



SHORT CV

PROFESSOR SARA EPIS,
DEPARTMENT OF BIOSCIENCES,
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SCIENTIFIC PRODUCTION

Author of 53 publications in indexed journals

Google scholar indexes (06 October 2017) Total citations = 969; H-index = 20; i10 index = 30

Speaker at 20 national and international congresses (11 as Invited speaker), author of 9 book chapters.

I have 11 years experience in Parasitology. In particular, I spent my research time at the University of Camerino and Milan, as member of the two main research groups focused on symbiosis of arthropod vectors (mosquitoes and ticks).

Current position

From September 2016, I am Associate Professor of Parasitology, at the Department of Biosciences at the University of Milan. Before I was Assistant Professor for 2,5 years; I was able to start my own research group in March 2014, on the basis of a grant from the Italian Ministry of Research. The FIR2013 is a highly competitive research funding system, tailored for young postdoctoral researchers who aim at starting their own laboratory, similarly to the ERC starting grants, albeit with lower budgets. Out of over 800 grant proposals for Life Sciences, only 28 were financed (I ranked first overall).

PhD studies

I spent my PhD working in the laboratory of Parasitology of the University of Milan. There I learnt molecular, microscopy, phylogeny and microbiological techniques, which I used to work on a completely new symbiotic system discovered in the tick *I. ricinus*. During my PhD I contributed to the description of a novel bacterial genus and species, *Midichloria mitochondrii* and to the genome sequencing of this bacterium. My PhD work on this topic resulted in 5 publications, two as first authors and one as corresponding. The paper published in the journal MBE 'Phylogenomic evidence for the presence of a flagellum and cbb(3) oxidase in the free-living mitochondrial ancestor' was selected by the post publication peer review system 'Faculty of 1000', which evaluated it as a 'must read work'. **Interdisciplinary experience**

During my PhD, I felt the need to explore other aspects of scientific research, outside the University system. I applied to RIFCon as field assistant (Society for the registration of agrochemicals, Heidelberg) for the monitoring arthropods pre-and post-treatment, using specific techniques. This experience strengthened my ability to understand how to move from basic to applied research. After my PhD, I decided to cooperate as a professional assistant with the Public Health Laboratory (ASL Milano), for the management of the projects "The use of biotechnology in the identification of epigeal macromycetes responsible for poisoning". The project led to the development of a system for the molecular identification of fungi responsible for poisoning and for the toxin alpha-amanitin, the international collaboration with Prof. Walton, and the publication of 2 papers in international journals (BioMedLib recognition), 2 articles in national magazines and 2 presentations as invited speaker at the V International Congress of Mycotoxicology (12-2012) and at the Conference "Intoxication of epigeal macromycetes" (10-2009). In 2012, I hosted the PhD student Alessandro Desirò from the University of Turin at the University of Milano. During his PhD fellowship, Dr. Desirò collaborated with me on molecular studies and microscopy (FISH staining) on the symbiotic interactions between liverworts,



arbuscular mycorrhizal fungi and their endobacteria. This collaboration was very successful, with the publication of two papers in high rank journals (Environmental Microbiology and ISME Journal).

Postdoctoral studies

After my PhD, following a competition based on qualifications and interview, I was able to obtain the fellowship on the topic "evaluation of the potential role of bacteria of the genus *Asaia* such microbial agents for the control of malaria vectors", under the supervision of Prof. G. Favia (University of Camerino) in the laboratory of Prof. Favia for a 3 years. I worked on the study of symbiosis in mosquitoes and on the manipulation of the bacterium *Asaia* with recombinant plasmids, publishing 6 scientific works (2 as first author). During this period, I attended a summer school on "Advances in symbiosis research" in Israel, The Hebrew University of Jerusalem, in order to obtain the necessary know-how. After this fellowship, I was contacted by Prof. C. Genchi (University of Milan), who wanted to activate a Postdoctoral project on the inhibition of multidrugresistance efflux pumps as new strategy for the control of arthropod vectors (*Anopheles* mosquitoes and ticks). The gained experience at the University of Camerino allowed me to obtain the know-how necessary to perform bioassays on mosquitoes and to study the ABC transporters (7 scientific works, 2 as first author and 2 as corresponding).

