensing systems suggests interplay between both types of systems. *PloS One*. 2013; 8(1):e55112.
  2. Perrin E, Fondi M, Papaleo MC, Maida I, Emiliani G, **Buroni S**, Pasca MR, Riccardi G, Fani R. A census of RND superfamily proteins in the *Burkholderia* genus. *Future Microbiol*. 2013; 8(7):923-937.
  3. Scoffone VC, Spadaro F, Udine C, Makarov V, Fondi M, Fani R, De Rossi E, Riccardi G, **Buroni S**. Mechanism of resistance to an antitubercular 2-thiopyridine derivative that is also active against *Burkholderia cenocepacia*. *Antimicrob. Agents Chemother*. 2014; 58(4):2415-2417.
  4. **Buroni S**, Matthijs N, Spadaro F, Van Acker H, Scoffone VC, Pasca MR, Riccardi G, Coenye T. Differential roles of RND efflux pumps in antimicrobial drug resistance of sessile and planktonic *Burkholderia cenocepacia* cells. *Antimicrob. Agents Chemother*. 2014; 58(12):7424-7429.
  5. Scoffone VC, Ryabova O, Makarov V, Iadarola P, Fumagalli M, Fondi M, Fani R, De Rossi E, Riccardi G, **Buroni S**. Efflux-mediated resistance to a benzothiadiazol derivative effective against *Burkholderia cenocepacia*. *Front Microbiol*. 2015 Aug 5;6:815.
- From 01-09-2009 to 31-08-2011: Participant to the project "The role of RND transporters in *Burkholderia cenocepacia* life by microarray analysis". Fondazione per la Ricerca sulla Fibrosi cistica 2009. (PI: Prof. G. Riccardi).

- Collaborations: Dr. E. Mahenthiralingam, Cardiff University (UK); Prof. R. Fani, University of Florence (Italy); Prof. T. Coenye, Gent University (Belgium); Prof. L. Leoni, Università di Roma Tre (Italy).
- Oral communications by **S. Buroni** to present the results achieved within the project to the VII Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 27<sup>th</sup> -28<sup>th</sup> November 2009), to the VIII Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 2<sup>nd</sup>-4<sup>th</sup> December 2010) and to the IX Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 1<sup>st</sup>-3<sup>rd</sup> December 2011).

Publications related to the project:

1. Perrin E, Fondi M, Papaleo MC, Maida I, **Buroni S**, Pasca MR, Riccardi G, Fani R. Exploring the HME and HAE1 efflux systems in the genus *Burkholderia*. BMC Evol. Biol. 2010; 10:164.
  2. Coenye T, Van Acker H, Peeters E, Sass A, **Buroni S**, Riccardi G, Mahenthiralingam E. Molecular mechanisms of chlorhexidine tolerance in *Burkholderia cenocepacia* biofilms. Antimicrob. Agents Chemother. 2011; 55(5):1912-1919.
  3. Bazzini S, Udine C, Sass A, Pasca MR, Longo F, Emiliani G, Fondi M, Perrin E, Decorosi F, Viti C, Giovannetti L, Leoni L, Fani R, Riccardi G, Mahenthiralingam E, **Buroni S**. Deciphering the role of RND efflux transporters in *Burkholderia cenocepacia*. PLoS One. 2011 6(4):e18902.
  4. Pasca MR, Dalla Valle C, De Jesus Lopes Ribeiro AL, **Buroni S**, Papaleo MC, Bazzini S, Udine C, Incandela ML, Daffara S, Fani R, Riccardi G, Marone P. Evaluation of fluoroquinolone resistance mechanisms in *Pseudomonas aeruginosa* multidrug resistance clinical isolates. Microb Drug Resist. 2012; 18(1):23-32.
- From 01-09-2006 to 31-08-2008: Participant to the project "The role of RND drug efflux transporters in the intrinsic antibiotic resistance of *Burkholderia cenocepacia*". Fondazione per la Ricerca sulla Fibrosi cistica 2006 (PI: Prof. G. Riccardi).
  - Collaborations: Prof. M.A. Valvano, Queen's University Belfast (UK); Dr. V. Venturi, ICGEB Trieste (Italy).
  - Oral communications by **S. Buroni** to present the results achieved within the project to the IV Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 17<sup>th</sup>-18<sup>th</sup> November 2006), to the V Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 26<sup>th</sup>-27<sup>th</sup> November 2007), and to the VI Convention of Italian Cystic Fibrosis Researchers (Verona, Italy 14<sup>th</sup>-15<sup>th</sup> November 2008).

