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Education

Master's in Medicinal Chemistry (December, 2015)
University of Utah (*one of the top five universities in USA funded by NIH*), medicinal chemistry department. Majored in drug discovery, isolation of bioactive small molecules and microbial pathway modifications. GPA is 3.4, total credit hours 37.

Doctorate of Pharmacognosy **(**April 2012)
Ain Shams University, Cairo, Egypt

Master's in Pharmacognosy (April 2008)
Ain Shams University (*one of the best pharmacy schools in Egypt*), Pharmacognosy department. Worked on phenolic small molecules and sugars active on TNF-α, myeloperoxidase and PGE2, GPA is 3.38.

BS in Pharmaceutical Sciences (May 2001)
Ain shams university, college of pharmacy
Graded "Excellent with Honor" in the 11th place, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt.

Core Qualifications

- **Isolation & structure elucidation of natural products**

Chromatography (CC) *Microscopy* *UV* *HPLC* *LC/MS*
1D &2D NMR *PC* *TLC* IR Organic synthesis
Organic chemistry

- **Molecular biology**

Fungal transformations *Drug biotechnology* *Spheroplasting*
Novel biosynthetic pathways *Drug discovery* *Protein expression*
Protein purifications *Microbial transformations* *Biological assays*
Fermentation *Protoplasting* *PCR*
Genetic engineering *cloning* *DNA analysis*

Experience:

Research scientist **(2001-2008)**

- Isolated and structure elucidated a group of steroidal and flavonoidal bioactive small molecules active as potent antioxidants and antidiabetics.
- Hands-on practice of chromatography, 1&2D-NMR, HPLC, GC and Mass spectrometry
- Teaching courses of quality control, pharmacognosy, phytochemistry, NMR, IR and HPLC analysis.

Research scientist **(2008-2012)**

- Preparing research proposal about "Anti-atherogenic and hypocholestremic effect of

selected Egyptian plants rich in biologically active phenolic compounds".

- Conducted affiliation with faculty of medicine, Ain shams university to study the (Recurrent urinary tract infections in females) and the antimicrobial effect of *Pistacia khinjuk* phenolic compounds on *E.coli* infecting the uroepithelium.
- Lectured many quality control courses of drugs, natural product chemistry I & II, and botanical taxonomy.
- Worked on phenolic bioactive small molecules and isolated rare tetra-glycosidated galloyllated valoneyl acid derivatives active as anti-inflammatory by reducing myeloperoxidases, TNF-α and tissue nitric oxide.

Research scientist (Lecturer): (2013-present)

- Worked on "Posttranslational modification of RIPPs" project in Skaggs pharmacy school, Schmidt lab (*one of the most recognized natural product biotechnology labs in the world*).
- Excelled in a very complicated part of the project (Ascidian fungi polyketides), their transformations, fermentation and genetic modification of their metabolic pathways. Through a creative bacterial synthetic methylation reaction, we tried to solve the supply problem of a novel anti-tuberculosis drug (pyrrolocin A).
- Active member of future grid marine bacterial metagenomics project.
- Supervising current projects "Bioactive secondary metabolites from *Halocenimum strobelium*" and "Bioactive secondary metabolites from *Gelistia caspica*" for isolation and structure elucidation of active new anticancer drug molecules from halophytic plants and their fungi endophytic counterparts.
- Supervising the quality assurance unit group in pharmacognosy department from 2015 until now.

Professional Skills

In the field of Pharmacognosy and Phytochemistry (2001-2012)

- Teaching different practical courses of pharmacognosy for 10 years at department of Pharmacognosy, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt.
- Teaching different practical courses of phytochemistry (Chemistry of Natural Products) for 10 years at department of Pharmacognosy, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt.
- Teaching practical courses of Quality Control of Herbal Products for 10 years at department of Pharmacognosy, Faculty of Pharmacy, Ain Shams University, Cairo, Egypt.
- Proficient in the use of various microscopes including light microscopy, sample preparation, dyeing and imaging. Using the microscopy knowledge I was able to study botanically three plant species (from genus *Ipomoea*) and differentiate them using fine macro and microscopical techniques by digital camera microscopy. This was published in bulletin of Cairo University, 2008.

- Extraction and purification of isolated natural products from different plant materials using different chromatographic methods, e.g. Column chromatography (CC), Thin Layer Chromatography (TLC), Paper Chromatography (PC), HPLC and GC.
- Utilization and measuring samples on UV spectroscopy.
- Analyzing sample extracts using HPLC, GC and MS spectrometry.
- Identification and structure elucidation of natural products using UV, IR, 1&2D NMR and

MS spectrometry.

