

Esraa Aldawood

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Professional Summary

Dr. Esraa is an Assistant Professor in Microbiology with extensive expertise in molecular bacteriology, infectious diseases, and antimicrobial resistance (AMR). Her research spans the development of natural and synthetic antimicrobial compounds, the optimization of bone tissue scaffolds for medical applications, and the molecular characterization of antimicrobial resistance. Dr. Esraa is passionate about integrating innovative technologies, including phage screening, to combat AMR in both healthcare and community settings.

With a commitment to academic excellence, she is skilled in teaching and supervising graduate students, fostering their research development, and mentoring them through diverse microbiology projects. Dr. Esraa's collaborative nature is reflected in her ongoing partnerships, including those with the Industrial Engineering and Pharmacology Departments at King Saud University. Her aim is to provide research-driven solutions that advance microbiology and inspire future scholars in the field.

Research Interests

1. Antimicrobial Resistance (AMR) in Healthcare and Community Settings

This research explores the prevalence and impact of antibiotic-resistant bacterial infections in both healthcare and community settings. It includes retrospective analysis of hospital data to evaluate the effects of AMR on clinical outcomes, such as mortality and length of stay, and investigates resistance profiles. Additionally, the study assesses the community-level spread of multidrug resistance, focusing on food sources like lamb meat in Riyadh, to inform infection control strategies and antimicrobial stewardship programs.

2. Natural and Synthetic Antimicrobial Compounds for Drug Development and Phage Screening Technology

In response to the rise of antimicrobial resistance, this project identifies both natural and synthetic compounds with potent antimicrobial properties. The study explores their mechanisms of action and efficacy against multidrug-resistant bacterial strains, with a focus on developing antimicrobial adjuvants to overcome resistance and enhance the activity of antibiotics. Furthermore, phage screening technology is being integrated into the research to combat antimicrobial resistance (AMR) in the environment, identifying bacteriophages that can target resistant pathogens and offer innovative solutions for infection control. This approach aims to contribute new strategies for addressing the growing challenge of AMR.

3. Utilization of Natural Products in Bone Tissue Engineering

This research investigates the development of bone tissue scaffolds incorporating natural local products with antibacterial properties, aiming to prevent bacterial colonization and biofilm formation. It focuses on optimizing scaffold geometry and material composition to enhance both antibacterial effects and biocompatibility for bone healing. The study also seeks

to replace conventional antimicrobial agents, like silver nanoparticles, with alternatives that reduce cytotoxicity and resistance concerns while promoting tissue growth and healing through experimental assays. This project is in collaboration with the Industrial Engineering Department at King Saud University.

Education

Doctor of Philosophy in Microbiology

University of Manchester, 2020

- Thesis: *Characterizing the Functional Roles of the Three Promoters in Region One of the Escherichia coli Group 2 Capsule Gene Cluster*
- Technical Skills: Cloning, transduction, qRT-PCR, flow cytometry, and infection assays.

Master of Science in Bioscience (Infection and Immunity)

University of Leeds, 2011

Bachelor's Degree in Clinical Laboratory Science

King Saud University, 2007

- Graduated with second class honors, top performer (GPA: 4.69/5).
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Professional Experience

Assistant Professor

King Saud University | 12/2020 - Present

- Developed innovative research projects focusing on antimicrobial resistance and biofilm prevention.
- Conducted curriculum development and course reviews to maintain high educational standards.
- Published multiple research papers enhancing institutional and academic visibility.

Head of Statistical and Information Technology Committee, CLS Department

King Saud University | 09/2021 - 10/2022

- Designed and analyzed departmental KPIs, streamlining quality assessments.
- Prepared comprehensive annual reports and proposed actionable improvements for continuous enhancement.

Research Assistant

University of Manchester

- Designed and optimized experiments leading to peer-reviewed publications.
- Mentored postgraduate students in cutting-edge microbiological techniques.

University Lecturer

King Saud University | 01/2015 - 12/2015

- Taught Immunology and Microbiology to undergraduate students.