Expertise

My experience in different laboratories, universities and companies allowed me to obtain expertise in multiple techniques, many of which will be useful within the proposed project. In particular, my professional skills, documented by the scientific production, are: the collection and maintenance of ticks, mosquitoes and sand flies; techniques of light and electron microscopy, IFA and FISH staining; biochemical and immunological methods for the study of proteins; methods for the study of nucleic acids, PCR, reverse transcription, real-time RT-PCR, cloning; isolation of bacteria and yeasts and bacterial transformations.

Invited speaker at internationally established conferences and international advanced schools

- May 2017: International conference on Insect symbionts: Plasticity in confronting environmental challenges. Ben Gurion University, Israele.
- Sept 2016: International Congress of Entomology, Orlando, USA.
- Jun 2015: Congress "System Approach for improving the sustainability of animal production, health and welfare", Milan.
- Jun 2015: Symposium "Symbiotic Fungi and Bacteria in arthropod vectors as a tool for disease control", Bangladesh.
- Mar 2014: Annual meeting Italian Malaria Network, "Wolbachia surface protein: role in immune activation and potential use for reducing vector competence of mosquitoes", Perugia.
- Dec 2012: 5th International Meeting of Mycotoxicology, Milano;
- Jun 2012: COST FA0701 Final Meeting and 7th Wolbachia Conference, Ile de Oleron, France;
- Mar 2010: COST arthropod symbiosis: from Fundamental Studies to Pest and Disease Management, Rehovot, Israel;

LIST OF PUBLICATIONS

1. De Marco L., Sassera D., Epis S., Mastrantonio V., Ferrari M., Ricci I., Comandatore F., Bandi C., Porretta D., Urbanelli S. The choreography of the chemical defense response to insecticide stress. Scientific Reports, 2016 in press.
2. Lauzi S, Maia JP, Epis S, Marcos R, Pereira C, Luzzago C, Santos M, Puente-Payo P, Giordano



