

BAHAA MUSTAFA, Ph.D.

Assistant Professor of Pharmaceutical Sciences
Department of Pharmaceutical Sciences
College of Pharmacy
University of Arkansas for Medical Sciences
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Little Rock, AR 72205
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EDUCATION

University of Missouri-Kansas City Kansas City, MO
Doctor of Philosophy in Pharmaceutical Sciences (GPA: 4.0) **May 2022**

Preparing Future Faculty Program
Graduate Certificate in College Teaching and Career Preparation **May 2022**

Petra University Amman, Jordan
Master of Pharmaceutical Sciences **June 2015**

Applied Science University Amman, Jordan
Bachelor of Pharmacy **January 2010**

PROFESSIONAL EXPERIENCE

University of Arkansas for Medical Sciences Little Rock, AR
Assistant Professor of Pharmaceutical Sciences **May 2022- present**

Division of Pharmacology and Pharmaceutical Sciences, UMKC Kansas City, MO
Graduate Research Assistant **August 2017 – May 2022**

Division of Pharmacology and Pharmaceutical Sciences, UMKC Kansas City, MO
Graduate Teaching Assistant **January 2018 – May 2022**

Astellas Pharma Amman, Jordan
Senior Medical Representative **June 2015 – April 2017**

Rafaa Pharmacy Amman, Jordan
Staff Pharmacist **March 2014 – May 2015**

Tamara Pharmacy Amman, Jordan
Staff Pharmacist **July 2010 – April 2013**

Applied Science University, College of Pharmacy Amman, Jordan
Laboratory Demonstrator **January 2010 – January 2014**

RESEARCH EXPERIENCE

Department of Pharmaceutical Sciences, UAMS

Assistant Professor

Little Rock, AR

June 2022 – Present

Ongoing Projects:

1. Oncolytic Virus Combined with Anti-CD47 Peptide Enhances Immune Response and Promotes Survival in Colorectal Cancer.
2. Development of Trop-2 Targeted Liposomes for Lung Cancer Chemo-immunotherapy.
3. Discovery of Macrocyclic Peptide Inhibitors Targeting CD47 for Cancer Immunotherapy.

Division of Pharmacology and Pharmaceutical Sciences, UMKC

Graduate Research Assistant

Mentors: Kun Cheng, PhD and Zhonghua Peng, PhD

Kansas City, MO

August 2017 – May 2022

- **Dissertation Title:** “Discovery of anti-CD47 peptides for cancer immunotherapy and CD47-mimicking peptides that inhibit the phagocytic clearance of nanoparticles”
- Discovered a novel anti-CD47 peptides for cancer immunotherapy using phage display.
- Discovered a novel SIRP α peptides for delivery of nanomedicine to macrophages using phage display.
- Designed an immune checkpoint inhibitor interaction assay to screen potential anti-CD47 candidates such as peptides and antibodies for blocking ability using ELISA.
- Developed a cell line-based binding assay to evaluate the binding of anti-CD47 peptide candidates to cancer cells using flow-cytometry.
- Designed a competition SPR assay for screening of the blocking ability of anti-CD47 peptides.
- Designed and executed a functional assay for immune-modulatory activity (phagocytosis assay) of anti-CD47 peptides using primary cells (PBMCs and human macrophages).
- Designed and developed an immune checkpoint inhibitor interaction assay to screen potential anti-SIRP α candidates such as peptides and antibodies for blocking ability using ELISA.
- Actively collaborated in different projects including Blood-Brain Barrier (BBB) delivery using shuttle peptide, discovery of peptide drug to inhibit COVID-19 infectivity, and discovery of anti-PDL-1 single-domain antibody for cancer immunotherapy.

Division of Pharmaceutical Sciences, Petra University

Graduate Student

Mentors: Zuhair Muhi-eldeen, PhD and Elham Al-Kaissi, PhD

Amman, Jordan

January 2012 – June 2015

- **Thesis Title:** “Synthesis and evaluation of the antimicrobial activity of newly synthesized benzothiazole derivatives”
- Designed and synthesized novel 2-{4-(t-amino)-2-(but-2-yn-1-yl)}-1,3-benzothiazole compounds.
- Performed characterization of the compounds using IR, $^1\text{H-NMR}$, $^{13}\text{C-NMR}$, DSC, elemental analysis, and melting point determination.
- Evaluated the *In vitro* antimicrobial activity of the synthesized compounds using agar well diffusion method and broth dilution test.

