Walid M. Abdelwahab, Ph.D.

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SUMMARY

- Experienced analytical, pharmaceutical and nanomaterials chemist with extensive hands-on experience in nanoparticles-based drug/vaccine delivery systems, and separation of complex mixtures of pharmaceutical compounds.
- Engaged in the discovery and development of advanced vaccine formulations for novel synthetic pattern recognition receptor (CLR and TLR) ligands adjuvants to promote long-term immunity to serious infectious diseases such as tuberculosis, influenza (flu), and COVID-19 as well as developing next-generation immunomodulators to fight cancer and help in controlling opioid epidemic crisis.
- Developed specifically designed vaccine delivery/presentation platforms including aqueous dispersions, lyotropic liquid crystals (LLCs), liposomes, and alum, as well as engineered inorganic and/or organic nanoparticles.
- Prepared superparamagnetic, fluorescently-labeled, biotin-tagged, and functionalized silica nanoparticles decorated with or conjugated to different organosilane coupling agents, amino acids and peptides using simple conjugation chemistry for separation, trafficking and mechanistic studies.
- Mastering techniques such as sol-gel chemistry, thin-film rehydration, liquid chromatography, capillary electrophoresis, mass spectrometry, UV spectrophotometry, spectrofluorimetry, NMR, IR, DLS, DSC, sample preparation and purification.
- Lecturer of analytical and pharmaceutical chemistry with 10+ years of experience. Since 2011, I have had 13 research articles published in peer-reviewed journals, one patent, and I offer my services as a peer reviewer for 13 well-known scientific journals.

Education

Georgia State University, **Department of Chemistry**, Atlanta, GA USA **Dec 2017**
Ph.D. in Analytical Chemistry
Advisors: Prof. Gabor Patonay, and Prof. Ramzia El-Bagary.
Dissertation title: *Using Different Analytical Techniques and Synthetically Tailored Nanoparticles for Separation and Determination of Some Drugs and for Hydrophobicity-Based Fluorogenic Detection Applications*. (GPA: 4.07/4.30)

Cairo University, **Faculty of pharmacy,** Cairo, Egypt **Dec 2011**
Masters in Pharmaceutical Chemistry
Advisors: Prof. Ramzia I. El-Bagary, Dr. Hanaa M. Hashem
Thesis title: *Analysis of some drugs affecting Renin Angiotensin System.*

Cairo University, **Faculty of pharmacy**, Cairo, Egypt **May 2006**
Bachelor of Pharmaceutical Sciences (Excellent with honors)

Work Experience

University of Montana, Biomedical & Pharmaceutical Sciences Department, Missoula, MT USA
Sep 2020 – Present

Research Assistant Professor

- **Vaccine Research:** I am interested in investigating topics at the interface of formulation science and immunology with a focus on human health and prevention of infectious diseases. A major aspect of my work will be the design and development of pathogen-mimicking co-delivery platforms for antigens and adjuvants to advance vaccine safety and efficacy as a starting point to discover novel immunomodulatory systems.

University of Montana, Biomedical & Pharmaceutical Sciences Department, Missoula, MT USA **Jan 2018 – Aug 2020**

Postdoctoral Research Associate

- **Vaccine Research:** I am focused on the use of nanoparticle technology to target adjuvants to specific cells of the immune system in a rational way that drives the type of immune response needed for a given disease. By tailoring the type of immune response adjuvants produce, we can increase vaccine efficacy, while simultaneously decreasing vaccine side-effects to improve patient safety.

Georgia State University, **Department of Chemistry**, Atlanta, GA USA **Feb 2013 – Dec 2017**

Graduate Research and Teaching Assistant

- **Research**: My dissertation work focused on the use of various analytical techniques for separation of complex mixtures of pharmaceutical compounds in different matrices which extended into the applications of synthetically tailored and fluorescent silica nanoparticles in the fields of electrophoretic separations, forensic science, fluorescent labeling, and bioanalytical analyses.
- **Teaching**: Contributed as a teaching assistant in general, analytical, biochemistry, inorganic and organic chemistry courses.

Georgia State University, **Department of Chemistry**, Atlanta, GA USA **Aug 2016 - May 2017**

Instructor of Chemistry laboratory

- Lead and set-up general, analytical and pre-nursing Chemistry laboratory courses.
- Design, prepare, and develop instructional course materials, grade tests, quizzes and examinations.
- Assess students' coursework and support students through an advisory role.