- A, Pajoro M, Sironi G, Faustino A. Molecular detection of *Anaplasma platys*, *Ehrlichia canis*, *Hepatozoon canis* and *Rickettsia monacensis* in dogs from Maio Island of Cape Verde archipelago. *Ticks Tick Borne Dis.* 2016 Jul;7(5):964-9. doi: 10.1016/j.ttbdis.2016.05.001.
3. Mangia C, Vismarra A, Kramer L, Bell-Sakyi L, Porretta D, Otranto D, Epis S, Grandi G. Evaluation of the in vitro expression of ATP binding-cassette (ABC) proteins in an *Ixodes ricinus* cell line exposed to ivermectin. *Parasit Vectors.* 2016 Apr 18;9:215. doi: 10.1186/s13071-016-14972.
 4. De Marco L, Epis S, Comandatore F, Porretta D, Cafarchia C, Mastrantonio V, Dantas-Torres F, Otranto D, Urbanelli S, Bandi C, Sasser D. Transcriptome of larvae representing the *Rhipicephalus sanguineus* complex. *Mol Cell Probes.* 2016 Feb 24. pii: S0890-8508(16)30013-5. doi: 10.1016/j.mcp.2016.02.006.
 5. Porretta D, Epis S*, Mastrantonio V, Ferrari M, Bellini R, Favia G, Urbanelli S. How heterogeneous is the involvement of ABC transporters against insecticides? *Acta Trop.* 2016 doi:10.1016/j.actatropica.2016.02.002.
 6. Zanzani SA, Cerbo AD, Gazzonis AL, Epis S, Invernizzi A, Tagliabue S, Manfredi MT. Parasitic and Bacterial Infections of *Myocastor coypus* in a Metropolitan Area of Northwestern Italy. *J Wildlife Dis.* 2016 Jan;52(1):126-30.
 7. Valzano M, Cecarini V, Cappelli A, Capone A, Bozic J, Cuccioloni M, Epis S, Petrelli D, Angeletti M, Eleuteri AM, Favia G, Ricci I. A yeast strain associated to *Anopheles* mosquitoes produces a toxin able to kill malaria parasites. *Malaria J* 2016 Jan 11;15(1):21.
 8. Epis S, Capone A, Martin E, Paolucci M, Bazzocchi C, Valzano M, Bozic J, Novati S, Favia G, Ricci I. A rapid qPCR method to investigate the circulation of the yeast *Wickerhamomyces anomalus* in humans. *New Microbiol.* 2015 Oct;38(4):577-81.
 9. Martin E, Bongiorno G, Giovati L, Montagna M, Crotti E, Damiani C, Gradoni L, Polonelli L, Ricci I, Favia G, Epis S*. Isolation of a *Wickerhamomyces anomalus* yeast strain from the sandfly *Phlebotomus perniciosus*, displaying the killer phenotype. *Med Vet Entomol.* 2016 Mar;30(1):101106.
 10. Rossi P, Ricci I, Cappelli A, Damiani C, Ulissi U, Mancini MV, Valzano M, Capone A, Epis S, Crotti E, Chouaia B, Scuppa P, Joshi D, Xi Z, Mandrioli M, Sacchi L, O'Neill SL, Favia G. Mutual exclusion of *Asaia* and *Wolbachia* in the reproductive organs of mosquito vectors. *Parasit Vectors.* 2015 May 17;8:278.
 11. Genchi M, Prati P, Vicari N, Manfredini A, Sacchi L, Clementi E, Bandi C, Epis S, Fabbi M. *Francisella tularensis*: No Evidence for Transovarial Transmission in the Tularemia Tick Vectors *Dermacentor reticulatus* and *Ixodes ricinus*. *PLoS One.* 2015 Aug 5;10(8):e0133593.
 12. Zanzani SA, Gazzonis AL, Epis S, Manfredi MT. Study of the gastrointestinal parasitic fauna of captive non-human primates (*Macaca fascicularis*). *Parasitol Res.* 2016 Jan;115(1):307-12.
 13. Di Venere M, Fumagalli M, Cafiso A, De Marco L, Epis S, Plantard O, Bardoni A, Salvini R, Viglio S, Bazzocchi C, Iadarola P, Sasser D. *Ixodes ricinus* and Its Endosymbiont *Mitochondria*: A Comparative Proteomic Analysis of Salivary Glands and Ovaries. *PLoS One.* 2015 Sep 23;10(9):e0138842.