- Experimental animal handlings such as mice, rats, and rabbits.
- Performed I.P, S.C, and oral administration of drugs in mice and rats.
- Studied the analgesic effects of drugs using the hot plate test in mice.
- Studied the effect of drugs on motor coordination of mice using the rotarod performance test.
- Studied the effect of different conditions on the hypoglycemic effect of insulin in mice.
- Studied organophosphorus insecticide poisoning in mice.
- Studied dose-response relationship of drugs in mice.
- Studied pharmacodynamic and pharmacokinetic drug interactions in mice.
- Hands-on experience in basic pharmaceutical microbiology techniques such as microbiological smear preparation, staining procedures, microscope, MIC & MBC determination, Kirby-Bauer test, autoclaving, agar, and broth media preparation.
- Pharmaceutical organic chemistry techniques: Synthesis of pharmaceutically active organic compounds such as aspirin, recrystallization, and reflux device use.

SKILLS

- **Molecular biology techniques:** Peptide-Phage display, ELISA, western blotting, SDS-PAGE, DNA extraction, DNA purification, BCA assay, quantitative PCR, immunohistochemistry, fluorescence microscopy, and flow cytometry.
- **Cell culture:** Experience in working with multiple cell lines (both suspension and adherent) and setting up cell-based assays. Working with cancer and primary cell lines.
- **In vivo studies design and execution:** *In vivo* (Syngeneic models) studies for antitumor activity, biodistribution, and pharmacokinetics (PK/PD) in rodents, animal handling, blood collection, tissue extraction, I.P, I.V, S.C administration of drugs.
- **Analytical methods:** HPLC/UPLC, LC-MS, plate reader-based UV/Vis, fluorescence, luminescence assays, and nanodrop.
- **Formulation development and characterization:** Design and preparation of polymeric nanoparticles, light scattering method (DLS), size & zeta potential.
- **Peptide Chemistry:** Solid-phase peptide synthesis, purification, and peptide-polymer conjugation.
- **Biophysical techniques:** Surface Plasmon Resonance (SPR-Biosensing).
- **Software tools:** Microsoft office, GraphPad Prism, SPSS, ChemDraw, ImageJ, FlowJo, Endnote, Canvas, Blackboard and Examssoft.

TEACHING EXPERIENCE

Department of Pharmaceutical Sciences, UAMS
Course coordinator and instructor

Little Rock, AR
May 2022 – Present

- Pharmaceutics I for PharmD students:
 - **Subjects included:** chemical and physical properties of drugs, buffers, salts, pH and solubility, stability kinetics, containers, excipients, ocular drug delivery, solutions and disperse systems.

- Pharmaceutics II PharmD students:
 - **Subjects included:** aerosols, solid dosage forms, biotechnology products and nanomedicine.
- Responsibilities:
 - Coordinated syllabus, lecture schedule, exams, and review sessions for the entire course.
 - Prepared lectures and exam questions.
 - Participated in exam item reviews to optimize exam items.
 - Class instruction included delivery of content, quizzes, polling, team activities and minute papers.
- Pharmaceutics II laboratory:
 - **Compounding prescriptions included** syrups, solutions, suspensions, emulsions, suppositories, lozenges, lip balms, creams, ointments, gels and foams.
- Responsibilities:
 - Leading lab sessions weekly for PharmD students.
 - Preparing lab manual and prescriptions to be compounded and updating the manual with new prescriptions.
 - Regularly update and maintain Blackboard site for the course.

Division of Pharmacology and Pharmaceutical Sciences, UMKC
Graduate Teaching Assistant

Kansas City, MO
January 2018 – May 2022

- PharmD and graduate courses:
 - Pharmaceutics I
 - Pharmaceutics II
 - Medicinal Chemistry I
 - Special Topics in Pharmacy
 - Introduction to Pharmacy Law
 - Aseptic Technique & Compounded Sterile Preparations
- Responsibilities:
 - Assisted course instructors with proctoring exams, grading exams, preparing quizzes questions and quizzes grading, and any necessary classroom support.
 - Communicated important information to students via email and Canvas (regarding assignments, lab sessions, grading, etc.).
 - Compiled, uploaded, and released assessment grades to students.

