

Areej Abuhammad

Faculty of Pharmacy, University of Jordan

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Education and Qualifications

- 2008- 2013 University of Oxford, DPhil in Pharmacology.
Thesis entitled: Arylamine *N*-Acetyltransferases from Mycobacteria: Investigations of a Potential Target for Anti-Tubercular Therapy.
- 2004-2006 University of Jordan, MSc of Pharmaceutical Science. GPA 4/4, **Distinction**.
Thesis entitled: Combining Docking, Scoring and Molecular Field Analyses to Probe Influenza Neuraminidase-Ligand Interactions.
- 1994-1999 University of Jordan, BSc in Pharmacy. GPA 3.94/4 Ranked first among 90 students. **Distinction**.
- 1993-1994 General Secondary Education Certificate Examination. **Distinction**. GPA: 94.9 %.

Employment

- 2013- present University of Jordan, Faculty of Pharmacy, Assistant Professor.
- 2013-2013 University of Oxford, Department of Chemistry, Postdoctoral Research Assistant.
- 2007-2008 University of Jordan, Faculty of Pharmacy, Full Time University Lecturer.
- 2004-2007 University of Jordan, Faculty of Pharmacy, Full Time Teaching and Research Assistant.
- 2000-2004 University of Jordan, Faculty of Pharmacy, Part Time Teaching and Research Assistant
- 2000-2003 Semiramis Pharmacy, Amman, Jordan. Responsible Pharmacist.

Skills

IT and computational skills: Microsoft Office applications, Endnote, GraphPad Prism, PYMOL, ChemDraw, Discovery Studio (From Accelrys) modules: LignadFit, Cerius and Catalyst modelling Environments, GOLD - Protein-Ligand Docking, ROCS and related OpenEye modules, CCP4 modules, Phenix and Coot. *In silico* analysis of chemical inhibitors (docking, pharmacophore modelling, 3D shape modelling).

General lab skills: Performed several applications on different analytical instruments. Protein expression and purification from prokaryotic systems. A wide range of biochemical and biophysical methods for the analysis of biomolecular interactions: enzymic assays, fragment screening, thermal shift assays, protein-MS analysis, SPR, microscale thermophoresis, multiangle light scattering.

X-ray Crystallography of Macromolecules: Protein crystallisation and crystal manipulation, crystallographic data collection and processing.

Schools and Training

- 16) Training in microscale thermophoresis Monolith NT instrument 2013
- 15) 14th BCA/CCG Intensive Teaching School in X-Ray Structure Analysis, Durham, 2013
- 14) CCP4 Study Weekend, Nottingham.2013
- 13) RSC's 23rd Symposium on Medicinal Chemistry, Hatfield 2012
- 12) CCP4 Study Weekend, Warwick.2011
- 11) Computational Biochemistry, Oxford 2011
- 10) Data Analysis GraphPad Prism, Oxford 2011
- 9) Python introduction, Oxford 2011
- 8) Comparative Genomics Course, Oxford 2011
- 7) Workshop on Biomolecular Interactions (ITC, DSF, MS, SPR). Alexandropois, Greece. 2010
- 6) CCP4 Study Weekend, Nottingham 2010
- 5) BCA/CCP4 Summer School XVII, Oxford 2010
- 4) Linux, Oxford 2010
- 3) Innovation Plus Programme, Oxford 2009
- 2) Wellcome Trust Programme for Structural Biology: Primer and Advanced NMR Course, Oxford 2009
- 1) The Wellcome Trust Programme for Structural Biology: Crystallography Primer and Advanced, Oxford 2009

Teaching:

Taught several modules in pharmacy including both theoretical and practical sessions of pharmaceutical organic chemistry, medicinal chemistry, pharmacokinetics, pharmaceuticals, pharmaceutical instrumental analysis, pharmaceutical analytical chemistry and biochemistry. Tutoring in biostatistics and demonstrating Protein Chemistry and Characterisation practical within the Department of Biochemistry - University of Oxford

Awards and Grants:

