CURRICULUM VITAE

Mohamed M. Mohyeldin, Ph.D.

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EDUCATION

Ph.D. (12/2016) University of Louisiana-Monroe (ULM), Pharmaceutical Sciences-Medicinal & Natural Products Chemistry.
Thesis Title: "Computer-Aided Discovery of Novel Natural Product Inhibitors of Receptor Tyrosine Kinases and their Rational Semisynthetic Optimizations for Multiple Malignancies Control".

M.Sc. (09/2011) Alexandria University, 2011, Pharmaceutical Sciences-Pharmacognosy.

B.Sc. (06/2007) Alexandria University, 2007, Pharmaceutical Sciences (Distinction).

JOB TITLE & ACADEMIC EXPERIENCE

2017-Present Assistant Professor of Natural Products Chemistry, Faculty of Pharmacy, Alexandria University, Alexandria, Egypt.

2017-2019 Visiting Assistant Professor of Natural Products Chemistry, Faculty of Pharmacy, Pharos University in Alexandria (PUA), Alexandria, Egypt.

2017-2018 Visiting Assistant Professor of Natural Products Chemistry, Faculty of Pharmacy, Damanhour University, El-Behaira, Egypt.

2013-2016 Teaching & Research Assistant, School of Pharmacy, University of Louisiana-Monroe, Louisiana.

2011-2013 Lecturer of Pharmacognosy, Faculty of Pharmacy, Alexandria University, Alexandria, Egypt.

2007-2011 Assistant Lecturer of Pharmacognosy, Faculty of Pharmacy, Alexandria University, Alexandria, Egypt.

HONORS & AWARDS

2019 Outstanding Conference Participation Award, Alexandria University, Egypt.
2018 Research Excellence Award, Alexandria University, Egypt.
2018 Outstanding Student Trainer Award, IPSF, Hague, Netherlands.
2017 Research Excellence Award, Alexandria University, Egypt.
2016 Best Podium Presentation Award, AAPS-ULM Chapter Symposium, USA.
2016 Best Poster Award, ULM Student Research Symposium, USA.
2014 Best Poster Award, ULM Student Research Symposium, USA.
2013 Teaching and Research fellowship, University of Louisiana-Monroe, USA.
2011 Masters Distinction Award, General Syndicate of Pharmacists, Egypt.
2007 Bachelors Distinction Award, Pharmacists Friends' Association, Egypt.

TEACHING EXPERIENCE

Spring 2018-20	➢ Design, Prepare and Teach a Course on Quality control of Herbal Medicines for P-4 Clinical Pharmacy Students, Alexandria University, Egypt. ➢ Design, Prepare and Teach a Course on Phytochemistry for Sophomore Pharmacy Students, Pharos University in Alexandria (PUA), Egypt.
Fall 2018-20	➢ Design, Prepare and Teach a Course on Applied Pharmacognosy for P-4 Bachelor Pharmacy Students, Alexandria University, Egypt. ➢ Design, Prepare and Teach a Course on Phytochemistry for Junior Pharmacy Students, Pharos University in Alexandria (PUA), Egypt. ➢ Design, Prepare and Teach a Course on Natural Products Drug Discovery for Post-graduate Pharmacy Students, Alexandria University, Egypt.
Spring 2017-18	➢ Design, Prepare and Teach a Course on Phytochemistry for P-3 Clinical Pharmacy Students, Alexandria University, Egypt. ➢ Design, Prepare and Teach a Course on Fundamentals of Phytotherapy for P-4 Clinical Pharmacy Students, Damanhour University, Egypt. ➢ Design, Prepare and Teach a Course on Pharmacognosy for Freshmen Pharmacy Students, Pharos University in Alexandria (PUA), Egypt. ➢ Design, Prepare and Teach a Course on Quality control of Herbal Medicines for P-5 Bachelor Pharmacy Students, Damanhour University, Egypt.
2014-2017	➢ Train Several Emerging Scholars, Pre-Pharmacy & Professional Pharmacy Students on Computer-Aided Drug Discovery & Design: Medicinal & Natural Products Chemistry Research Problems, ULM, Monroe, LA, USA.
2013-2017	➢ Design, Teach, and Evaluate Chemical and Spectral Laboratory Exercises on the Chemistry of Antibiotics with Clinical Relevance, P-2 Professional Pharmacy Students, School of Pharmacy, ULM, Monroe, LA, USA.
2011-2013	➢ Design and Teach Tutorial Sessions for Theoretical Chemistry of Natural Product Courses, Alexandria University, Alexandria, Egypt.
2007-2011	➢ Design, Prepare, and Teach Pharmacognosy and Phytochemistry Practical Sessions, Alexandria University, Alexandria, Egypt.