Applied Science University, College of Pharmacy
Lab Demonstrator

Amman, Jordan
January 2010 – January 2014

- Undergraduate pharmacy courses:
 - Pharmaceutics I
 - Pharmaceutics II

- Pharmaceutical Organic Chemistry
- Pharmaceutical Microbiology
- Pharmacology

MENTORING EXPERIENCE

1. Daniel Armstrong: PharmD/PhD student **April 2024-present**
 - o Served as a member of the advisory committee for Ph.D. dissertation "Discovery of Novel DNA-PKcs Inhibitors for Prevention of Graft Rejection".
2. Somaya Ibrahim: PharmD student **June 2024-present**
 - o Summer research fellowship, project title: Discovery of Short Peptide Targeting "Do Not Eat Me" Signal CD47 For Cancer Immunotherapy.

PUBLICATIONS

1. Strategies to Enhance Neoadjuvant Virotherapy's Effectiveness by Targeting Stroma to Improve Resectability in Pancreatic Cancer. Khandoker Usran Ferdous, Mulu Z. Tesfay, Aleksandra Cios, Conner Hartuppee, Jean C. Chamcheu, Emmanouil Giorgakis, **Bahaa Mustafa**, Randal S. Shelton, Camila Simoes, Isabelle R. Miousse, Alexei G. Basnakian, Omeed Moaven, Steven R. Post, Martin J. Cannon, Thomas J. Kelly, and Bolni Marius Nagalo. 2024 (submitted)
2. Enhancing Immune Response and Survival in Hepatocellular Carcinoma with Novel Oncolytic Jurona Virus and Immune Checkpoint Blockade. Mulu Z Tesfay; Yuguo Zhang; Khandoker Usran Ferdous; Mika A. Taylor; Aleksandra Cios; Randal S. Shelton; Camila C. Simoes; Chelsae R. Watters; Oumar Barro; Natalie M. Elliott; **Bahaa Mustafa**; Jean Christopher Chamcheu; Alicia L. Graham; Charity L. Washam; Duah Alkam; Allen Gies; Stephanie D. Byrum; Emmanouil Giorgakis; Steven R. Post; Thomas Kelly; Jun Ying; Omeed Moaven; Chiswili Y. Chabu; Martin E. Fernandez-Zapico; Dan G. Duda; Lewis R. Roberts; Rang Govindarajan; Mitesh J. Borad; Martin J. Cannon; Alexei G. Basnakian; Bolni M. Nagalo. Molecular Therapy Oncology. 2024 (submitted)
3. Development of a Peptide-Based Tumor-Activated Nanoparticle for Cancer Immunotherapy. zhen Zhao, John Fetse, Umar-Farouk Mamani, Yuhan Guo, Yuanke Li, Pratikkumar Patel, Yanli Liu, Chien-Yu Lin, Yongren Li, **Bahaa Mustafa**, Kun Cheng. Journal of Controlled Release. 2024 (submitted)
4. Discovery of Proteolytically Stable Peptidomimetic Inhibitors of PD-L1 For Cancer Immunotherapy. John Fetse, Zhen Zhao, Hao Liu, Umar-Farouk Mamani, **Bahaa Mustafa**, Pratik Adhikary, Mohammed Ibrahim, Yanli Liu, Pratikkumar Patel, Maryam Nakhjiri, Mohammed Alahmari, Guangfu Li, Kun Cheng. 2024 (under preparation)
5. Discovery of Anti-CD47 Peptides as Innate Immune Checkpoint Inhibitors. **Bahaa Mustafa**, John Fetse, Sashi Kandel, Chien-Yu Lin, Pratik Adhikary, Umar-Farouk Mamani, Yanli Liu, Mohammed Nurudeen Ibrahim, Mohammed Alahmari, Kun Cheng. Adv. Therap. 2023, 2300114.
<https://doi.org/10.1002/adtp.202300114>