- Deanship of Academic Research Grant. Enzymic screening for neuraminidase inhibitors of chemical and natural origin as potential antiviral agents (2014).
- John Fell OUP Research Fund: The effect of protein homology on microseeding nucleation events in protein crystallography (2013).
- The University of Jordan Full Scholarship to study PhD in Pharmacology (2008-2012).
- Faculty of Graduate Studies' Award for publishing a paper from MSc thesis – University of Jordan (2007).
- Candidate for The Arabic Honouring Awards/Scientific Fields – Arab Thought Foundation, Lebanon (2007).
- Abdel-Rahim Jardaneh Award for Academic Excellence in Pharmacy – University of Jordan (1999).
- The Hashemite Kingdom of Jordan Ministry of Education Full Scholarship for outstanding students to study Pharmacy at the University of Jordan (1994-1999).

Publications:

Peer Reviewed Publications:

- 14) **Abuhammad A**, McDonough M, Brem J, Schofield CJ, Garman, EF. "From one seed a whole handful": homologous proteins as seeds in crystallisation of beta-lactamases. *Acta Cryst D*. In preparation.
- 13) **Abuhammad A**, Fullam E, Bhakat S, Russell A, Sim E. Exploration of piperidinols as potential antitubercular agents. *Molecules*. In preparation.
- 12) Sim E, **Abuhammad A**, Ryan A. Arylamine N-acetyltransferases: From Drug Metabolism and Pharmacogenetics to Drug Discovery. *Br J Pharmacol* **2014**, 171(11), 2705–2725.
- 11) **Abuhammad A**, Lowe ED, McDonough M, P.D.S. Stewart, S.A. Kolek, Sim E, Garman EF. Structure of arylamine N-acetyltransferase from *M. tuberculosis* determined by cross-seeding with homologous protein from *M. marinum*: Triumph over Adversity. *Acta Cryst D*. **2013** (69): 1433-1446.
- 10) Fullam E, Talbot J, **Abuhammed A**, Long H, Westwood IM, Russell AJ, Davies S, Sim E. Design, synthesis and structure-activity relationships of 3,5-diaryl-1H-pyrazoles as inhibitors of arylamine N-acetyltransferase. *Bioorg Med Chem Lett*, **2013** 23 (9), 2759-2764.
- 9) **Abuhammad A**, Fullam E, Lowe ED, Staunton D, Kawamura A, Westwood IM, Bhakta S, Garner AC, Wilson DL, Seden PT, Davies SG, Russell AJ, Garman EF, Sim E. Piperidinols that show anti-tubercular activity as inhibitors of arylamine N-acetyltransferase: an essential enzyme for mycobacterial survival inside macrophages. *PLoS ONE* **2012**, 7(12), e52790.
- 8) **Abuhammad A**, Lack N, Schweichler J, Staunton D, Sim RB, Sim E, Improvement of the expression and purification of *Mycobacterium tuberculosis* arylamine N-acetyltransferase (TBNAT) a potential target for novel anti-tubercular agents. *Protein Expr Purif* **2011**, 80(2), 246-252.
- 7) **Abuhammad A**, Lowe ED, Fullam E, Noble M, Garman EF, Sim E. Probing the architecture of the *Mycobacterium marinum* Arylamine N-Acetyltransferase active site. *Protein Cell* **2010**, 1(4), 384-394.
- 6) Fullam E, **Abuhammad A**, Wilson DL, Anderton MC, Davies SG, Russell AJ, Sim E. Analysis of β -amino alcohols as inhibitors of the potential anti-tubercular target N-acetyltransferase. *Bioorg Med Chem Lett*, **2010**, 21 (4), 1185-1190.
- 5) Wang C, Laurieri N, **Abuhammad A**, Lowe ED, Westwood I, Ryan A, and Sim E. Role of Tyrosine 131 in the active site of paAzoR1, an azoreductase with specificity for the inflammatory bowel disease pro-drug balsalazide. *Acta Cryst F*, **2010**, 66(1), 2-7.
- 4) Fullam E, Kawamura A, Wilkinson H, **Abuhammad A**, Westwood I, Sim E. Comparison of the Arylamine N-Acetyltransferase from *Mycobacterium marinum* and *Mycobacterium tuberculosis*, *Protein J* **2009**, 28, 281-293
- 3) **Abu Hammad A** and Taha MO. Pharmacophore modeling, quantitative structure-activity relationship analysis, and shape-complemented *in silico* screening allow access to novel influenza neuraminidase inhibitors. *J Chem Inf Model*, 2009, 49 (4), 978-996.
- 2) **Abu-Hammad A.**, Zalloum WA, Zalloum H, Abu-Sheikha G and Taha MO. Homology modeling of MCH1 receptor and validation by docking/scoring and protein-aligned CoMFA. *Eur J Med Chem*, **2009**, 44(6), 2583-2596.
- 1) **Abu Hammad A**, Afifi F, Taha MO. Combining Docking, Scoring and Molecular Field Analyses To Probe Influenza Neuraminidase-Ligand Interactions. *J Mol Graphics Modell*, **2007**. 26(2), 443-456