NEW TECHNOLOGY INNOVATOR

- Successfully designed and synthesized new chemical entities for treating solid cancer types, inspired by the olive oil secoiridoid class. As a result, three novel compounds potently inhibited two oncogenes that are important in cancer progression both in vitro and in vivo, and showed excellent selectivity index relative to non-tumorigenic cells.
- Shared in development efforts to identify a particular class of isothiocyanatostilbene compounds as novel hepatocyte growth factor receptor (c-Met) inhibitors in multiple cancer cell lines representing solid tumors of different organs. These compounds displayed much greater selectivity for inhibiting c-Met activation compared to similar tyrosine kinases.
- Shared in development efforts to identify the tobacco-based cembranoid 1S,2E,4S,6R,7E,11E)-2,7,11-cembratriene-4,6-diol, and its mammalian monohydroxy and dihydroxy metabolites as novel potent angiogenesis modulators, through targeting the VEGFR2-paxillin-FAK pathway, to treat cancer and other VEGF-dependent diseases.

RESEARCH PUBLICATIONS

1. D. Ghallab, **M. Mohyeldin**, E. Shawky, A. Metwally, and R. Ibrahim; Chemical profiling of Egyptian propolis and determination of its xanthine oxidase inhibitory properties using UPLC-MS/MS and chemometrics. *LWT-Food Science and Technology*, **2020**. In press. **IF: 4.006**.
2. K. Abdelwahed, A. Siddique, **M. Mohyeldin**, M. Qusa, A. Goda, S. Singh, N. Ayoub, J. King, S. Jois, and K. El Sayed; Pseurotin A as a novel suppressor of hormone dependent breast cancer progression and recurrence by inhibiting PCSK9 secretion and interaction with LDL receptor. *Pharmacol. Res.,* **2020**; 158: 104847. **IF (2019): 5.574**.
3. A. Siddique, H. Ebrahim, **M. Mohyeldin**, M. Qusa, Y. Batarseh, A. Fayyad, A. Tajmim, S. Nazzal, A. Kaddoumi, and K. El Sayed; Novel liquid-liquid extraction and self-emulsion methods for simplified isolation of extra-virgin olive oil phenolics with emphasis on (-)-oleocanthal and its oral anti-breast cancer activity. *PLoS One*, **2019**; 14: e0214798. **IF: 2.766**.
4. A. Siddique, H. Ebrahim, M. Akl, N. Ayoub, A. Goda, **M. Mohyeldin**, S. Nagumalli, W. Hananeh, Y. Liu, S. Meyer, and K. El Sayed; (-)-Oleocanthal combined with lapatinib treatment synergized against HER-2 positive breast cancer in vitro and in vivo. *Nutrients*, **2019**; 11: 412-430. **IF (2018): 4.171**.