6. Discovery of Anti-LAG-3 Peptides for Cancer Immunotherapy. Mohammed Alahmari, Umar-Farouk Mamani, John Fetse, Yuhan Guo, Chien-Yu Lin, **Bahaa Mustafa**, Mohammed Nurudeen Ibrahim, Pratikumar Patel, Kun Cheng. (2022). AAPS PharmSci 360, Boston, MA
7. Discovery of Cyclic Peptide Inhibitors Targeting PD-L1 for Cancer Immunotherapy. John Fetse, Zhen Zhao, Hao Liu, Umar-Farouk Mamani, **Bahaa Mustafa**, Pratik Adhikary, Mohammed Ibrahim, Yanli Liu, Pratikumar Patel, Maryam Nakhjiri, Mohammed Alahmari, Guangfu Li, Kun Cheng. (2022). Journal of Medicinal Chemistry 65(18):12002-12013 <https://doi.org/10.1021/acs.jmedchem.2c00539>
8. Discovery of Anti-CD47 Peptides for Cancer Immunotherapy and CD47-mimicking Peptides That Inhibit Phagocytic Clearance of Nanoparticles (Doctoral dissertation). University of Missouri-Kansas City. **Bahaa Mustafa**. (2022) <https://mospace.umsystem.edu/xmlui/handle/10355/90561>
9. Discovery of Anti-PD-L1 Human Domain Antibodies for Cancer Immunotherapy. Hao Liu, Yanli Liu, Zhen Zhao, Yuanke Li, **Bahaa Mustafa**, Zhijin Chen, Ashutosh Barve, Akshay Jain, Guangfu Li, Kun Cheng. (2022). Frontiers in Immunology <https://doi.org/10.3389/fimmu.2022.838966>
10. Discovery of Small Anti-ACE2 Peptides to Inhibit SARS-CoV-2 Infectivity. Pratik Adhikary, Sashi Kandel, Umar-Farouk Mamani, **Bahaa Mustafa**, Siyuan Hao, Qianming Qiu, John Fetse, Yanli Liu, Mohammed Ibrahim Nurudeen, Yongren Li, Chien-Yu Lin, Evanthia Omoscharka, Kun Cheng. (2021). Advanced Therapeutics <https://doi.org/10.1002/adtp.202100087>
11. Synthesis, Structural Elucidation and Antimicrobial Evaluation of 2-{4-(T-AMINO)-2-(BUT-2-YN-1-YL)}-1, 3 Benzothiazole Derivatives. **Bahaa Mustafa**, Eldeen, Z. M., Al-kaissi, E., & Al-adham, I. S. (2016). International Journal of Pharmacy and Pharmaceutical Sciences
12. Synthesis and Characterization of α -AMINO-N-PHENYL SUCCINIMIDE as Precursor for Corresponding Thionimides. Muhi-Eldeen, Zuhair & Al-Adham, Ibrahim & Al-Kaissi, Elham & Arafat, Tawfik & **Bahaa Mustafa**. (2015). European Journal of Pharmaceutical and Medical Research

GRANTS AND FUNDING

Winthrop P. Rockefeller Cancer Institute

Travel grant award

Budget: \$1500

Award Period: 03/15/2024 – present

Seeds of science award

Budget: \$50000

Award Period: 03/01/2024 - 02/28/2025

UAMS College of Pharmacy

Faculty startup grant

Budget: \$10000

Award Period: 05/22/2022 – present

Fulbright Jordan

Pre-doctoral scholarship grant

Budget: \$121000

Award Period: 08/21/2017 – 07/31/2021

ACADEMIC HONORS AND AWARDS

University of Arkansas for Medical Sciences

Runner-up for the Rho Chi Teacher of the Year Award

April 2023

- I was nominated by PharmD class of 2026 for the academic year 2022-2023

University of Missouri-Kansas City

Outstanding Dissertation Award

March 2023

- I have been selected to receive this award by the school of graduate studies for my dissertation "Discovery of Anti-CD47 Peptides for Cancer Immunotherapy and CD47-mimicking Peptides that Inhibit Phagocytic Clearance of Nanoparticles".

Best Seminar Speaker Award

April 2022

- Awarded by Division of Pharmacology and Pharmaceutical Sciences and UMKC-AAPS student chapter for the best seminar presented in spring 2022 semester.

William J. Rost Memorial Graduate Scholarship

September 2019- October 2021

- Awarded by University of Missouri-Kansas City Pharmacy foundation for a pharmaceutical sciences graduate student who is planning a career in academia.