Publication related to the project:

1. **Buroni S**, Pasca MR, Flanagan RS, Bazzini S, Milano A, Bertani I, Venturi V, Valvano MA, Riccardi G. Assessment of three Resistance-Nodulation-Cell Division drug efflux transporters of *Burkholderia cenocepacia* in intrinsic antibiotic resistance. BMC Microbiol. 2009; 9:200.
- From 31-01-2006 to 30-01-2008: participant to the project "Sviluppo di nuovi farmaci antitubercolari, valutazione della loro attivita' antimicobatterica e identificazione del bersaglio cellulare". PRIN 2005 (Coordinator: Prof. M. Botta, PI: Prof. E. De Rossi)
  - Collaborations: Prof. M. Botta, Università degli studi di Siena; Prof. M. Biava, Università La Sapienza di Roma; Prof. A. De Logu, Università degli studi di Cagliari.

Publication related to the project:

1. La Rosa V, Poce G, Ortiz-Canseco J, **Buroni S**, Pasca MR, Biava M, Raju RM, Porretta GC, Alfonso S, Battilocchio C, Javid B, Sorrentino F, Ioerger TR, Sacchettini JC, Manetti F, Botta M, De Logu A, Rubin E, De Rossi E. MmpL3 protein is a cellular target of the antitubercular pyrrole derivative BM212. Antimicrob. Agents Chemother. 2012; 56: 324-331.



- From 01-01-2006 to 31-12-2010: Participant to the project “New medicines for tuberculosis” (NM4TB). FP6-2004-LIFESCIHEALTH-5 (Coordinator: Prof. S. Cole; PI: Prof. G. Riccardi).
- Collaborations: Prof. S.T. Cole, EPFL Lausanne (Switzerland); Dr. V. Makarov, Bakh Institute of Biochemistry Moscow (Russia); Prof. K. Mikusova, Comenius University Bratislava (Slovakia); Prof. P. Butcher, University of London (UK).
- Oral communications by **S. Buroni** to present the results achieved within the project:
  - Davos, Switzerland, 16th – 17th February 2011;
  - Manchester, United Kingdom, 7th – 9th June 2010;
  - Bangalore, India, 8th – 13th December 2009;
  - London, United Kingdom, 22nd – 24th June 2009;
  - Toulouse, France, 12th – 14th January 2009;
  - Tällberg, Sweden, 24th – 26th June 2008;
  - Villars, Switzerland, 21st – 23rd January 2008;
  - Pavia, Italy, 30th May – 1st June 2007.

Publications related to the project:

