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## **BIOGRAPHY**

The outline of my research is focused on the metabolism and drug resistance of gram-negative bacteria particularly *Acinetobacter baumannii*, and the mechanism mediated resistance, the structure of cell wall and proteomic study involved in resistance, the composition of LPS and factors affect the growth and biofilm formation of this bacterium. The newly research will be focused on the gram- positive bacteria in terms of metabolism and antimicrobial drug resistance. CRISPR technique is another side of my subject.

Up to date, my research is focused on the presence and occurrence of antibiotics in different water bodies, and the fate of antibiotics in water, and related multidrug resistance bacteria that have the ability to degrade and/ or adsorb antibiotic residuals. In addition, we also involved modern techniques (eDNA , NGS, and metagenomic) in our scope and aims.

## **CAREER**

**Senior lecturer:** University of Baghdad, College of Science for Women, Biology Department

**PhD:** University of Sheffield, Molecular Biology and Biotechnology Department

**BSc/MSc:** University of Baghdad, College of Science for Women, Biology Department

## **ACADEMIC QUALIFICATIONS AND SKILLS**

### **PhD in Molecular Microbiology at the University of Sheffield (2011-2015)**

My PhD was undertaken under the supervision of Prof. David J Kelly in the Department of Molecular Biology and Biotechnology. This degree has enabled me to develop my skills in microbiology and gain more skills in high level molecular biology techniques, in addition to proteomics, protein crystallography

and bioinformatics. In addition, the PhD experience improved my communication skills through presentations and conferences, scientific research, analysing and gathering data, solving the problem and working independently and as a part of a team.

My PhD study focussed on the food-borne pathogen *Campylobacter jejuni*, which is the leading cause of human bacterial gastroenteritis. The genome has many genes of unknown function, which might be important in cell physiology, colonisation or pathogenicity. Previous transcriptomic studies unveiled a distinctive regulatory system with a novel three-gene operon (here designated *ridMLP*) controlled by a small repressor protein, RidR, in *C. jejuni* NCTC 11168. The *ridMLP* operon encodes proteins with predicted localisation in the cell envelope. We showed that RidL is an outer membrane MORN-repeat protein with an unusual single-layer  $\beta$ -strand structure and has a protruding loop of two negatively charged residues (E<sub>126</sub>D<sub>127</sub>), which might have a role in binding a cationic ligand. Purified RidL was shown by NMR and Resonance Rayleigh light scattering to weakly interact with cationic antimicrobial peptides, and site-directed mutagenesis suggested the ED loop is important for binding and the overall structure of the protein. The cellular localisation of RidM, RidL and RidP in *C. jejuni* was determined by western blot analyses with FLAG-tagged Rid proteins and was consistent with bioinformatic analyses. Heterologous expression of each Rid protein in the *E. coli* cell envelope resulted in some protection against killing by cationic antimicrobial peptides. However, quantitative viability assays of *C. jejuni* *ridM*, *ridL* and *ridP* single, *ridML* double and *ridMLP* triple deletion mutant strains revealed similar sensitivities to cationic antimicrobial peptides as for the wild type parent. The *ridML* mutant was able to colonize the chicken. Thus, no consistent evidence for a direct role of the *rid* genes in protection against antimicrobial peptides or in host colonisation could be demonstrated. However, more recent studies have shown RidL to be a lipid binding-protein which may stabilise the outer membrane. The crystal structure of RidP was successfully determined in my work and shown to be surprisingly similar to human cystatin C, a cysteine protease inhibitor. Biochemical assays showed that RidP was able to significantly inhibit papain (a cysteine protease) in comparison to a chemical inhibitor, but not pronase E (a serine protease).