Somerset Scholarship

September 2020

- Awarded by University of Missouri-Kansas City Pharmacy foundation for a selected and limited number of pharmaceutical sciences graduate students based on academic performance.

Outstanding Leadership Award

May 2018- May 2019

- Awarded for serving as president of Pharmaceutical Sciences Graduate Students Association (PSGSA-UMKC Student Chapter).

Fulbright Jordan

Fulbright Foreign Student Scholarship

August 2017 – July 2021

- This scholarship was awarded to pursue PhD in Pharmaceutical Sciences at UMKC.

Applied Science University, College of Pharmacy

University's Honour List

January 2006

- Acknowledgment of students with a grade average of 90% and above

UNIVERSITY SERVICE

University of Arkansas for Medical Sciences

Little Rock, AR

Member of the curriculum transformation committee

August 2023-present

Member of the awards committee

August 2023-present

Member of the educational and technology support advisory committee

August 2023-present

Member of Cancer Therapeutics Program

April 2023-present

Member of the admission committee

August 2022- present

Member of the curriculum committee

August 2022-present

Applied Science University, College of Pharmacy*Member of the academic guidance committee**Member of the training committee*

Amman, Jordan

2011-2014**2011-2014****PROFESSIONAL MEMBERSHIPS**

*Controlled Release Society***March 2024- Present***Winthrop P. Rockefeller Cancer Institute-UAMS***April 2023- Present***American Association of Pharmaceutical Scientists***March 2023- Present***American Association of Colleges of Pharmacy***October 2022- Present***American Peptide Society***January 2022 – Present***American Association of Cancer Research***January 2019 – Present***Pharmaceutical Sciences Graduate Student Association***May 2018 – May 2020***Jordanian Pharmacists Association***January 2010 – Present****PROFESSIONAL DEVELOPMENT**

National Academics of Sciences, Engineering, Medicine*AI in Drug Design: Part I – Molecular Drug Discovery***March 2024****AAPS Online Learning Webinars***AAV8 Shedding Assay to Support Gene Therapy Clinical Trials***May 2024***DMPK Strategies in the Development of Antibody-Drug Conjugates***March 2024***Droplet Size Analysis of Pharmaceutical Emulsions: Lab and In-process Testing***March 2024****AACP Webinars***Navigating the Future: Exploring the Impact of AI in Pharmacy Education***February 2024****University of Arkansas for Medical Sciences**

Little Rock, AR

*NIH Grants Process and Finding Funding Opportunities***June 2024***Building Machine Learning Pipelines for Drug Discovery***June 2024***Artificial Intelligence in drug discovery: “The elephant in the Room”***June 2024***Academic Writing: Basics of Writing Your Manuscript***May 2024***Alternative Careers in Science***May 2024***Overview of the NIH Review Process***May 2024***Academic writing workshop: Writing award nomination or job support letter***February 2024***“AI in Healthcare Education Instructional Design” workshop***February 2024***NIGMS Collaborative Program Grants for Multidisciplinary Team (RM1)***November 2023***Crafting Clear, Compelling Research Aims***November 2023***Write Winning NIH Grant Proposals***October 2023***ChatGPT and Other AI Tools for Medicine and Medical Education***October 2023***An Introduction to Artificial Intelligence and Machine Learning***September 2023***Artificial Intelligence: Preparing for the Next Paradigm Shift in Medical Education***September 2023***AI Tools for Medical Educators***September 2023**