5. S. Souid, H. Elsayed, H. Ebrahim, **M. Mohyeldin**, A. Siddique, H. Karoui, K. El Sayed, and K. Essafi-Benkhadir; 13^1-Oxophorbine protopheophorbide A from *Ziziphus lotus* as a novel mesenchymal-epithelial transition factor receptor inhibitory lead for the control of breast tumor growth in vitro and in vivo. *Mol. Carcinog*, **2018**; 57:1507-1524. **IF (2018): 3.411**.
6. S. Mohy El-Din and **M. Mohyeldin**; Component analysis and antifungal activity of the compounds extracted from four brown seaweeds with different solvents at different seasons. *J. Ocean Univ. China*, **2018**; 17:1178-1188. **IF (2018): 0.699**.
7. A. Goda, A. Siddique, **M. Mohyeldin**, N. Ayoub, and K. El Sayed; The Maxi-K (BK) channel antagonist penitrem A as a novel breast cancer-targeted therapeutic. *Mar. Drugs*, **2018**; 16: 157-177. **IF (2018): 3.772**.
8. A. Siddique, H. Ebrahim, **M. Mohyeldin**, S. Jois, and K. El Sayed; Abstract 2683: The olive-based oleocanthal as a dual HER2-MET inhibitor for the control of breast cancer recurrence. *Cancer Res.*, **2018**; 78 (13 Supplement): 2683-2683. **IF (2018): 9.13**.
9. H. Elsayed, H. Ebrahim, **M. Mohyeldin**, A. Kamal, M. Akl, E. Haggag, and K. El Sayed; Rutin as a novel c-Met inhibitory lead for the control of triple negative breast malignancies. *Nutr. Cancer*, **2017**; 69: 1256-1271. **IF (2017): 2.261**.
10. M. Hailat, H. Ebrahim, **M. Mohyeldin**, A. Goda, A. Siddique, and K. El Sayed; The tobacco cembranoid (1S,2E,4S,7E,11E)-2,7,11-cembratriene-4,6-diol as a novel angiogenesis inhibitory lead for the control of breast malignancies. *Bioorg. Med. Chem*., **2017**; 25: 3911-3921. **IF (2018): 2.802**.
11. N. Ayoub, A. Siddique, H. Ebrahim, **M. Mohyeldin**, and K. El Sayed; The olive oil phenolic (-)-oleocanthal modulates estrogen receptor expression in luminal breast cancer in vitro and in vivo and synergizes with tamoxifen treatment. *Eur. J. Pharmacol*., **2017**; 810: 100-111. **IF (2018): 3.17**.
12. **M. Mohyeldin**, M. Akl, A. Siddique, H. Hassan, and K. El Sayed; The marine-derived pachycladin diterpenoids as novel inhibitors of wild-type and mutant EGFR. *Biochem. Pharmacol*., **2017**; 126: 51-68. **IF (2018): 4.825**.
13. A. Siddique, H.Y. Ebrahim, M. Akl, **M. Mohyeldin**, and K. El Sayed; Abstract 1077: Extra-virgin olive oil Met inhibitor oleocanthal-lapatinib: A novel synergistic combination for

HER2-dependent breast malignancies. *Cancer Res.*, **2017**; 77 (13 Supplement):1077-1077. **IF (2018): 9.13**.