14. Cafarchia C, Porretta D, Mastrantonio V, Epis S, Sassera D, Iatta R, Immediato D, Ramos RA, Lia RP, Dantas-Torres F, Kramer L, Urbanelli S, Otranto D. Potential role of ATP-binding cassette transporters against acaricides in the brown dog tick *Rhipicephalus sanguineus* sensu lato. *Med Vet Entomol.* 2015, 29: 88-93.
15. Gaiarsa S, Comandatore F, Gaibani P, Corbella M, Dalla Valle C, Epis S, Scaltriti E, Carretto E, Farina C, Labonia M, Landini MP, Pongolini S, Sambri V, Bandi C, Marone P, Sassera D. Genomic Epidemiology of *Klebsiella pneumoniae* in Italy and Novel Insights into the Origin and Global Evolution of Its Resistance to Carbapenem Antibiotics. *Antimicrob Agents Chemother.* 2015, 59: 389-396.
16. Epis S, Porretta D, Mastrantonio V, Urbanelli S, Sassera D, De Marco L, Mereghetti V, Montagna M, Ricci I, Favia G, Bandi C. Temporal dynamics of the ABC transporter response to insecticide treatment: insights from the malaria vector *Anopheles stephensi*. *Scientific Reports.* 2014, 11;4:7435.
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18. Montagna M, Chouaia B, Sacchi L, Porretta D, Martin E, Giorgi A, Lozzia GC, Epis S. A new strain of *Wolbachia* in an alpine population of the viviparous *Oreina cacaliae* (Coleoptera: Chrysomelidae). *Environ Entomol.* 2014, 43:913-922.
19. Sgambelluri RM, Epis S, Sassera D, Luo H, Angelos ER, Walton JD. Profiling of amatoxins and phallotoxins in the genus *Lepiota* by liquid chromatography combined with UV absorbance and mass spectrometry. *Toxins (Basel).* 2014, 6:2336-2347.
20. Epis S, Porretta D, Mastrantonio V, Comandatore F, Sassera D, Rossi P, Cafarchia C, Otranto D, Favia G, Genchi C, Bandi C, Urbanelli S. ABC transporters are involved in defense against permethrin insecticide in the malaria vector *Anopheles stephensi*. *Parasites & Vectors.* 2014, 7:349.
21. Montagna M, Gómez-Zurita J, Giorgi A, Epis S, Lozzia G, Bandi C. Metamicrobiomics in herbivore beetles of the genus *Cryptocephalus* (Chrysomelidae): toward the understanding of ecological determinants in insect symbiosis. *Insect Science.* 2014, doi: 10.1111/1744- 917.12143.
22. Cappelli A, Ulissi U, Valzano M, Damiani C, Epis S, Gabrielli MG, Conti S, Polonelli L, Bandi C, Favia G, Ricci I. A *Wickerhamomyces anomalus* killer strain in the malaria vector *Anopheles stephensi*. *PLoS One.* 2014, 9(5):e95988.
23. Zanzani S, Epis S, Bandi C, Manfredi MT. What is your diagnosis? Fecal smear stained with Lugol's solution and Giemsa from a cynomolgus macaque (*Macaca fascicularis*) presenting with liquid diarrhea. *Vet Clin Pathol.* 2014, 43(2):293-294.
24. Desirò A, Salvioli A, Ngonkeu EL, Mondo SJ, Epis S, Faccio A, Kaech A, Pawlowska TE, Bonfante P. Detection of a novel intracellular microbiome hosted in arbuscular mycorrhizal fungi. *ISME Journal.* 2014, 8(2):257-270.