<i>ATG Developing and Funding Your Research</i>	September 2023
<i>NIH Grant-Writing Boot Camp</i>	April 2023
<i>BioRender 101 workshop</i>	March 2023
<i>Writing a Successful DoD Grant Application</i>	February 2023
<i>Anatomy of an impactful Specific Aims page</i>	November 2022
<i>Addressing the main review criteria in your research strategy?</i>	November 2022
<i>How study sections review your proposal?</i>	December 2022
<i>How to address reviewers' comments?</i>	December 2022
<i>How to Make Learning "stick"? by Leda McDaniel</i>	October 2022
<i>Facilitation Skills & IPE Event Design</i>	September 2022
<i>Interprofessional Collaboration: the theory & application at UAMS</i>	August 2022
<i>Blackboard training</i>	August 2022
<i>Pointsolutions training</i>	July 2022
<i>Kahoot training</i>	July 2022
U.S Department of Energy	
<i>Grant Writing for Early Career Scientists</i>	April 2022
University of Missouri-Kansas City	Kansas City, MO
<i>Preparing Future Faculty Graduate Certificate in College Teaching</i>	May 2022
<i>Building a Foundation: Discrimination and Title IX Training</i>	August 2021
<i>ExamSoft Training</i>	January 2019
<i>Canvas Training</i>	January 2019
IRIS Reading	
<i>Speed Reading Workshop</i>	April 2021
<i>Maximizing Memory Workshop</i>	April 2021
Nature Master Classes	
<i>Focus on Peer Review</i>	September 2021
CITI Program	
<i>Working with Mice in Research</i>	September 2020
<i>Working with Rats in Research Settings</i>	October 2021
<i>Group2: Researchers</i>	October 2020
GYROS Protein Technologies	
<i>PurePep® Chorus Peptide Synthesizer</i>	January 2020
The Jackson Laboratory	
<i>Introduction to Mouse Models for Cancer Immunotherapy Research</i>	August 2020
Biosensing Instrument	Phoenix, AZ
<i>Surface Plasmon Resonance Training</i>	May 2018

Cheeky Scientist

Industry Careers Strategy Workshop

March 2018

VOLUNTEERING AND COMMUNITY ENGAGEMENT

American Association of Pharmaceutical Scientists

Abstract reviewer for 2024 annual meeting

May 2024

American Association of Colleges of Pharmacy

Abstract reviewer for 2024 annual meeting

March 2024

University of Arkansas for Medical Sciences

Poster Judge for UAMS Student Research Day

Little Rock, AR
March 2023 – March 2024

Judge for Student Pharmacist Compounding Competition

March 2023

Health Occupations Students of America Pharmacy Day

January 2023- October 2023

Facilitator for Career orientation and communication course

August 2022- December 2022

Chat with PharmD applicants

August 2022-present

University of Missouri-Kansas City

President of Pharmaceutical Sciences Graduate Students Association

Kansas City, MO

May 2019- May 2020

Secretary of Pharmaceutical Sciences Graduate Students Association

May 2018- May 2019

Lab demonstration for undergraduate students

January 2017- January 2021

Lab demonstration for American Cancer Society

January 2018

Reviewer for Drug Delivery Journal

January 2018

CONFERENCES AND PROFESSIONAL MEETINGS

2024 Drug Discovery & Development Colloquium MALTO, Little Rock, AR

June 2024

2024 AACP AI Institute in Pharmacy Education

April 2024

2024 UAMS Translational Research Day, Little Rock, AR

March 2024

2024 UAMS Surgical Research Symposium, Little Rock, AR

March 2024

2024 UAMS Student Research Day, Little Rock, AR

March 2024

2023 BioArkansas Kick-Off Conference

October 2023

2023 AACP Pharmacy Education, Denver, CO

July 2023

2023 UAMS Student Research Day Little Rock, AR

March 2023

7th Annual Online Career Conference by Beyond the Professoriate

May 2020

2019 AACR Annual Meeting, Atlanta, GA

April 2019

Collaboration between Academia and Industry Sectors Conference, Jordan

January 2012

PRESENTATIONS AND POSTERS

Hot Springs Village Walk for Cancer Research, Hot Springs, AR

June 2024

Presentation title: Development of Small Drug Carriers for Lung Cancer Treatment

Winthrop P. Rockefeller Cancer Institute, Little Rock, AR

May 2024

Cancer Therapeutics Research Program Speaker

Presentation title: Applications of peptides in cancer immunotherapy and drug delivery

2024 UAMS Translational Research Day, Little Rock, AR

March 2024

Poster title: Anti-CD47 Peptide Combined with Oncolytic Vesiculovirus-Driven Intratumoral Immunotherapy for Colorectal Cancer

2024 UAMS Surgical Research Symposium, Little Rock, AR

March 2024

Poster title: Anti-CD47 Peptide Combined with Oncolytic Vesiculovirus-Driven Intratumoral Immunotherapy for Colorectal Cancer

Gulf Medical University, Ajman, U.A.E

March 2023

Presentation title: Peptides Targeting CD47/SIRP α Pathway for Cancer Immunotherapy and Drug Delivery