14. A. Elmaidomy[†], **M. Mohyeldin**[†], M. Ibrahim, H. Hassan, E. Amin, M. Rateb, M. Hetta, and K. El Sayed; Acylated iridoids and rhamnopyranoses from *Premna odorata* (Lamiaceae) as novel mesenchymal-epithelial transition factor receptor inhibitors for the control of breast cancer. *Phytother. Res.*, **2017**; 31: 1546–1556. [†] Both authors equally contributed. **IF: 3.766**.
15. **M. Mohyeldin**, M. Akl, H. Ebrahim, A. Dragoi, S. Dykes, J. Cardelli, and K. El Sayed; The oleocanthal-based homovanillyl sinapate as a novel c-Met inhibitor. *Oncotarget*, **2016**; 7: 32247-32273. **IF (2016): 5.168**.
16. H. Ebrahim, **M. Mohyeldin**, A. Siddique, M. Akl, M. Ibrahim, and K. El Sayed; Abstract 345: Olive oil-based oleocanthal and bioisosteres as c-Met inhibitors for the control of triple negative breast cancer. *Cancer Res.*, **2016**; 76 (14 Supplement):345-345. **IF (2018): 9.13**.
17. **M. Mohyeldin**, B. Busnena, M. Akl, A. Dragoi, J. Cardelli, and K. El Sayed; Novel c-Met inhibitory olive secoiridoid semisynthetic analogs for the control of invasive breast cancer. *Eur. J. Med. Chem*., **2016**; 118: 299-315 **IF (2018): 4.833**.
18. H. Ebrahim, **M. Mohyeldin**, M. Hailat, and K. El Sayed; (1*S*,2*E*,4*S*,7*E*,11*E*)-2,7,11-Cembratriene-4,6-diol semisynthetic analogs as novel c-Met inhibitors for the control of c-Met-dependent breast malignancies. *Bioorg. Med. Chem*., **2016**; 24: 5748-5761. **IF: 2.802.**
19. H. Ebrahim, H. Elsayed, **M. Mohyeldin**, M. Akl, J. Bhattacharjee, S. Egbert, and K. El Sayed; Norstictic acid inhibits breast cancer cells proliferation, migration, invasion and in vivo invasive growth through targeting c-Met. *Phytother. Res.*, **2016**; 30: 557-566. **IF: 3.766**.
20. A. Gray, D. Coleman, R. Castore, **M. Mohyeldin**, K. El Sayed, & J. Cardelli; Isothiocyanatostilbenes as novel c-Met inhibitors. *Oncotarget*, **2015**; 6: 41180-93. **IF: 5.168.**
21. H. Qosa, Y. Batarseh, **M. Mohyeldin**, K. El Sayed, J. Keller, and A. Kaddoumi; Oleocanthal enhances amyloid β clearance from the brains of TgSwDI mice and in vitro across a human blood-brain barrier Model. *ACS Chem. Neurosci.*, **2015**; 6: 1849-1859. **IF: 3.861.**
22. M. Mady, **M. Mohyeldin**, H. Ebrahim, H. Elsayed, W. Houssen, E. Haggag, R. Soliman, and K. El Sayed; The indole alkaloid meleagrin, from the olive tree endophytic fungus *Penicillium chrysogenum*, as a novel lead for the control of c-Met-dependent breast cancer proliferation, migration and invasion. *Bioorg. Med. Chem.*, **2015**; 24: 113-122. **IF (2018): 2.802.**
23. M. Akl, N. Ayoub, H. Ebrahim, **M. Mohyeldin**, K. Orabi, A. Foudah, and K. El Sayed; Araguspongine C induces autophagic death in breast cancer cells through suppression of c-Met and HER2 receptor tyrosine kinase signaling. *Mar. Drugs*, **2015**; 13: 288-311. **IF: 3.772.**
24. M. Akl, N. Ayoub, **M. Mohyeldin**, B. Busnena, A. Foudah, Y. Liu, and K. El Sayed; Olive phenolics as c-Met inhibitors: (-)-Oleocanthal attenuates cell proliferation, invasiveness, and tumor growth in breast cancer models. *PLoS One*, **2014**; 9: e97622. **IF: 2.766.**
25. A. Sallam, **M. Mohyeldin**, A. Foudah, M. Akl, S. Nazzal, S. Meyer, Y. Liu, and K. El Sayed; Marine natural products-inspired phenylmethylene hydantoins with potent in vitro and in vivo antitumor activities via suppression of Brk and FAK signaling. *Org. Biomol. Chem.*, **2014**; 12: 5295-5303. **IF: 3.49.**
26. M. Akl, B. Busnena, **M. Mohyeldin**, and K. El Sayed; Abstract C259: Olive phenolics as c-Met inhibitors: Molecular mechanisms mediating the anticancer effects of oleocanthal in breast cancer cells. *Mol. Cancer Ther*., **2013**; 12 (11 Supplement). **IF: 5.365.**
27. A. Abou-Donia, E. Shawky, **M. Mohyeldin**, and A. Seif Eldin; Screening of *Pancratium maritimum* for acetylcholine-esterase inhibitory alkaloids using thin layer chromatography in combination with bioactivity staining. *J. Nat. Pharm*., **2013**; 4: 61-66.