1. Riccardi G, Pasca MR, **Buroni S**. Mycobacterium tuberculosis: drug resistance and future perspectives. *Future Microbiol.* 2009; 4(5):597-614.
  2. Makarov V, Manina G, Mikusova K, Möllmann U, Ryabova O, Saint-Joanis B, Dhar N, Pasca MR, **Buroni S**, Lucarelli AP, Milano A, De Rossi E, Belanova M, Bobovska A, Dianiskova P, Kordulakova J, Sala C, Fullam E, Schneider P, McKinney JD, Brodin P, Christophe T, Waddell S, Butcher P, Albrethsen J, Rosenkrands I, Brosch R, Nandi V, Bharath S, Gaonkar S, Shandil RK, Balasubramanian V, Balganesht T, Tyagi S, Grosset J, Riccardi G, Cole ST. Benzothiazinones kill *Mycobacterium tuberculosis* by blocking arabinan synthesis. *Science.* 2009; 324(5928):801-804.
  3. Bellinzoni M, **Buroni S**, Schaeffer F, Riccardi G, De Rossi E, Alzari PM. Structural plasticity and distinct drug-binding modes of LfrR, a mycobacterial efflux pump regulator. *J Bacteriol.* 2009; 191(24):7531-7537.
  4. Manina G, Bellinzoni M, Pasca MR, Neres J, Milano A, Ribeiro AL, **Buroni S**, Skovierová H, Dianišková P, Mikušová K, Marák J, Makarov V, Giganti D, Haouz A, Lucarelli AP, Degiacomi G, Piazza A, Chiarelli LR, De Rossi E, Salina E, Cole ST, Alzari PM, Riccardi G. Biological and structural characterization of the *Mycobacterium smegmatis* nitroreductase NfnB, and its role in benzothiazinone resistance. *Mol Microbiol.* 2010; 77(5):1172-1185.
  5. Manina G, Pasca MR, **Buroni S**, De Rossi E, Riccardi G. Decaprenylphosphoryl- $\beta$ -D-ribose 2'-epimerase from *Mycobacterium tuberculosis* is a magic drug target. *Curr Med Chem.* 2010; 17(27):3099-3108.
  6. Lucarelli AP, **Buroni S**, Pasca MR, Rizzi M, Cavagnino A, Valentini G, Riccardi G, Chiarelli LR. *Mycobacterium tuberculosis* phosphoribosylpyrophosphate synthetase: biochemical features of a crucial enzyme for mycobacterial cell wall biosynthesis. *PLoS One.* 2010; 5(11):e15494.
- From 01-09-2004 to 31-08-2006: Participant to the project “Antimicrobial resistance in *Burkholderia cepacia* complex from Cystic Fibrosis patients: identification, characterization and role of efflux transporters in intrinsic and acquired drug resistance”. Fondazione per la Ricerca sulla Fibrosi cistica 2004 (PI: Prof. G. Riccardi).
  - Collaborations: Dr. P. Arrigo, National Research Council (CNR) Genoa (Italy).

#### Publication related to the project:

1. Guglierame P, Pasca MR, De Rossi E, **Buroni S**, Arrigo P, Manina G, Riccardi G. Efflux pump genes of the resistance-nodulation-division family in *Burkholderia cenocepacia* genome. BMC Microbiol. 2006; 6:66.

#### **REFeree'S ACTIVITY AND EDITORIAL BOARD**

- She has been referee for "Israely Ministry of Science, Technology and Space" for the call proposal "Resistant pathogens 2017".
- She has been referee for the following scientific journals: Critical Reviews in Microbiology; Journal of Antimicrobial Chemotherapy; Frontiers in Microbiology; BMC Microbiology; Future Microbiology; Journal of Medical Microbiology; Microbial Drug Resistance; Current Microbiology; PLoS ONE; International Journal of Medicine and Medicinal Sciences.
- She is guest associate editor for "Evolutionary and Genomic Microbiology" Research Topic for the Journals Frontiers in Genetics and Frontiers in Microbiology.
- She is member of the Editorial Board of "EC Pulmonology and Respiratory Medicine".
- She has been member of the committee for the best poster award at the conference: "I discepoli di Adriano Buzzati-Traverso: la Genetica Molecolare tra Università e CNR", University of Pavia, Italy (2011).

#### **PUBLICATIONS**

She is author of 35 peer-reviewed articles (23 of which without the participation of the PhD supervisor), 4 book chapters, and 55 national and international communications.

Total IF=168,533

From Scopus (09-01-19): H-index=17; Total Citations=1252.

From Google scholar (09-01-19): H-index=18; Total Citations=1636.

She is first author of 5 papers (\*) and corresponding author of 6 papers (§).