Teaching Assistant

King Saud University | 01/2008 - 01/2015

- Conducted practical classes in Biochemistry, Immunology, and Microbiology.

Research Grants

Funding Body	Grant	Project Title	Period
Ministry of Education	Institutional Fund-Research Groups II	Awareness of Human Papillomavirus among Male and Female University Students in Saudi Arabia.	2022-2023
Ministry of Education	Institutional Fund-Research Groups III	HPV "Vaccine Knowledge and Hesitancy among Health College Students at a Saudi University	2023
The Research, Development and Innovation Authority (RDIA)	Young Scholars Grant (YSG) CO-PI	Novel IoT osteoSMARTfix with real-time monitoring system: an online diagnostic medical implant	2024

MSc Students Supervision

Student Name	Track	Role	Project Title	Period
Malak T. Alruwilli	Microbiology	PI	Evaluate the influence of scaffold geometrical design and local natural products on bacterial colonization and biofilm formation in vitro	2024 - present
Wafaa Almalki	Microbiology	Co-PI	Epidemiological and Genetic Characteristics of Clinical Carbapenem-resistance Acinetobacter baumannii Isolates in King Fahad Medical City, Riyadh, Saudi Arabia	2024 - present

Core Qualifications

- Expert in molecular biology techniques, including PCR, gel electrophoresis, sequencing, qPCR, and gene expression analysis.
- Experienced in antibacterial testing methods, including disk diffusion, MIC assays, time kills, and biofilm formation assays.
- Proficient in cell biology techniques such as cell culture, cytotoxicity assays, flow cytometry, and cellular proliferation assays.
- Highly skilled in designing and optimizing experimental protocols to investigate antimicrobial resistance, tissue engineering, and cellular mechanisms.
- Proficient in grant writing, with a track record of securing funding and experienced in academic publishing in high-impact journals.
- Adept at mentoring graduate students, fostering their professional growth, and leading multidisciplinary collaborative research projects in microbiology, molecular biology, and tissue engineering.
- Skilled in analyzing and interpreting large datasets using statistical tools and bioinformatics software, translating complex results into actionable insights for scientific research and clinical applications.

Publications

Book Chapters

1. Alharbi, S., **Aldawood E.**, Jamil, N., Alshehri, F., Ashour, M., Elfaky, M. (2024). Mobile Genetic Elements and the Evolution of Microbes. In Sylwia Okoń, Beata Zimowska, & Mahendra Rai (Eds.), *Microbial Genetics*. Chapter 7. Routledge Taylor & Francis Group.

Original Articles/Reviews

1. Jia, J., King, J. E., Goldrick, M. C., **Aldawood, E.**, & Roberts, I. S. (2017). Three tandem promoters, together with IHF, regulate growth phase dependent expression of the *Escherichia coli* kps capsule gene cluster. *Scientific Reports*, 7(1), 17924.
2. **Aldawood, E.**, Roberts, I. S. (2022). Regulation of *Escherichia coli* group 2 capsule gene expression: A mini review and update. *Frontiers in Microbiology*, 768.
3. Mubarak, M. A., Alalhareth, A. S., **Aldawood, E.**, Albouloushi, A., Aljarah, M. S., Hafiz, T. A., ... & Dkhil, M. A. (2022). The iron deficiency anemia in association to *Helicobacter pylori* infection in Najran city, Saudi Arabia. *Journal of King Saud University-Science*, 34(8), 102353.
4. Hafiz, T. A., **Aldawood, E.**, Albouloushi, A., Alghamdi, S. S., Mubarak, M. A., Alyami, A. S., & Aldriwesh, M. G. (2022). *Stenotrophomonas maltophilia*: Epidemiology, resistance characteristics, and clinical outcomes. *Microorganisms*, 10(12), 2506.