Using my phytochemical expertise I worked for isolation of antioxidant and anti-inflammatory molecules from one of the most wide-spread plants in Egypt, (*Ipomoea palmata*). Through biology guided fractionation and column chromatography, I isolated luteolin-4-glucoside, luteolin-7-glucoside, ferulic acid, isoferulic acid and other flavonoids that were identified by 1&2D NMR. By carrying out blood glutathione assays I found that these compounds were moderately active as hypoglycemic agents. Also I studied the lipid content of the plant using GC-MS for detection of saponifiable and unsaponifiable matter.

Furthermore, I isolated 25 phenolic galloylated compounds and tannins from *Pistacia* leaves; including but not restricted to valoneoic acid dilactone and 2-O-galloyl 3-O-valoneoyl dilactone (α/β)-4C1-glucopyranoside. The latter compound was second reported in nature and since it was a mixture of isomers α/β it took me more effort to identify it by means of partial and controlled acid hydrolysis and by comparison with previously published 3-O-galloyl-2-valoneoyl dilactone-(α/β)-4C1- glucose (Oenothein C). I carried out in-vivo and ex-vivo assays to determine the compounds activity on the cyclooxygenase enzyme COX2, prostaglandin-E2 (PGE2), myeloperoxidase enzyme (MPO) and Nitric oxide in inflamed tissues.

- Experienced in writing research paper in various forms according to what is required by the journal editors.
- Making presentations (club journal) every week in special seminars for our department and for the quality assurance program.

In the field of Molecular and synthetic biology (2013-now)

Through my work in Schmidt lab (the most recognized natural product lab in USA), I got deep experience in genetic modification techniques, cell culture, proteins, plants, fungi and bacterial research. I learned to use synthetic biology to discover drugs active against cancer and neurological disorders. I deeply excelled the following skills:

- Aseptic techniques, cell selection, screening, cell culture, biohazards and tools for their control, enzymology, chromatography, spectroscopy, PCR, hybridization, blotting, engineering of genetic regulatory systems, methodologies of synthetic biology approaches, (bio) reactors, kinetics and thermodynamics.
- Designing and conducting experiments, making observations and measurements, researching information, analyzing data, presenting findings at scientific meetings and conferences, and supervising staff members work.
- Investigating the chemical structure of living cells and their isolated components, organs and tissues in plants, fungi and micro-organisms.
- Examining micro-organisms, such as bacteria, fungi, yeast and their enzymes, and using the knowledge gained to create and develop new, and improve existing, products, materials and processes.

Pyrrolocin project: In this project I practiced all my knowledge to determine the genetic cluster of pyrrolocin "new anti-tuberculosis drug that is not in the market yet". It was discovered in Schmidt lab and since it was isolated from marine fungi in small amounts, we aimed to provide a practical way for its synthesis biologically in fungi factory inside the lab. Using cell culture techniques and protein expression of the methylase enzyme responsible for the bioactivity of the compound, I was able to produce minute amounts of pyrrolocin A in the lab. However, we needed higher production yield and so I did further work in culture optimization.

- Planning and undertaking experiments to study, measure and understand marine animals and plants.

- Studying the growth and characteristics of micro-organisms, such as bacteria, algae and fungi, and the effects they have on plants and animals to develop medical, industrial, environmental and other practical application.
- Bioinformatics analysis of microbial community metagenomics.

Trunkamide®: I worked with a very talented team in the Trunkamide® mutant project, my role was to incorporate a series of genetic modifications in bacterial symbiotic pathways (cyanobactin ribosomal peptides pathway). In other words, mutations in the gene sequence to produce new active derivatives of Trunkamide® (the anticancer marketed drug) and to express them in E.coli host. This is a major goal of synthetic biology; to engineer the synthesis of active compounds in vivo.
I was further trained on the NMR instrument 400MHz and 500MHz doing multiple experiments daily which gave me an impeccable experience as a spectroscopist. As well as high performance liquid chromatography (HPLC), column chromatography and TLC which are indispensable in the field of natural products?

- Participated in scientific field trips for collection of marine samples in the Red sea and their aseptic transfer for the lab location.

Fungi endophytes: In Egypt I was interested to study endophytes especially those growing symbiotically with halophytic plants near the "Bardaweel lake" (known for its high salinity). I isolated various fungi species and carried out the DNA isolation to identify them by ITS sequencing. After culturing on solid media, extracting and evaluating the anticancer activity against MCF-7, Caco-2 and HEP-2 cell lines, it was evident that they produce powerful cell killing activity. I am now doing in-vivo assay of the isolated pure compounds from these extract.