28. A. Abou-Donia, E. Shawky, **M. Mohyeldin**, H. Takayama, and A. Seif Eldin; Bio-guided isolation of acetylcholine-esterase inhibitory alkaloids from the bulbs of *Crinum bulbispermum*. *Natural Products: An Indian Journal*, **2012**; 8: 107-114. **IF: 0.78.**

CONFERENCE PROCEEDINGS & SEMINARS

1. **M. Mohyeldin,** A. Goda and K. El Sayed; Discovery of the marine dibromotyrosines as a novel c-Met kinase inhibitory class for breast cancer control. Abstracts of the 2nd PUA International Conference ICMAPS, Alexandria, Egypt, **2020**.
2. A. Siddique, H. Ebrahim, **M. Mohyeldin**, N. Ayoub, S. Singh, S. Jois, and K. El Sayed; PO-406: The olive-based oleocanthal as a dual HER2-MET inhibitor for the control of breast cancer. Abstracts of the 25th Biennial Congress of the European Association for Cancer Research, Amsterdam, The Netherlands, **2018**.
3. **M. Mohyeldin**, A. Siddique, A. Goda, B. Garetty and K El Sayed; Discovery of c-Met & EGFR marine natural product inhibitors for breast malignancies control. *Innovations in Marine Natural Products Research: From Discovery to Application Gordon Research Conference*, **2018**.
4. **M. Mohyeldin**; Olive secoiridoid semisynthetic analogs as novel c-Met inhibitors. *MALTO Medicinal Chemistry Podium Presentation*, **2016**.
5. **M. Mohyeldin**; Directed discovery of natural product-based scaffolds targeting the c-Met kinase using active-site specific virtual screening. *American Association of Pharmaceutical Sciences (AAPS) Symposium Presentation*, **2016**.
6. S. Egbert, H. Elsayed, H. Ebrahim, **M. Mohyeldin**, J. Bhattacharjee, and K. El Sayed; Bioassay-guided discovery of the Louisiana-based lichen depsides as promising hits for controlling breast cancer through targeting HGF/c-Met axis. *ULM Student Symposium*, **2016**.
7. **M. Mohyeldin**, M. Akl, J. Cardelli, and K. El Sayed; The oleocanthal-based homovanillyl sinapate as a novel dual c-Met-ABL1 inhibitor. *ULM Student Symposium*, **2016**.
8. **M. Mohyeldin**, B. Busnena, M. Akl, and K. El Sayed; c-Met inhibitory olive secoiridoids and semisynthetic bioisosteres: In vitro and in vivo activities for the control of invasive breast cancer. *ULM Student Symposium*, **2014**.
9. **M. Mohyeldin** and K. El Sayed; Optimization of standardized extra-virgin olive oil secoiridoid rich fraction as a new dietary-based c-Met inhibitor for the control of metastatic breast malignancies. *MALTO Medicinal Chemistry Meeting*, **2013**.

PATENTS

1. K. El Sayed, H. Ebrahim, **M. Mohyeldin**, M. Hailat. Therapeutics and methods to treat angiogenesis related pathologies; WO2018213824A2, Published 3/26/2020.
2. **M. Mohyeldin**, K. El Sayed, J. Cardelli, A. Dragoi. Methods for treating c-met-dependent cancers; US20190328690A1, Published 10/31/2019.
3. A. Gray, J. Cardelli, **M. Mohyeldin**, K. El Sayed. Isothiocyanatostilbenes as a novel method and product for treating cancer; US20190000791A1, Published 3/1/2019.

PROFESSIONAL SERVICE

Membership in Scientific and Professional Societies:

- Member of the American Association of Pharmaceutical Scientists (AAPS).
- Member of the American Society of Pharmacognosy (ASP).
- Member of the American Association for Cancer Research (AACR).
- Member of the International Relations and Agreements Office (IRAO), Alexandria University.

