CURRICULUM VITAE CV

Full Name **Alaa Ropy Mahmoud Sayed**

Name in publications Alaa **Ropy** *(previously)* & Alaa R.M. **Sayed** *(currently)*

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Education Profile

2012 – 2014	**Ph.D.** in Molecular Biology and Biochemistry, Universidad Autónoma de Madrid (**UAM**), Spain.
2010 – 2011	**M.Sc.** in Cellular and Molecular Biology, Universidad Autónoma de Madrid (**UAM**), Spain.
2008	Master courses in biochemistry, Fayoum University, Egypt.
2002 – 2006	**B.Sc.** in chemistry and biochemistry, Fayoum University, Egypt.

Academic & Research Experience

Feb 2019 - present **Postdoctoral Research Associate at college of Pharmacy, University of Florida, USA.**

Mentor: Prof. Dr. Jürgen B. Bulitta

Summary: I am working on very important projects at University of Florida focusing on the interactions of beta-lactam antibiotics with their target receptors, the penicillin-binding proteins. Likewise, this research assessed antibiotic resistance mechanisms and leveraged latest proteomic approaches. I am applying innovative biochemistry and molecular biology techniques that have substantially moved our

existing projects forward. These innovative and high quality contributions will undoubtedly result in high-impact papers for several of the most clinically important bacterial pathogens.

To date, I participated in many conferences (see below) to disseminate our research findings and interact with colleagues and peers in the field. Additionally, I have been drafting manuscripts for journal publication.

Apr 2015 – Jan 2019 **Lecturer in biochemistry**, **Faculty of Science, Fayoum University, Egypt.**

Summary:

- Teaching biochemistry courses to undergraduate and postgraduate students the following biochemistry courses.
- Supervising undergraduate students during practical sessions.
- Supervision of three master students and two doctoral students.

Sep 2017 – Oct 2017 **Visiting researcher at Instituto de Investigación Sanitaria Illes Balears (IdISBa), Hospital Universitario Son Espases, Palma de Mallorca, Spain.**

Summary: Postdoctoral research training (RT-PCR).

Dec 2014 – Mar 2015 **Teaching Assistant** at Faculty of Science, Fayoum University.

Summary:

- Teaching a biochemistry course to undergraduate students.
- Teaching laboratory experiments and techniques in biochemistry (e.g. enzymes, proteins, blood chemistry).
- Helping students during practical sessions to run experiments understand the techniques principles and the results.

Oct 2010 – Sep 2014 **Doctoral Fellow & PhD student at Centro De Biología Molecular Severo Ochoa, Universidad Autónoma de Madrid (CBMSO-CSIC/UAM), Madrid, Spain.**

Thesis Mentor: Prof. Dr. Juan Alfonso Ayala

Thesis title: Functional characterization of AmpC β-lactamase and role of LMM-PBPs in peptidoglycan composition, β-lactam resistance and ampC regulation in *Pseudomonas aeruginosa*.

Thesis Summary:

Pseudomonas aeruginosa is one of the most problematic versatile Gram-negative bacteria in causing opportunistic human infections which are particularly difficult to treat because of its intrinsic resistance to antibiotics, as a consequence of many intervening resistance mechanisms involving the ability to overproduce the chromosomally encoded cephalosporinases, Pae-AmpC, which are periplasmic enzymes, belong to group I class C serine β-lactamases and are also responsible of bacterial resistance in many bacteria. In *P. aeruginosa*, ampC expression is regulated mainly by AmpG permeases, AmpD amidases, AmpR, NagZ, and two competing AmpR-binding muropeptides [UDP-MurNAc-pentapeptides (ampC suppressor) and 1,6-anhydromuropeptides (ampC inducer)]. Low molecular mass penicillin-binding proteins

[LMM-PBP; e.g. PBP4 (DacB), PBP5 (DacC), PBP7 (PbpG)] are a group of periplasmic enzymes that have DD-carboxypeptidase and/or DD-endopeptidase activities which participate in cell separation, peptidoglycan (PG) maturation and recycling. Binding of β-lactams (e.g. penicillin) with LMM-PBPs causes an increase in anhydromuropeptides and periplasmic AmpC overproduction to hydrolyze that external unwelcome inducer. This study aims to highlight and to characterize the functions of Pae-AmpC and the role of LMM-PBPs PBP4, PBP5 and PBP7 in