Cairo University, **Faculty of pharmacy**, Cairo, Egypt **May 2007 - Dec 2012**

Assistant Lecturer of Pharmaceutical Chemistry

- **Research:** Gained a huge research experience in developing validated methods for analysis of pharmaceutical compounds using different analytical techniques such as liquid chromatography, spectrophotometry, spectrofluorimetry and mass spectroscopy. These methods are useful for quality control and routine analysis as well as for bioequivalence and pharmacokinetic studies of drugs especially those affecting Renin Angiotensin System.
- **Teaching**: Contributed as a teaching assistant then as an assistant lecturer of pharmaceutical chemistry with preparing and teaching laboratory sessions and tutorials responsibilities. These sessions focused on the physicochemical properties, metabolism, qualitative and quantitative analyses, synthesis and computer aided design of drugs.

Special Skills and Expertise:

- Expertise in preclinical vaccine process development.
- Excellent leadership/communication skills and ability to adapt in a multidisciplinary team.

- Expertise with a wide variety of formulations and drug/vaccine delivery techniques including nanoparticles (liposomes, inorganic nanoparticles, organic polymeric nanoparticles,.. etc.).
- Developing superparamagnetic, fluorescently-labeled, biotin-tagged, and functionalized silica nanoparticles decorated with or conjugated to different organosilane coupling agents, receptor ligands, amino acids and peptides using simple conjugation and silanization chemistry for separation, trafficking and mechanistic studies.
- Characterization of inorganic and organic nanoparticles using DLS, S/TEM, DSC, FT-IR and zeta potential measurements.
- Separation and determination of drugs and/or biomolecules using validated analytical techniques such as electrophoresis, spectrophotometry, spectrofluorimetry, HPLC, and LC/MS-MS in complex matrices.
- Performing forced drug degradation and degradation kinetics studies.
- Characterization of drugs` degradation products and identification of their structures using MS, IR and NMR techniques.
- Synthesis of NIR organic dyes.
- Computational: Chemdraw, GraphPad (Prism), Empower, Chemstation, Endnote, Matlab, Spartan, Hyperchem, Microsoft Office.
- Strong knowledge of operating and maintenance, troubleshooting of analytical instrumentation like HPLC, capillary electrophoresis, and optical detection instruments such as UV-VIS spectrophotometers and fluorescence spectrophotometers.
- Excellent experience in writing, reviewing and presenting scientific documents, proposals, reports and articles.
- Perform statistical data analyses on experimental data obtained from collaborative research projects.
- Execute research and general laboratory functions in compliance with EMA, GLP, FDA and ICH guidelines.

Research Interests

- Immunotherapeutics and vaccines R&D.
- Formulation of APIs and using nanotechnology applied to drug delivery.
- Developing multifunctional nanoparticles for imaging, sensing, vaccine/drug delivery, separation, and theranostic applications.
- Developing validated methods for separations of pharmaceutical compounds using various analytical techniques.

Editorial Duties and Professional Affiliations

- Editorial board member, International Journal of Pharmaceutical Sciences.
- Member - American Association of Pharmaceutical Scientists (AAPS).
- Member – Precision Vaccines Program.

Honors and Awards

- PhD fellowship, Department of Chemistry, Georgia State University **2014**
- National Fellowship for Studying Abroad, Ministry of Higher Education, Egypt **2012**
- Best master`s thesis in Pharmaceutical Chemistry awarded by the 3rd International Scientific Conference of Faculty of Pharmacy Cairo University "Good Pharmacy Practice" **2012**

Peer-reviewing Services

- Journal of Nanoparticles Research
- AOAC International
- Fluorescence
- Current Pharmaceutical Analysis
- Journal of Chromatographic Science
- Biomedical Chromatography
- Journal of Biological and Chemical Luminescence
- Science of the Total Environment (STOTEN)
- Arabian Journal of Chemistry
- Analytical Chemistry Insights
- Analytical Chemistry Letters
- Food Analytical Methods
- Advanced Power Technology
- New journal of chemistry

Publications

Complete list of publications and citation indices in my Google Scholar home page and publons
https://scholar.google.com/citations?user=0EyB9mAAAAAJ&hl=en
https://publons.com/researcher/319090/walid-m-abdelwahab/

Patents

1. **Walid Abdelwahab**, David Burkhart, Jay Evans, Craig Johnson, Kendal T. Ryter, Alyson Smith, "Immunologic Trehalose Compounds and Uses Thereof", Patent number: WO 2019169313, **2019**.
2. **Walid Abdelwahab**, David Burkhart, Shannon Miller, "Silicon Particles for the Co-Delivery of Therapeutic Agents" Provisional patent filed on February 11, **2020**.