- Member of the General Syndicate of Pharmacists, Egypt.
- Member of the Quality Assurance Unit, Faculty of Pharmacy, Alexandria University.
- Member of the Scientific Committee of the 3rd International Conference on Pharmaceutical & HealthCare Sciences (PHS), Alexandria, Egypt.
- Member of the Scientific Committee of two M.Sc. Pharmacy Students, Alexandria University.
- Member of the Scientific Committee of two M.Sc. Pharmacy Students, Pharos University-PUA.
- Reviewer in well-reputed Scientific Journals including *Cancer Management and Research*, *Letters in Drug Design & Discovery*, *Journal of Medicinal Chemistry and Drug Designing*, and *OncoTargets and Therapy.*

SKILLS, KNOWLEDGE & RESEARCH METRICS

- Excellent academic teaching skills and good command of e-learning & assessment methods.
- Efficient research data acquisition and analysis with ability to multitask on multiple projects.
- Excellent oral and written communication skills.
- Effective collaboration within a multidisciplinary team and productive independent research.
- Ability to maintain good laboratory practice and appropriate research records.
- Excellent command of manuscript and grant proposal writing.
- Excellent command of SciFinder, Endnote, ChemDraw, Modelling programs and MS office.
- Creativity and self-motivation to gain new experimental and computational research skills.
- ResearchGate (RG) score: 28.7, h-index: 11, Google Scholar Citations: 446.

SCIENTIFIC FORUMS, WORKSHOPS & COMMUNITY SERVICES

2020 Designing and developing digital content Workshop, International Board of Certified Trainers European Division (IBCT).
2020 Interactive case-based learning Workshop, Alexandria University, Egypt.
2019 How to Design Integrated Courses Workshop, PHS 2019, Alexandria, Egypt.
2019 Advances in NMR Spectroscopy Workshop, Alexandria University, Egypt.
2019 Blood Donation, Breast Cancer and Hepatitis C Screening campaigns, Egypt.
2018 Questions Banks and Objective Assessment Workshop, Alexandria University, Egypt.
2017 Competitive Research Projects and Grant Proposals Workshop, Egypt.
2017 Funded Research Implementation and Research Team Management Workshop, Egypt.
2017 Student Evaluation and Examination Techniques Workshop, Egypt.
2016 AAPS-ULM Student Chapter Symposium, Monroe, LA, USA.
2016 Annual MALTO Meeting, Houston, TX, USA.
2016 AACR 107th Annual Meeting, New Orleans, LA, USA.
2016 ULM Student Symposium, Monroe, LA, USA.
2014 ULM Student Symposium, Monroe, LA, USA.
2013 AACR-EORTC International Conference, Boston, MA, USA.
2013 Annual MALTO Meeting, Little Rock, AR, USA.
2012 Quality Standards in Academic Teaching Workshop, Alexandria, Egypt.
2011 Research Methodology Workshop, Alexandria, Egypt.

COURSE INSTRUCTION & UNDERGRADUATE TRAINING

- Pharmacognosy I & II –Essential fundamentals of medicinal botanicals (2 Cr. Lec + 1 Cr. Lab).
- Phytochemistry I & II –Intensive background of the chemistry of natural products and their

methods of screening, extraction, separation, and quantitative analysis (2 Cr. Lec + 1 Cr. Lab).

- Quality Control of Herbal Medicines – Principles of compendial qualitative and quantitative quality control methods used for the evaluation of herbal products, (2 Cr. Lec + 1 Cr. Lab).
- Fundamentals of Phytotherapy – Modern phytopharmacotherapy and clinical evidence base for the safety and efficacy of herbal products (2 Cr. Lec + 1 Cr. Tutorial).
- Applied Pharmacognosy – Intensive knowledge of different chromatographic techniques used in the analysis of phytopharmaceuticals and herbal preparations (2 Cr. Lec + 1 Cr. Lab).
- Natural Products Drug Discovery: Comprehensive information of several approaches involved in the natural products drug discovery process (2 Cr. Lec + 1 Cr. Tutorial).
- Computer-Aided Drug Discovery & Design: Tutorial and Lab Exercises: Medicinal Chemistry Research Problems. (1 Cr. tutorial + 2 Cr. Lab); 3-10 students per class).
- Pharmacy Integrated Lab Sequences: Chemical and spectral exercises on the chemistry of antibiotics with clinical relevance. (1 Cr. tutorial + 2 Cr. Lab; 20-30 students per class).
- Undergraduate Summer Research: Design experiments and work directly with students to conduct undergraduate research projects regarding natural products drug discovery. Throughout this summer research school, several undergraduate students have been trained to conduct research and present their data in student research symposiums.