25. Bazzocchi C, Mariconti M, Sassera D, Rinaldi L, Martin E, Cringoli G, Urbanelli S, Genchi C, Bandi C, Epis S*. Molecular and serological evidence for the circulation of the tick symbiont *Midichloria* (Rickettsiales: Midichloriaceae) in different mammalian species. *Parasites & Vectors*. 2013, 6:350.
26. Porretta D, Mastrantonio V, Amendolia S, Gaiarsa S, Epis S, Genchi C, Bandi C, Otranto D, Urbanelli S. Effects of global changes on the climatic niche of the tick *Ixodes ricinus* inferred by species distribution modelling. *Parasites & Vectors*. 2013, 6:271.
27. Sassera D, Epis S, Pajoro M, Bandi C. Microbial symbiosis and the control of vector-borne pathogens in tsetse flies, human lice, and triatomine bugs. *Pathogens and Global Health*. 2013, 107(6):285-292.
28. Capone A, Ricci I, Damiani C, Mosca M, Rossi P, Scuppa P, Crotti E, Epis S, Angeletti M, Valzano M, Sacchi L, Bandi C, Daffonchio D, Mandrioli M, Favia G. Interactions between *Asaia*, *Plasmodium* and *Anopheles*: new insights into mosquito symbiosis and implications in malaria symbiotic control. *Parasites & Vectors*. 2013, 6(1):182.
29. Montagna M, Sassera D, Epis S, Bazzocchi C, Vannini C, Lo N, Sacchi L, Fukatsu T, Petroni G, Bandi C. "*Candidatus* Midichloriaceae" fam. Nov. (Rickettsiales), an ecologically widespread clade of intracellular alphaproteobacteria. *Appl Environ Microbiol*. 2013, 79(10):3241-3248.
30. Porretta D, Mastrantonio V, Mona S, Epis S, Montagna M, Sassera D, Bandi C, Urbanelli S. The integration of multiple independent data reveals an unusual response to Pleistocene climatic changes in the hard tick *Ixodes ricinus*. *Molecular Ecology* 2013, 22(6):1666-1682.
31. Epis S, Mandrioli M, Genchi M, Montagna M, Sacchi L, Pistone D, Sassera D. Localization of the bacterial symbiont *Candidatus* Midichloria mitochondrii within the hard tick *Ixodes ricinus* by whole-mount FISH staining. *Ticks and Tick Borne Diseases*. 2013, 4(1-2):39-45.
32. Desirò A, Naumann M, Epis S, Novero M, Bandi C, Genre A, Bonfante P. Mollicutes-related endobacteria thrive inside liverwort-associated arbuscular mycorrhizal fungi. *Environ Microbiol*. 2013, 15(3):822-836.
33. Mariconti M, Epis S, Gaibani P, Dalla Valle C, Sassera D, Tomao P, Fabbi M, Castelli F, Marone P, Sambri V, Bazzocchi C, Bandi C. Humans parasitized by the hard tick *Ixodes ricinus* are seropositive to *Midichloria mitochondrii*: is *Midichloria* a novel pathogen, or just a marker of tick bite? *Pathog Glob Health*. 2012, 106(7):391-396.
34. Ricci I, Valzano M, Ulissi U, Epis S, Cappelli A, Favia G. Symbiotic control of mosquito borne disease. *Pathog Glob Health*. 2012, 106(7):380-385.
35. Montagna M, Sassera D, Griggio F, Epis S, Bandi C, Gissi C. Tick-box for 3'-end formation of mitochondrial transcripts in Ixodida, basal chelicerates and *Drosophila*. *PLoS One*. 2012, 7(10):e47538.
36. Mariconti M, Epis S, Sacchi L, Biggiogera M, Sassera D, Genchi M, Alberti E, Montagna M, Bandi C, Bazzocchi C. A study on the presence of flagella in the order Rickettsiales: the case of '*Candidatus* Midichloria mitochondrii'. *Microbiology*. 2012, 158(Pt 7):1677-1683.



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39. Epis S, Gaibani P, Ulissi U, Chouaia B, Ricci I, Damiani C, Sambri V, Castelli F, Buelli F, Daffonchio D, Bandi C, Favia G. Do mosquito-associated bacteria of the genus *Asaia* circulate in humans? *Eur J Clin Microbiol Infect Dis.* 2012, 31:1137-1140.
40. Sassera D, Lo N, Epis S, D'Auria G, Montagna M, Comandatore F, Horner D, Peretó J, Luciano AM, Franciosi F, Ferri E, Crotti E, Bazzocchi C, Daffonchio D, Sacchi L, Moya A, Latorre A, Bandi C. Phylogenomic evidence for the presence of a flagellum and *cbb(3)* oxidase in the free-living mitochondrial ancestor. *Mol Biol Evol.* 2011, 28: 3285-3296.
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43. Epis S, Luciano AM, Franciosi F, Bazzocchi C, Crotti E, Pistone D, Bandi C, Sassera D. A novel method for the isolation of DNA from intracellular bacteria, suitable for genomic studies. *Annals of Microbiology.* 2010, 60 (3), 455-460.
44. Pistone D, Pajoro M, Fabbi M, Vicari N, Marone P, Genchi C, Novati S, Sassera D, Epis S, Bandi C. Lyme borreliosis, Po River Valley, Italy. *Emerg Infect Dis.* 2010, 16(8):1289-91.
45. Damiani C, Ricci I, Crotti E, Rossi P, Rizzi A, Scuppa P, Capone A, Ulissi U, Epis S, Genchi M, Sagnon N, Faye I, Kang A, Chouaia B, Whitehorn C, Moussa GW, Mandrioli M, Esposito F, Sacchi L, Bandi C, Daffonchio D, Favia G. Mosquito-bacteria symbiosis: the case of *Anopheles gambiae* and *Asaia*. *Microbial Ecology.* 2010, 60(3):644-654.
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Milano, 06 October 2017