Oral Presentations

1- **Abdelwahab, Walid**; Alsolmy, Eman; Phillips, Edjohnier; Patonay, Gabor. Modified Silica Nanoparticles for Enhanced Electrophoretic Separations and Hydrophobicity-Based Detection Applications. Georgia State University 9th Annual Chemistry Research Symposium, Atlanta, Georgia, United States, March 24, **2017**.

2- **Abdelwahab, Walid**; Patonay, Gabor; Ramzia El-Bagary. Modified Silica Nanoparticles for Molecular Recognition and Fluorescence Labeling. PITTCON Conference and Expo, Chicago, Illinois, United States, March 5- March 8, **2017**.

3- Patonay, Gabor; Henary, Maged; **Abdelwahab, Walid**; Chapman, Gala. Copolymerized and bonded fluorescent silica nanoparticles as labels and pseudostationary phase in bioanalytical applications. SPIE, San Francisco, California, United States, January 28- February 2, **2017**. doi:10.1117/12.2256542

4- Patonay, Gabor; **Abdelwahab, Walid**; Salim, Mohamed. Separation and identification of forced degradation products of pharmaceuticals using simple analytical techniques. Abstracts of Papers, 252nd ACS National Meeting & Exposition, Philadelphia, PA, United States, August 21-25, **2016**, Pages: ANYL-193.

5- Patonay, Gabor; Chapman, Gala; Henary, Maged; **Abdelwahab, Walid**. Copolymerized fluorescent silica nanoparticles for labels and molecular recognition. Abstracts of Papers, 252nd ACS National Meeting & Exposition, Philadelphia, PA, United States, August 21-25, **2016**, Pages: ANYL-241.
6- Patonay, Gabor; Henary, Maged; **Abdelwahab, Walid**; Chapman, Gala. Analytical Applications of Copolymerized Silica Nanoparticles. Abstracts of Papers, Chirality in Pharma, SCIX2016, Reno, NV, United States, August 8-13, **2016**.

Poster Presentations

1- **Walid Abdelwahab**; Shannon M. Miller; Alexander Riffey; Cassie Buhl; Craig Johnson; George Ettenger; Robert Child; Kendal Ryter; Jay T. Evans; David J. Burkhart. Silica Nanoparticles as a Presentation and Co-delivery Platform for C-type Lectin Receptors (CLR) Ligands and TB Antigen. 2nd Biennial International Precision Vaccines Conference, Boston, Massachusetts, October 17, **2019**.
2- Eman Alsolmy, Vincent Martinez, **Walid Abdelwahab,** Carl Kananda, Maged Henary, Gabor Patonay**.** Investigation of Some Novel Benzophenoxazine Dyes for the Detection of Latent Fingermarks on Porous Surfaces. PITTCON Conference and Expo, Chicago, Illinois, United States, March 5- March 8, **2017**.

Manuscripts in Preparation

1- **Walid M. Abdelwahab**, Alex Riffey, Shannon Miller, Cassie Buhl, Kris Short, Craig Johnson, Robert Child, George Ettenger, Kendal Ryter, Jay T. Evans, David J. Burkhart. Nano-Self-Assemblies of Synthetic Branched-Chain and Aralkyl Trehalose Derivatives: Biophysical Properties and TB Vaccine Adjuvant Activity.
2- **Walid M. Abdelwahab**, Shannon Miller, Alexander Riffey, Cassie Buhl, Kendal Ryter, Jay T. Evans, David J. Burkhart. Tailored Submicron Silica Particles as a Presentation and Co-delivery Platform for Novel C-type Lectin Receptors-based Adjuvants and the Tuberculosis (M72) Antigen

Peer-reviewed Articles (* = CORRESPONDING AUTHOR)