RESEARCH INTERESTS

- Discovery of bioactive natural product scaffolds, iterative structure-based drug design, synthesis, purification, characterization using various spectroscopic technologies, and structure-activity relationship studies of novel small-molecules, inspired by natural product scaffolds, with potential to selectively target enzymes known to be dysregulated in solid cancers, drug resistant pathogens, or CNS disorders.
- Computer-aided drug discovery & design including virtual screening of chemically diverse libraries using molecular docking and active-site specific pharmacophore search to identify novel small-molecules that can be used in targeted-cancer and infectious diseases therapy.
- Bio-guided exploration, isolation, structure elucidation, quantification of secondary metabolites from different natural product sources using HPLC and qNMR and evaluating their acetylcholinesterase inhibitory activities in Alzheimer's disease in vitro models and/or cytotoxicity in different cancer cells. Examples of studied natural products included olive oil phenolics, amaryllidaceous alkaloids, and some marine and fungi-derived natural products.
- Biological characterization of the isolated or designed novel small-molecules using cell-based screens, molecular and cellular biology assays to assess their ability to attenuate cancer cell proliferation, invasiveness, and tumor growth in different in vitro and in vivo cancer models.

RESEARCH EXPERIENCE

My broad background is medicinal and natural products chemistry and pharmacology with specific training and expertise in the discovery and optimization of bioactive natural products.

- Natural Product Isolation - Experience in isolation of secondary metabolites including:
  - Multiple methods of isolation such as column chromatography, High-Performance Thin Layer Chromatography (HPTLC), semi-preparative as well as preparative HPLC.
  - Proficiency in common analytical methods such as HPLC and HPTLC.

- Structure elucidation using 1D and 2D NMR spectroscopy as well as mass spectrometry, in addition to the investigation of some physical parameters such as optical activity and melting point, to confirm small molecules identity.
- Interpretation of NMR and mass spectral data of isolated secondary metabolites.
- Biological evaluation of extracts, isolated fractions, and pure secondary metabolites using different in vitro and in vivo models of cancer and Alzheimer's disease.

- Synthetic Organic Chemistry – Solid experience in synthesis of novel drug-like molecules including:
  - Different standard and modern synthetic reactions, for small and large-scale preparation of small-molecules.
  - Semisynthetic optimization of natural product scaffolds as chemical probes to inhibit the function of key oncoproteins and develop these probes into lead anticancer compounds.
  - Products purification by extraction, open column chromatography, preparative High-Performance Liquid Chromatography (HPLC), and crystallization.
  - Spectroscopic characterization of small-molecules using NMR, IR, UV, and LC-MS data.
- Medicinal Chemistry - Experience in designing research plans and using in silico approaches for the goal of hit identification, establishing structure-activity relationships (SARs), and hit to lead optimization of small-molecule enzyme inhibitors including:
  - Virtual screening of compound libraries.
  - Structure and ligand-based drug design to enable rational hit to lead optimization.
  - SAR analysis.
  - Docking and overlay studies.
  - Homology modeling.
  - 2D and 3D similarity search.
  - ADME profile and drug-likeness prediction.
  - Evaluation and comparison of binding sites of different kinases.
- Pharmacology- Mastering various animal models, cell culture, cell free, and related qualitative and quantitative technologies including:
  - Enzyme inhibition assays and kinetic studies.
  - Cell-based assays including cancer cell proliferation, cytotoxicity, and motility assays.
  - Flow cytometry and cell cycle analysis.
  - Western blot analysis and signal transduction interruption to elucidate and/or validate on-target effects on the molecular level and biologically relevant mechanisms of action.
  - Off-target effects and selectivity evaluation.
  - Three-dimensional cell culture assays.
  - In vivo efficacy and pharmacodynamic studies in preclinical rodent models.