Conference presentations:

- 13) **Abuhammad A**, McDonough M, Brem J, Schofield CJ, Garman, EF. "From one seed a whole handful": homologous proteins as seeds in crystallisation. Presentation in: IUCr 23rd Congress 2014 Montreal.
- 12) **Abuhammad A**, Lowe ED, McDonough MA, Garman EF, Sim E. Structure of NAT from *Mycobacterium tuberculosis* – a novel method for crystallization of recalcitrant proteins. In: 6th NAT workshop 2013 Toronto.
- 11) **Abuhammad A**, Fullam E, Bhakta S, Russell A, Westwood I, Finn P, Morris G, Sim E. NAT as a target for anti-tubercular drug therapy – new mechanisms of inhibition. In: 6th NAT workshop 2013 Toronto.
- 10) **Abuhammad A**, Lowe ED, McDonough MA, Sim E, Garman EF. Structure of arylamine N-acetyltransferase from *M. tuberculosis*: Triumph over Adversity. In: British Crystallographic Association Spring Meeting 2013, Warwick.
- 9) **Abuhammad A**, Fullam E, Garman EF, Sim E. Structural Studies on Novel Antitubercular Targets. In: The Young Crystallographer Satellite meeting-British Crystallographic Association Spring Meeting 2012, Warwick.
- 8) **Abuhammad A**, Fullam E, Westwood I, Russell A, Davies S, Sim E. Structural studies on novel antitubercular targets. In: The XXII International Congress and General Assembly of the IUCr 2011: Madrid.
- 7) **Abuhammad A**, Schweichler J, Lack N, Fullam E, Sim E. NAT in mycobacteria. In: The NAT Symposium 2011: Oxford.
- 6) **Abuhammad A**, Keany S, Ciulli A, Cheng H, Ballet R, Lack N, Abell C, Sim E, Ryan A. Investigation of a novel potential target for anti-tuberculars. In: Proteinase: From Molecules to Medicines, the 7th RSC-SCI Symposium 2011: Basel.
- 5) **Abuhammad A**, Lowe ED, Fullam E, Noble M, Schweichler J, Garman EF, Sim E. Structural studies on the mycobacterial arylamine N-acetyltransferases. In: The 5th International N-acetyltransferase Workshop 2010: Paris.
- 4) **Abuhammad A**, Lowe ED, Fullam E, Noble M, Schweichler J, Garman EF, Sim E. Structural studies on the mycobacterial arylamine N-acetyltransferases. In: The 9th International ISSX Meeting: Drug discovery and development 2010: Istanbul.
- 3) **Abuhammad AM**, Lowe ED, Fullam E, Noble M, Garman EF, Sim E. Probing the architecture of the *Mycobacterium marinum* arylamine N-acetyltransferase active site. In: Young Crystallographers Satellite Meeting of the British Crystallographic Association Spring Meeting 2010: Warwick.
- 2) **Abuhammad A**, Lowe ED, Fullam E, Noble M, Schweichler J, Garman EF, Sim E. Structural studies on the mycobacterial arylamine N-acetyltransferases. In: Medical Sciences DPhil Day 2010: Oxford.
- 1) **Abuhammad A**, Fullam E, Talbot J, Kawamura A, Westwood I, Davies SG, Russell A, Sim E. Inhibitors of arylamine N-acetyltransferase as potential anti-tuberculars. In: The first RSC/SGC Symposium on Chemical Biology for Drug Discovery 2009: Oxford.

References are available upon request.