PG composition and bacterial resistance in *P. aeruginosa*; also, to study the role of these LMM-PBPs in Pae-ampC regulation and to see if they are needed for the recovery of rod shape of imipenem-induced round cells in P. aeruginosa. To fulfill this study we characterized several Pae-AmpC forms (wild type and mutants) in wild type and mutants of E. coli and in *P. aeruginosa* PAO1 strain which were tested for their PG composition by HPLC analysis and for bacterial resistance by disc diffusion method. Also, we constructed single and combined mutants of dacB, dacC, pbpG and ampC in PAO1 strain which were tested for their PG composition, ampC expression by RT-PCR, β-lactams susceptibility and their PBPs pattern by Bocillin-FL binding test. We analyzed PG composition and PBPs pattern in imipenem-induced round cells and their rod shape recovered cells in PAO1. We found that some Pae-AmpC
mutants had a very low β-lactamase activity (AmpC-F4:C3 and AmpC-F4:C6); the mature form of Pae-AmpC had a high β-lactamase activity and a secondary DD-endopeptidase and DDcarboxypeptidase activities; only dacB single and combined mutations produced high ampC expression and β-lactam resistance; only dacC single and combined mutations produced maximum increase of PG pentapeptides. The triple mutant of dacB, dacC and pbpG displayed the largest increase in ampC expression and β-lactams resistance. Microscopic examination of all the constructed Pae mutants showed that they still retain their rod shape morphology similar to their parental PAO1 strain. Also, we found that activities of DacB, DacC and PbpG are not essential for recovery of rod shape in imipenem-induced spheres in *P. aeruginosa*.

Jul 2013 – Sep 2013 **Visiting researcher**, **IdISBa, Palma de Mallorca, Spain.**

Summary:

Research training including generating knock-out mutants in *Pseudomonas aeruginosa*.

Nov 2006 – Aug 2010 **Demonstrator in Biochemistry, Faculty of Science, Fayoum University.**

Summary:

- Assisted in teaching laboratory experiments in biochemistry.
- Helping students during practical sessions to run experiments.
- Research training for Master degree in biochemistry.
- Studying some courses for Master degree in biochemistry.

Thesis Mentoring I shared in the supervision of the following theses at Fayoum University, Egypt;

1. Ph.D. thesis entitled "Long non-coding RNAs in acute myocardial infarction related to hypercholesterolemia."
2. M.Sc. thesis entitled "P.Oxynase-1 activity and diabetic markers for diabetic patients of type 2."
3. M.Sc. thesis entitled "Production, purification and characterization of cellulase from a thermophilic *Bacillus* sp. and their industrial applications."

   This thesis was funded by M.Sc. grant from of Scientists for Next generation (Grant reference SNG-2015-104) funded by the Academy of Scientific Research and Technology, Egypt.
4. M.Sc. thesis entitled "Production, purification and characterization of hydrolytic enzymes from *Trichoderma* isolates collected from different rhizosphere and assessment of their biocontrol efficiency against some pathogenic fungi."

   This thesis was funded by M.Sc. grant from of Scientists for Next generation (Grant reference SNG-2015-106) funded by the Academy of Scientific Research and Technology, Egypt.

Workshops at UF

1. Workshop in OPEN-SOURCE softwarePK-Sim® & MoBi® on PBPK and PBPK-based QSP. UF Research and Academic Center (UFRAC), Saturday & Sunday 9-10th March 2019. https://esqlabs.com/event-20190309-2/
2. MonolixSuite Workshop at UF, UFRAC, CPSP, Orlando, FL. Thur., October 24th 2019. https://lixoft.com/blog/2019/07/16/2019uf_ws_monolixsuite/
3. Simbiology/Matlab workshop at UF, Guidewell Innovation Center, Orlando. Friday, October 25th 2019. https://www.mathworks.com/licensecenter/classroom/ML_UFlorida_Oct2019/

Course Auditing at College of Pharmacy, UF

1. PHA6125-13GH(25588) Pharmacokinetics and Biopharmaceuticals, Spring 2020.
2. PHA6418 Introduction to Model-Informed Drug Development (MIDD), Fall 2020.
3. PHA6133-404C(20734) Translational Pharmacology, Spring 2021.