1. Sass A, Slachmuylders L, Van Acker H, Vandenbussche I, Ostyn L, Bové M, Crabbé A, Chiarelli LR, **Buroni S**, Van Nieuwerburgh F, Abatih E, Coenye T. (2019) Various evolutionary trajectories lead to loss of the tobramycin potentiating activity of the quorum sensing inhibitor baicalin hydrate in *Burkholderia cenocepacia* biofilms. Antimicrobial Agents and Chemotherapy. In press. (IF=4.476)
2. Rahman T, Seraj F, **Buroni S**. (2018) Lessons from *Vibrio* pathogen and the comparative study of vaccines developed. Advances in Microbiology 8: 950-964. (IF=1.150)
3. Hogan AM, Scoffone VC, Makarov V, Gislason AS, Tesfu H, Stietz MS, Brassinga AKC, Domaratzki M, Li X, Azzalin A, Biggiogera M, Riabova O, Monakhova N, Chiarelli LR, Riccardi G, **Buroni S**§, Cardona ST. (2018) Competitive fitness of essential gene knockdowns reveals a broad-spectrum antibacterial inhibitor of the cell division protein FtsZ. Antimicrobial Agents and Chemotherapy 62. pii: e01231-18. (IF=4.476)
4. **Buroni S**\*, Scoffone VC\*, Fumagalli M, Makarov V, Trespidi G, De Rossi E, Forneris F, Riccardi G, Chiarelli LR. (2018) Investigating the mechanism of action of diketopiperazines inhibitors of the *Burkholderia cenocepacia* quorum sensing synthase CepI: a site directed mutagenesis study. Frontiers in Pharmacology 9: 836. (\*equal contributors). (IF = 3.831)

5. Perrin E, Maggini V, Maida I, Gallo E, Lombardo K, Madarena MP, **Buroni S**, Scoffone VC, Firenzuoli F, Mengoni A, Fani R. (2018) Antimicrobial activity of six essential oils against *Burkholderia cepacia* complex: insights into mechanism(s) of action. *Future Microbiology* 13: 59-67. (IF=3.190)
6. Perrin E, Fondi M, Bosi E, Mengoni A, **Buroni S**, Scoffone VC, Valvano M, Fani R. (2017) Subfunctionalization influences the expansion of bacterial multidrug antibiotic resistance. *BMC Genomics* 18: 834. (IF=3.730)
7. Scoffone VC, Chiarelli LR, Trespidi G, Mentasti M, Riccardi G, **Buroni S**<sup>§</sup>. (2017) *Burkholderia cenocepacia* infections in cystic fibrosis patients: drug resistance and therapeutic approaches. *Frontiers in Microbiology* 8: 1592. (IF=4.019)
8. Israyilova A\*, **Buroni S**\*, Forneris F, Scoffone VC, Shixaliyev NQ, Riccardi G, Chiarelli LR. (2016) Biochemical characterization of glutamate racemase-a new candidate drug target against *Burkholderia cenocepacia* infections. *PLoS One* 11: e0167350. (\*equal contributors). (IF=2.806)
9. Scoffone VC, Chiarelli LR, Makarov V, Brackman G, Israyilova A, Azzalin A, Forneris F, Riabova O, Savina S, Coenye T, Riccardi G, **Buroni S**<sup>§</sup>. (2016) Discovery of new diketopiperazines inhibiting *Burkholderia cenocepacia* quorum sensing *in vitro* and *in vivo*. *Scientific Reports* 6: 32487. (IF=4.259)
10. Spadaro F, Scoffone VC, Chiarelli LR, Fumagalli M, **Buroni S**, Riccardi G, Forneris F. (2016) The crystal structure of *Burkholderia cenocepacia* DfsA provides insights into substrate recognition and quorum sensing fatty acid biosynthesis. *Biochemistry* 55: 3241-3250. (IF=2.938)
11. Scoffone VC, Ryabova O, Makarov V, Iadarola P, Fumagalli M, Fondi M, Fani R, De Rossi E, Riccardi G, **Buroni S**<sup>§</sup>. (2015) Efflux-mediated resistance to a benzothiadiazol derivative effective against *Burkholderia cenocepacia*. *Frontiers in Microbiology* 6: 815. (IF=4.165)
12. **Buroni S**\*, Matthijs N, Spadaro F, Van Acker H, Scoffone VC, Pasca MR, Riccardi G, Coenye T. (2014) Differential roles of RND efflux pumps in antimicrobial drug resistance of sessile and planktonic *Burkholderia cenocepacia* cells. *Antimicrobial Agents and Chemotherapy* 58: 7424-7429. (IF=4.476)
13. Albesa-Jové D, Chiarelli LR, Makarov V, Pasca MR, Urresti S, Mori G, Salina E, Vocat A, Comino N, Mohorko E, Ryabova S, Pfeiffer B, de Jesus Lopes Ribeiro AL, Rodrigo-Unzueta A, Tersa M, Zanoni G, **Buroni S**, Altmann KH, Hartkoorn RC, Glockshuber R, Cole ST, Riccardi G, Guerin ME. (2014) Rv2466c mediates the activation of TP053 to kill replicating and nonreplicating *Mycobacterium tuberculosis*. *ACS Chemical Biology* 9: 1567-1575. (IF=5.331)
14. Scoffone VC, Spadaro F, Udine C, Makarov V, Fondi M, Fani R, De Rossi E, Riccardi G, **Buroni S**<sup>§</sup>. (2014) Mechanism of resistance to an antitubercular 2-thiopyridine derivative that is also active against *Burkholderia cenocepacia*. *Antimicrobial Agents and Chemotherapy* 58: 2415-2417. (IF=4.476)
15. Perrin E, Fondi M, Papaleo MC, Maida I, Emiliani G, **Buroni S**, Pasca MR, Riccardi G, Fani R. (2013) A census of RND-superfamily proteins in the *Burkholderia* genus. *Future Microbiology* 8: 923-937. (IF=3.819)
16. Gamberi T, Rocchiccioli S, Papaleo MC, Magherini F, Citti L, **Buroni S**, Bazzini S, Udine C, Perrin E, Modesti A, Fani R. (2013) RND-4 efflux transporter gene deletion in *Burkholderia cenocepacia* J2315: a proteomic analysis. *Journal of Protein Science and Computational Biology* 2: 1.
17. Udine C, Brackman G, Bazzini S, **Buroni S**, Van Acker H, Pasca MR, Riccardi G, Coenye T. (2013) Phenotypic and genotypic characterisation of *Burkholderia cenocepacia* J2315 mutants affected in homoserine lactone and diffusible signal factor-based quorum sensing systems suggests interplay between both types of systems. *PLoS ONE* 8: e55112. (IF=3.534)