Training and Workshops Attended

- Trained in (Amoun Pharmaceutical company) for 3 months in Research andDevelopment unit (June 1999).

Faculty Training and Management Workshop for Faculty members - Faculty and Leadership Development Program (FLDP), (May 2010) Ain Shams Teaching Center, Ain Shams University:

- Leading and management of research team
- Quality control and assurance
- Research projects and Funding

Faculty Training and Management Workshop for Faculty members - Faculty and Leadership Development Program (FLDP), (January 2011) Ain Shams Teaching Center, Ain Shams University:

- Leadership
- Using Technology as a teaching aids
- How to write a scientific paper
- International Publishing.
- Powerful Communication Skills
- "Radiation safety training for radioisotopes users", workshop for research graduates at University of Utah (August 2013).
- "Fungi culture and future of microbial biotransformation", workshop for research

graduates at Ain shams university in collaboration with faculty of information and computer science (January 2016).
- "How to teach international students", workshop for research graduates in University of Utah. (March 2015).

Professional Affiliations:
- Skaggs School of Pharmacy, University of Utah, UT, USA.
- Egyptian Syndicate of Pharmacists, Cairo, Egypt.
- Faculty of Medicine, Ain Shams University, Abbassia, Cairo, Egypt.
- Faculty of Pharmacy, Ain Shams University, Abbassia, Cairo, Egypt.
- National Research Center, Dokki, Cairo, Egypt.
- Badr University in Cairo.

Publications

Ashaimaa Y. Mousa, Olaa M. Mousa, Nahla A. Ayoub, Abdel Nasser B. Singab, Mohamed M. El-Azizi, Botanical study of the stems and leaves of certain Ipomoea species grown in Egypt, Bulletin of Faculty of Pharmacy, Cairo University., vol. 46(1), 95-115, 2008.

Ahmed Esmat, Fahd A. Al-Abbasi, Mordi M. Algandaby, Ashaimaa Y. Moussa, Rola M. Labib, Nahla A. Ayoub, Ashraf B. Abdel-Naim," Anti-inflammatory activity of *Pistacia khinjuk* in different experimental models: isolation and characterization of its flavonoids and galloylated sugars", Journal of Medicinal Food, vol.15 (3), 278-287, 2012.

Key Strengths
- Exceptional persistence and perseverance in challenging research work.
- Demonstrated problem solving, initiative and good judgment possesses the ability to clearly express thoughts.
- Excellent communication and interpersonal skills - working effectively with my colleagues and professors. Listens attentively, assesses situations and build excellent rapport with teammates.
- Team player attitude - works effectively in both self-managed and team-based environment while maintaining high ethical and quality standards.

Personal Skills and Knowledge

- Excellent working knowledge of Windows, Microsoft Office and various internet applications, Chemdraw, endnote and MestRec softwares.
- Participating in the Students Conference of Pharmaceutical Studies (SCOOPS) through a four successive generations in judgment committee.
- Participating in Students Union and Ain Shams Scientific Pharmaceutical Student Association (ASSPSA).
- Supervised the Quality Assurance Unit for Accreditation in the Faculty of Pharmacy, Ain Shams University, Cairo, Egypt.
- Coordinating students in constructing a green pharmacy and clinical pharmacy unit.
- Working as Community Pharmacist in ElSayeda Goeyria chain of pharmacies in Egypt for about 2 years.
- Language spoken: Arabic (native language), English (Fluent) and French (intermediate

level).

Honors & Awards

- Ain-Shams Teaching and Research Fellowship of Pharmacognosy, Faculty of Pharmacy, Ain-Shams University, Cairo, Egypt.
- Excellence Award by (Egyptian Pharmacist Syndicate) in Pharmacist's Day 2008.
- Excellence Award by (Egyptian Pharmacist Syndicate) in Pharmacist's Day 2012.
- [International Publication Award] from Ain Shams University.
- University of Utah BCP (Biological chemistry program) Fellowship, Salt Lake city, USA (2013).
- American chemical Society membership.

Supervisions:

1. Master thesis of Hagar Ashraf (junior researcher in Ain shams university) under the title of " bioactive secondary metabolites from certain plants belonging to family Fabaceae"

2. Master thesis of Mohamed Mahmoud Abdel Razik (junior researcher in Badr university) under the title of "Bioactive secondary metabolites from certain plants belonging to family Chenopodiaceae"

Conferences:

1. Biological Chemistry Program Symposium, University of Utah, 2013.
2. Molecular Biology Era Symposium, University of Utah, 2014.
3. The 3rd China-Africa Forum on International cooperation and Development of Chinese Medicine, 2017.