### **Publications:**

**All publications are listed in Google Scholar, Research gate, and Scopus with the following links:**

<https://scholar.google.com/citations?user=SB5s8icAAAAJ&hl=en>

<https://www.researchgate.net/profile/Halah-Alhaideri>

<https://www.scopus.com/authid/detail.uri?authorId=56951188800>

## **SKILLS ACQUIRED DURING MY PhD TRAINING**

- Molecular Biology: cloning, making deletion mutants, site directed mutagenesis, design primer, PCR
- protein biochemistry: protein over-expression, protein purification (metal affinity chromatography, Ion-exchange, gel filtration), SDS-PAGE, Tris-Tricine PAGE and protein concentration determination, development and application of ligand binding assays.
- Growing and cultivation of aerobic, microaerobic, anaerobic bacteria, microdilution assay, disc diffusion assay, growth curve, liquid culture preparation.
- Gram negative periplasmic and cell envelope preparation
- Western Blot, NMR, Circular Dichroism, Thermoflour, enzyme and kinetic assays, microscope and fluorescent light microscope
- Crystallography and protein structure determination

## **MBioSci Zoology at the University of Baghdad (2004-2007)**

- Averaging 1<sup>st</sup> class degree qualification with honours for modules taken in the first and second semester (courses):
- First courses included (%): secondary metabolites 83, Immunotechniques 83, molecular Biology 91, and Experimental Design 90, English language 76.
- Second courses included (%): Animal comparative Physiology 83, Advanced Insect Ecology 91, Biological control of Vectors 94, English language 84 and Seminars 93.
- Title of Thesis: The study of leaves and fruits Ethanolic extract of *Duranta repenes* and the fungi *Beauveria bassiana* on Mosquitos *Culex pipiens pipiens*
- Thesis and viva mark 91%
- In this study I was able to work independently on the project, rearing the mosquitoes in the laboratory under specific conditions, isolating and diagnosing fungi species, cultivating the fungi aerobically both in *vivo* and in *vitro*, designing the experiment, handling the data, analyzing the results, biochemical studies of plants and organic extractions of plant parts. The degree has also helped me to develop my social communication skills through seminars and conferences define my work accurately and deliver the main ideas to my peers precisely.

## **BSc in Biology at the University of Baghdad (1997-2001)**

- Averaging 2<sup>nd</sup> class degree qualification with honors for modules taken over four years with an overall degree result of 78.39
- Averaging fourth-year degree qualification for modules was 81.78
- Averaging third-year degree qualification for modules was 77.71
- Averaging second-year degree qualification for modules was 75.09
- Averaging first-year degree qualification for modules was 73.55

## **EMPLOYMENT AND WORK EXPERIENCE**

- **University of Baghdad in Biology department (June 2015-to date).**
  - Lecturer fellowship in Biology department/ University of Baghdad, giving lectures in Bacteriology modules for 2<sup>nd</sup> class undergraduate.
  - My main recent work is focused on the novel aspects of clinically isolated *Acinetobacter spp.*, multidrug resistance Gram-negative bacteria; investigate the resistant mechanisms to broad range of antibiotics that are mediated by blaOXA-like genes, and growth phenotypes of different species and mutants. In addition, I am looking for the regulation and metabolism of phosphorus by investigating the exact role of PsiE gene under different P levels, particularly in *A. lowffii*. Moreover, identification of clinically isolated *Acinetobacter spp.* is performed by using 16S-23S rRNA ITS analysis, in addition to the biochemical analysis tests.
  - Another work is involved in the regulation, expression, and molecular analysis of AcrAB and MurA of clinically isolated *E.coli*
  - Further works are involved in the identification and distribution of campylobacter spp. that is isolated from local chicken faecals and meat.
  - Supervision for two 4<sup>th</sup> year undergraduates, which they work on the *Acinetobacter* project
  - As a part of the departmental policy and requirements;
    - Administration of Microbiology laboratory ( 2016-to date)
    - Member of the examination committee for Undergraduate study (2016-2019)
    - Member of the examination committee for Postgraduate study (2019-2021)
    - Membership of the accreditation certificate committee ( 2017-2021)
    - Membership of higher studies committee (2017- to date)
    - Membership of the scientific committee in the department (2018-2022)
    - Undertaken in the evaluation and proofreading of scientific papers and MSc/Ph.D. thesis (2016-to date)