Other Softwares

GraphPad Prism, Phoenix, Endnote, Mendeley, XLSTAT, Principal component analysis (PCA), agglomerative hierarchical clustering.

Training at UF

Online courses

1. UF_EHS850G_OLT: Bloodborne Pathogens and Biomedical Waste General Training
2. UF_EHS809: Hazardous Waste Management
3. UF_PRV800v_OLT: HIPAA & Privacy - General Awareness
4. UF_OOC101v_OLT: Compliance & Ethics
5. UF_EHS853_OLT: General Biosafety Training
6. UF_EHS861_OLT: Chemical Hygiene Plan

Grants & Fellowships

Feb 2019 – present	Postdoctoral Research Associate, College of Pharmacy, University of Florida, USA.
Oct 2010 – Sep 2014	The master and doctoral studies were funded and supported by a pre-doctoral grant (JAE, 2010-2014) from the Spanish National Research Council (Consejo Superior de Investigaciones Científicas, CSIC), Madrid, Spain.

List of Publications

PubMed Bibliography
https://www.ncbi.nlm.nih.gov/myncbi/1t9SemWBiNUIlf/bibliography/public/

Google Scholar Citations
https://scholar.google.com/citations?hl=en&user=EfxoJZUAAAAJ&view_op=list_works

1. Lang Y*, Shah NR* (*joint 1st), Tao X, Reeve SM, Zhou J, Moya B, **Sayed ARM**, Dharuman S, Oyer JL, Copik AJ, Fleischer BA, Shin E, Werkman C, Basso KB, Deveson Lucas D, Sutaria DS, Megroz M, Kim TH, Loudon-Hossler V, Wright A, Jimenez-Nieves RH, Wallace MJ, Cadet KC, Jiao Y, Boyce JD, LoVullo ED, Schweizer HP, Bonomo RA, Bharatham N, Tsuji BT, Landersdorfer CB, Norris MH, Shin BS, Louie A, Balasubramanian V, Lee RE, Drusano GL, Bulitta JB. Combating multidrug-resistant bacteria by integrating a novel target site penetration and receptor binding assay platform into translational modeling. Clinical Pharmacology & Therapeutics. 2021; 109(4):1000-1020. https://pubmed.ncbi.nlm.nih.gov/33576025/
2. **Sayed ARM**, Shah NR, Basso KB, Kamat M, Jiao Y, Moya B, Sutaria DS, Lang Y, Tao X, Liu W, Shin E, Zhou J, Werkman C, Louie A, Drusano GL, Bulitta JB. First penicillin-binding protein occupancy patterns for 15 β-lactams and β-lactamase inhibitors in *Mycobacterium abscessus*. Antimicrob Agents Chemother, 2020; 65(1):e01956-20. https://pubmed.ncbi.nlm.nih.gov/33106266/
3. Abd Elhameed E, **Sayed ARM**, Radwan TEE, Hassan G. Biochemical and Molecular Characterization of Five *Bacillus* Isolates Displaying Remarkable Carboxymethyl Cellulase Activities. Current Microbiology 2020; 77:3076-3084. https://pubmed.ncbi.nlm.nih.gov/32710168/

4. Elnesr SS, **Ropy A** and Abdel-Razik AH. Effect of dietary sodium butyrate supplementation on growth, blood biochemistry, haematology and histomorphometry of intestine and immune organs of Japanese quail. Animal 2019; 13(6):1234-1244. https://pubmed.ncbi.nlm.nih.gov/30333074/
5. **Ropy A**, Cabot G, Sanchez-Diener I, Aguilera C, Moya B, Ayala JA, Oliver A (2015) Role of *Pseudomonas aeruginosa* Low-Molecular-Mass Penicillin-Binding Proteins in AmpC Expression, beta-Lactam Resistance, and Peptidoglycan Structure. Antimicrobial agents and chemotherapy 59:3925-3934. https://pubmed.ncbi.nlm.nih.gov/25896695/
6. **Ropy A** and Ayala JA. The effect on peptidoglycan composition of uncharacterized Pae-AmpC mutants probes its functionality as DD-peptidase. International Journal of Microbiology Research 2015; 7(6):710- 716.