1- **Walid M. Abdelwahab**, Alexander Riffey, Cassie Buhl, Craig Johnson, Kendal Ryter, Jay T. Evans, David J. Burkhart. Co-Adsorption of Synthetic Mincle Agonists and Antigen to Silica Nanoparticles for Enhanced Vaccine Activity: A Formulation Approach to Co-Delivery. *International Journal of Pharmaceutics* **2020**, https://doi.org/10.1016/j.ijpharm.2020.120119
2- Alsolmy, Eman; **Abdelwahab, Walid**; Martinez, Vince; Henary, Maged; Patonay, Gabor. Investigation of benzophenoxazine derivatives for the detection of latent fingerprints on porous surfaces. *Journal of Photochemistry and Photobiology A: Chemistry* **2020**, 392, 112416.
3- **Abdelwahab, Walid***; Alsolmy, Eman; Patonay, G. “A Comparative Study of Fluorescein Isothiocyanate-Encapsulated Silica Nanoparticles Prepared in Seven Different Routes for Developing Fingerprints”. *Journal of Fluorescence* **2018**, 28(5):1049-1058**.**
4- **Abdelwahab, Walid***; Phillips, Edjohnier; Patonay, Gabor. “Preparation of Fluorescently Labeled Silica Nanoparticles Using an Amino Acid-catalyzed Seeds Regrowth Technique: Application to Latent Fingerprints Detection and Hemocompatibility Studies”. *Journal of Colloid and Interface Science* **2018**, 512:801-811**.**

5- **Ebeid, Walid***; Salim, Mohamed; Elkady, Ehab; Elzahr, Asmaa; El-Bagary, Ramzia; Patonay, Gabor. "Simultaneous determination of valsartan, amlodipine besylate and hydrochlorothiazide using capillary zone electrophoresis (CZE)". *Pharmazie* **2015**, *70* (6), 368-373.
6- **Ebeid, Walid***; Elkady, Ehab; Elzahr, Asmaa; El-Bagary, Ramzia; Patonay, Gabor. "Simultaneous Determination of Aliskiren Hemifumarate, Amlodipine Besylate and Hydrochlorothiazide in Spiked Human Plasma Using UPLC-MS/MS". *Journal of Chromatographic Science.* **2015**, *53* (7), 1178-84.
7- **Ebeid, Walid***; Elkady, Ehab; Elzahr, Asmaa; El-Bagary, Ramzia; Patonay, Gabor. "Stability-indicating RP-LC method for determination of azilsartan medoxomil and chlorthalidone in pharmaceutical dosage forms: application to degradation kinetics". *Analytical and Bioanalytical Chemistry.* **2014**, *406* (26), 6701-6712.
8- **Ebeid, Walid***; Elkady, Ehab; Elzahr, Asmaa; El-Bagary, Ramzia; Patonay, Gabor. "Spectrophotometric and spectrofluorimetric studies on azilsartan medoxomil and chlorthalidone to be utilized in their determination in pharmaceuticals". *Analytical Chemistry Insights***. 2014**, *9*, 33-40, 8.
9- **Ebeid, Walid***; Elkady, Ehab; Elzahr, Asmaa; El-Bagary, Ramzia; Patonay, Gabor. "Synchronized separation of seven medications representing most commonly prescribed antihypertensive classes by using reversed-phase liquid chromatography: Application for analysis in their combined formulations". *Journal of Separation Science.* **2014**, *37* (7), 748-757.
10- Salim, Mohamed; **Ebeid, Walid**; El-Enany, Nahed; Belal, Fathalla; Walash, Mohamed; Patonay, Gabor. "Simultaneous determination of aliskiren hemifumarate, amlodipine besylate, and hydrochlorothiazide in their triple mixture dosage form by capillary zone electrophoresis". *Journal of Separation Science*, **2014**, 37(9-10): 1206-1213.
11- **Ebeid, Walid***; Elkady, Ehab; Elzahr, Asmaa; El-Bagary, Ramzia; Patonay, Gabor. "Steady-state and synchronous spectrofluorimetric methods for simultaneous determination of aliskiren hemifumarate and amlodipine besylate in dosage forms". Luminescence **2014**, *29* (7), 878-883.
12- El-Bagary, Ramzia; Patonay, Gabor; Elzahr, Asmaa; Elkady, Ehab**; Ebeid, Waleed***. "Ion-pair LC method for simultaneous determination of aliskiren hemifumarate, amlodipine besylate and hydrochlorothiazide in pharmaceuticals". *Chromatographia* **2014**, *77* (3-4), 257-264.
13- El-Bagary, Ramzia; Hashem, Hanaa; Elkady, Ehab; **Ebeid, Walid***. "Chemometric assisted spectrophotometric and stability indicating LC methods for the determination of candesartan cilexetil and hydrochlorothiazide in their combined formulation". *Inventi Impact: Pharm Analysis & Quality Assurance,* **2014**, DOI: Inventi:ppaqa/1204/13
14- El-Bagary, Ramzia; Hashem, Hanaa; **Ebeid, Waleed***. "Septrofluorometric, Spectrophotometric and LC Determination of Irbesartan". *Journal of chemical and pharmaceutical research*, **2011**, *3*(4): 722-733.