18. Neres J, Pojer F, Molteni E, Chiarelli LR, Dhar N, Boy-Röttger S, **Buroni S**, Fullam E, Degiacomi G, Lucarelli AP, Read RJ, Zanoni G, Edmondson DE, De Rossi E, Pasca MR, McKinney JD, Dyson PJ, Riccardi G, Mattevi A, Cole ST, Binda C. (2012) Structural basis for benzothiazinone-mediated killing of *Mycobacterium tuberculosis*. *Science Translational Medicine* 4: 150ra121. (IF=10.757)
19. Trefzer C, Škovierová H, **Buroni S**, Bobovská A, Nenci S, Molteni E, Pojer F, Pasca MR, Makarov V, Cole ST, Riccardi G, Mikušová K, Johnsson K. (2012) Benzothiazinones are suicide inhibitors of mycobacterial decaprenylphosphoryl- $\beta$ -D-ribofuranose 2'-oxidase DprE1. *Journal of the American Chemical Society* 134: 912-915. (IF=10.677)
20. La Rosa V, Poce G, Ortiz-Canseco J, **Buroni S**, Pasca MR, Biava M, Raju RM, Porretta GC, Alfonso S, Battilocchio C, Javid B, Sorrentino F, Ioerger TR, Sacchettini JC, Manetti F, Botta M, De Logu A, Rubin E, De Rossi E. (2012) MmpL3 protein is a cellular target of the antitubercular pyrrole derivative BM212. *Antimicrobial Agents and Chemotherapy* 56: 324-331. (IF=4.565)
21. Pasca MR, Dalla Valle C, de Jesus Lopes Ribeiro AL, **Buroni S**, Papaleo MC, Bazzini S, Udine C, Incandela ML, Daffara S, Fani R, Riccardi G, Marone G. (2012) Evaluation of fluoroquinolone resistance mechanisms in *Pseudomonas aeruginosa* MDR clinical isolates. *Microbial Drug Resistance* 18: 23-32. (IF=2.364)
22. de Jesus Lopes Ribeiro AL, Degiacomi G, Ewann F, **Buroni S**, Incandela ML, Kim J, Contreras-Dominguez M, Park Y-S, Han S-J, Chiarelli LR, Brodin P, Valentini G, Rizzi M, Riccardi G, Pasca MR. (2011) Analogous mechanisms of resistance to benzothiazinones and dinitrobenzamides in *Mycobacterium smegmatis*. *PLoS ONE* 6: e26675. (IF=4.092)
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25. Lucarelli AP, **Buroni S**, Pasca MR, Rizzi M, Cavagnino A, Valentini G, Riccardi G, Chiarelli LR. (2010) *Mycobacterium tuberculosis* phosphoribosylpyrophosphate synthetase: biochemical features of a crucial enzyme for mycobacterial cell wall biosynthesis. *PLoS ONE* 5: e15494. (IF=4.411)
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27. Manina G, Bellinzoni M, Pasca MR, Neres J, Milano A, Ribeiro AL, **Buroni S**, Skovierová H, Dianišková P, Mikušová K, Marák J, Makarov V, Giganti D, Haouz A, Lucarelli AP, Degiacomi G, Piazza A, Chiarelli LR, De Rossi E, Salina E, Cole ST, Alzari PM, Riccardi G. (2010) Biological and structural characterization of the *Mycobacterium smegmatis* nitroreductase NfnB, and its role in benzothiazinone resistance. *Molecular Microbiology* 77: 1172-1185. (IF=4.819)
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29. Bellinzoni M, **Buroni S**, Schaeffer F, Riccardi G, De Rossi E, Alzari PM. (2009) Structural plasticity and distinct drug-binding modes of LfrR, a mycobacterial efflux pump regulator. *Journal of Bacteriology* 191: 7531-7537. (IF=3.940)
30. **Buroni S**<sup>\*</sup>, Pasca MR, Flannagan RS, Bazzini S, Milano A, Bertani I, Venturi V, Valvano MA, Riccardi G. (2009) Assessment of three Resistance-Nodulation-Cell Division drug