5. **Aldawood, E.**, Alzamil, L., Faqih, L., Dabbagh, D., Alharbi, S., Hafiz, T. A., ... & Dabbagh, R. (2023, February). Awareness of Human Papillomavirus among Male and Female University Students in Saudi Arabia. *Healthcare, 11*(5), 649.
6. Hafiz, T. A., Alghamdi, S. S., Mubarak, M. A., Alghamdi, S. S., Alothaybi, A., **Aldawood, E.**, & Alotaibi, F. (2023). A Two-Year Retrospective Study of Multidrug-Resistant *Acinetobacter baumannii* Respiratory Infections in Critically Ill Patients: Clinical and Microbiological Findings. *Journal of Infection and Public Health*.
7. Hafiz, T. A., D'Sa, J. L., Zamzam, S., Visbal Dionaldo, M. L., **Aldawood, E.**, Madkhali, N., & Mubarak, M. A. "The Effectiveness of an Educational Intervention on *Helicobacter pylori* for University Students: A Quasi-Experimental Study." *Journal of Multidisciplinary Healthcare* (2023): 1979-1988.
8. Aldarhami, A., Bazaid, A. S., Qanash, H., Ahmad, I., Alshammari, F. H., Alshammari, A. M., Alshammari, A. H., Aljanfawe, F. M., Aldamiri, B., **Aldawood, E.**, Alghamdi, M. A., Binsaleh, N. K., Saeedi, N. H., & Snoussi, M. "Effects of Repeated *in vitro* Exposure to Saudi Honey on Bacterial Resistance to Antibiotics and Biofilm Formation." *Infection and Drug Resistance* (2023): 4273-4283.
9. Al-Tamimi, A. A., & **Aldawood, E.** (2024). The effect of 3D-printed bone tissue scaffolds geometrical designs on bacterial biofilm formation. *International Journal of Bioprinting, 10*(1), 1768.
10. **Aldawood, E.**, Dabbagh, D., Alharabi, S., Alzamil, L., Faqih, L., Alshurafa, H. H., & Dabbagh, R. HPV "Vaccine Knowledge and Hesitancy among Health College Students at a Saudi University." *Journal of Multidisciplinary Healthcare* (2023): 3465–3476.
11. Faqih, L., Alzamil, L., **Aldawood, E.**, Alharbi, S., Muzzaffar, M., Moqnas, A., ... & Alwelaie, Y. (2023). Prevalence of Human Papillomavirus Infection and Cervical Abnormalities among Women Attending a Tertiary Care Center in Saudi Arabia over 2 Years. *Tropical Medicine and Infectious Disease, 8*(12), 511.
12. **Aldawood, E.**, Aldawood, Z., & Alfihli, M. (2024). Awareness and knowledge of congenital cytomegalovirus (cCMV) among audiologists and speech-language pathologists in Saudi Arabia: A cross-sectional survey. *Journal of Multidisciplinary Healthcare, 4*155–4163.
13. **Aldawood, E.**, Alzamil, L., Dabbagh, D., Hafiz, T. A., Alharbi, S., & Alfihli, M. A. (2024). The Effect of Educational Intervention on Human Papillomavirus Knowledge among Male and Female College Students in Riyadh. *Medicina, 60*(8), 1276.

Professional Certifications

- **Consultant - Laboratory Microbiology**, Saudi Commission for Health Specialties (12/2023 - Present).
- **Senior Specialist - Laboratory Microbiology**, Saudi Commission for Health Specialties (12/2021 - 12/2023).

Awards and Honors

- Recipient of Saudi Arabian Cultural Mission (SACM) Academic Excellence Awards (2017).

- Scholarship recipient for graduate studies (MS and PhD), King Saud University (2010).
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Workshops & Conferences

- Poster presenter, Annual Microbiology Society Conference, Birmingham, UK (2018).
 - Poster presenter, Biotechnology Trends Conference, Barcelona, Spain (2018).
 - Completed specialized training on infection control and evidence-based healthcare practices.
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References

Prof. Ian S. Roberts

Emeritus Professor of Microbiology

University of Manchester, UK

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