- Supervision of 27 fourth project student (2015-to date)
- Supervision of 7 MSc students and 2 Ph.D. students (2017- to date).
- Three scientific excellence awards (2008, 209, 2014)
- More than 35 acknowledgment letters from the dean of the college, and the head of the University of Baghdad (2008- to date)
- Recruitment membership of plagiarism detector committee (2016- to date)
- ISO membership (2015-2017)
- Member of the Comprehensive Exam committee for Ph. D. students (2019-to date)
- Member of the Competitive Exam Committee for Ph. D. students (2018-to date)
- Designer in Baghdad Science Journal (2022- to date).
- Editor in Asian Journal of Research in Infectious Diseases (2021-to date)

- **University of Sheffield in Molecular Biology and Biotechnology department (May- Dec 2013)**

-Participated in the Society for General Microbiology Spring Conference, Manchester Central Convention Complex Manchester, UK. Poster Presentation. The Rid system: a novel type of defence mechanism against host-derived antimicrobial peptides in *Campylobacter jejuni*.

-During my third year I supervised two third-year project students in the Kelly lab in which the students aimed to investigate the effect of site directed mutants in the RidL protein on the overall structure of the native protein. The transferred skills were cloning, protein expression, protein purification, Circular Dichroism, and bacterial culture..

- **University of Sheffield in Molecular Biology and Biotechnology Department (May 2014)**

-Awarded the Biological Science Division, annual Poster Competition prize. University of Sheffield

- 1<sup>st</sup> Midland Molecular Microbiology Meeting M<sup>4</sup>, University of Birmingham. UK. Poster Presentation. Identification of a novel system against host-derived antimicrobial peptides in *Campylobacter jejuni*.

- Campylobacter UK Meeting, Food Standard Agency, University of Liverpool, Liverpool. UK. Oral Presentation. Identification of a novel defence system against host derived antimicrobial peptides in *Campylobacter jejuni*

- **University of Baghdad in Faculty of Science (2008-2011)**

- Assistant Lecturer and teacher at the University of Baghdad in Biology department, undertaking modules for third and fourth year students.
- Supervised two fourth year project students. The project aimed to classify and characterize the isolated bacteria and fungi from soil in industrial areas, using biochemical diagnostic kits. The deliverable skills were how to handle and cultivate the bacterial on normal, nutrient and selective media, in addition to identifying the antibiotic resistance phenotype by disc diffusion assay.
- Published 6 papers in Microbiology and Entomology discipline in the University of Baghdad journal, three of them with first authorship and the others with the second site list. My last paper in histopathology with first authorship has been published in 2012 during my PhD study and published in the same journal as above. Participated in two scientific conferences 2009 and 2010. In addition to five workshops in development research and continues education institute at University of Baghdad.
- Awarded an Academic excellence prize form the Minister of Higher Minister of Education (2009).
- Awarded 1<sup>st</sup> degree class honours prize (University arms) from the Faculty of science, University of Sheffield (2008).
- Responsible work
  1. as an administrator in the higher study committee in Biology department.
  2. Manager and leader in the animal housing and reproductive unit in Biology department.
- **University of Baghdad in Biology department (2001-2004)**
  - Temporary lab assistant at undergraduate labs
  - Permanent employment at 2002 as lab assistant and lab administration for 2<sup>nd</sup> year and 4<sup>th</sup> year modules.
- **Volunteer summer work**

**Sep-to date 2015**

  - Giving lectures in pathology and serology workshops for public society

-Public engagement in non-academic institutes, by giving symposiums and seminars

- Health and hygiene inspection of some restaurants, canteens, and shops in the University

- Clinical visiting for hospitals and monitoring the practical training course giving to the newly graduated students.

**Jul-Sep 1999**

- Working as lab assistant in a private pathological and serological Laboratory, health institute.

• **Skills**

- English (speaking, listening, writing and reading)

- IT (Word, Excel and Power point)

- GraphPad prism

- Turnitin and plagiarism detection software

- End Note

- Mendley

- Bioinformatics

• **REFEREES**

Can be supplied by request