- efflux transporters of *Burkholderia cenocepacia* in intrinsic antibiotic resistance. *BMC Microbiology* 9: 200. (IF=2.890)
31. Riccardi G, Pasca MR, **Buroni S**. (2009) *Mycobacterium tuberculosis*: drug resistance and future perspectives. *Future Microbiology* 4: 597-614. (IF=2.875)
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  35. Bellinzoni M, **Buroni S**, Pasca MR, Guglierame P, Arcesi F, De Rossi E, Riccardi G. (2005) Glutamine amidotransferase activity of NAD<sup>+</sup> synthetase from *Mycobacterium tuberculosis* depends on an amino-terminal nitrilase domain. *Research in Microbiology* 156: 173-177. (IF=2.426)

#### **Book chapters:**

1. Scoffone VC, Coenye T, Riccardi G, **Buroni S**. (2016) Drug efflux pumps in *Burkholderia*. Chapter 15 for the book: "Efflux-Mediated Antimicrobial Resistance in Bacteria". Springer Link. ISBN: 978-3-319-39656-9.
2. Bazzini S, **Buroni S**, Udine C, Pasca MR, Riccardi G. (2014) Molecular basis for antibiotic resistance in the genus *Burkholderia*. Chapter 9 for the book: "*Burkholderia*: from genomes to function". Caister Academic Press. ISBN: 978-1-908230-35-5.
3. Pasca MR, Riccardi G, **Buroni S**. (2013) *Mycobacterium tuberculosis* efflux pumps: an update. Chapter 8 for the book: "Microbial Efflux Pumps: Current Research". Caister Academic Press. ISBN: 978-1-908230-21-8.
4. **Buroni S**, Riccardi G, Pasca MR. (2012) Fighting against resistant strains: the case of benzothiazinones and dinitrobenzamides. Chapter for the book: "*Mycobacterium tuberculosis*/Book 2". InTech Press. ISBN 978-953-307-948-6.