List of conferences

1. **Alaa R.M. Sayed**, Nirav R. Shah, Kari Basso, Manasi Kamat, Yuanyuan Jiao, Bartolome Moya, Dhruvitkumar S. Sutaria, Yinzhi Lang, Xun Tao, Weiguo Liu, Eunjeong Shin, Jieqiang Zhou, Carolin Werkman, Arnold Louie, George L. Drusano, Jürgen B. Bulitta. Inhibitory Binding Profiles for β-lactams and Penicillin-Binding Proteins in *Mycobacterium abscessus*. Virtual US/Australian ISAP Scientific Meeting; February 2/3, 2021. (Oral presentation)
2. **A. Ropy**, N. Shah, D. S. Sutaria, K Basso, J. Zhou, Y. Lang, J. Oyer, A. Copik, X. Tao, Y. Jiao, B. Moya, A. Louie, G. L. Drusano, J. B. Bulitta. Targeting *Mycobacterium abscessus* Penicillin-binding proteins with some b-lactams. The 33rd Annual Research Showcase. UF College of Pharmacy, Annual Research Showcase. Gainesville, FL; February 10, 2020.
3. Dhruvitkumar S. Sutaria, Nirav Shah, **Alaa Ropy**, Bartolome Moya, Yuanyuan Jiao, Xun Tao, Jieqiang Zhou, Yinzhi Lang, Elena Shin, Arnold Louie, George Drusano, Jürgen Bulitta. Comprehensive Penicillin-Binding Protein (PBP) Occupancy Patterns of 29 Drugs in *Klebsiella pneumonia*. ESCMID/ASM Conference on Drug Development to meet the challenge of Antimicrobial Resistance 2019. Boston, Massachusetts; 3-6 September 2019.

4. Moya B, **Ropy A**, Inactivation of Penicillin-Binding Proteins (PBPs) 5 and 7 attenuates imipenem-induced persistence formation in *Pseudomonas aeruginosa* (PA). VI JORNADES IdISBa, Hospital Universitari Son Espases, Palma, Illes Balears; November 28-29, 2019.
5. Cristian Aguilera, **Alaa Ropy**, Juan A. Ayala. Role of Peptidoglycan Remodeling on Biofilm and Resistance. V Simposio Internacional de Resistencia Antimicrobiana, La Habana, Cuba; 6th December 2017.
6. **Alaa Ropy** and Juan A. Ayala. Understanding of the regulatory aspects of resistance to β-lactam antibiotics in Pseudomonas and the link with other biological processes. The 22th Conference of Chemistry, Santiago, Cuba; 29th November – 1st December 2017.
7. **Alaa Ropy**, Gabriel Cabot, Antonio Oliver, Juan A. Ayala. Peptidoglycan Composition of *Pseudomonas aeruginosa* Spheroplasts of the wild type PAO1 and the mutant PAOΔ*dacB*Δ*dacC*Δ*pbpG*Δ*ampC*. The 2017 Great Wall Symposium, Hotel Atlântico São Rafael, Algarve, Portugal; 24-27th September 2017.
8. **Alaa Ropy**, Cristian G. Aguilera, Juan A. Ayala. Role of Peptidoglycan Remodeling on Biofilm and Resistance. The 7th Congress of European Microbiologists: The Federation of European Microbiological Societies (FEMS) in association with the Spanish Society for Microbiology (SEM), Valencia, Spain; 9-13th July 2017.
9. **Alaa Ropy**, Juan Ayala. The effect on peptidoglycan composition of uncharacterized Pae-AmpC mutants probes its functionality as DD-peptidase. IX Reunión Temática de la Red de Estructura y Función de Proteínas, Sevilla, Spain; 11-13 Nov 2015.
10. **Alaa Ropy**, Gabriel Cabot, Irina Sánchez-Diener, Cristian Aguilera, Bartolome Moya, Juan A. Ayala, Antonio Oliver. Updates on the mechanism of induction of class C betalactamase in Pseudomonas. Role of the LMW-PBPs. IC-AR-ALAM2014, Cartagena, Colombia; 5-8 November.
11. **Alaa Ropy**, Juan A. Ayala. Antimicrobial resistance and peptidoglycan maturation: Functional characterization of the AmpC type β-lactamase in Pseudomonas. IX Meeting of Molecular Microbiology SEM, Palma de Mallorca, Spain; 14-16 November 2012.