

## Alaaldin M. Alkilany

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### Education:

2010-2012	Postdoctoral Fellow Pharmacology and Toxicology department Georgia Regents University Augusta, Georgia, USA
2006-2010	PhD., Chemistry (research focus on Nanotechnology) University of Illinois Urbana-Champaign, Illinois, USA
1995-2000	B.S. Pharmacy Jordan University of Science and Technology Irbid-Jordan

### Positions:

2012-present	Assistant Professor Department of Pharmaceutics University of Jordan
2004-2006	Formulation Team Leader (R&D) Hikma Pharmaceuticals ( <a href="http://www.hikma.com">http://www.hikma.com</a> ) Amman-Jordan
2000-2004	Formulation Scientist (R&D) Hikma Pharmaceuticals ( <a href="http://www.hikma.com">http://www.hikma.com</a> ) Amman-Jordan

### Visiting Research and Consultation Appointments:

June -Sep 2014	Research visiting scientist Chemistry Department, University of Illinois at Urbana-Champaign, Illinois, USA
June -Sep 2012	Research visiting scientist Chemistry Department, University of Illinois at Urbana-Champaign, Illinois, USA
2012-present	Consultant Jordan Food & Drug Administration (JFDA) Pharmaceutical bioequivalence committee

### Teaching Experience:

Pharmaceutical Statistics; Pharmaceutical Dispensing; Physical Pharmacy; Industrial Pharmacy; Seminars in Pharmaceutics; Organic Chemistry (class and lab); General Chemistry (class and lab)

### Pharmaceutical Industry Experience:

- Extensive experience in pharmaceutical pre-formulation, formulation, scale up, and pilot clinical trials in an FDA-approved pharmaceutical company (<http://www.hikma.com>).
- Excellent theoretical and practical experience on various pharmaceutical unit operations such as: granulation, drying, milling, compaction, blending, tablet compression/coating, and capsule filing.
- Strong experience in writing manufacturing batch records, scientific reports, formulation protocols, scale-up/production protocols/reports, process validation protocols/reports and other formulation related documents.
- Strong experience in technology transfer from R&D to production and from production site to another.
- Knowledge of GMP (good manufacturing practice), GLP (good laboratory practice), FDA and ICH guidelines, CFR codes, and USP (US Pharmacopeia).

### Nanotechnology Technical skills:

- Synthesis and characterization of various types of nanoparticles.
- Modification of nanoparticle surfaces with biomolecules and small molecules, and quantification of the loading using proper analytical methods.
- Fabrication of drug delivery systems based on anisotropic gold nanoparticles.
- NMR, vibration spectroscopy (FTIR, Raman, SERS), GC-MS, LC-MS, ICP-MS/AES, XPS, electron microscopy (TEM/Cryo-TEM and SEM), dark/bright field optical microscopy, fluorescence microscopy, Dynamic Light Scattering (DLS), Zeta potential analysis, electrophoresis, PCR, western blotting.
- HPLC: operation and method development.
- Synthesis of small organic molecules.
- Cell culture and standard biochemical assays.
- Hands-on experience with animal handling (mice and rats).

### Publications:

1. Murphy, C. J.; Gole, A. M.; Hunyadi, S. E.; Stone, J. W.; Sisco, P. N.; **Alkilany, A. M.**; Kinard, B. E.; Hankins, P. "Chemical Sensing and Imaging With Metallic Nanorods" *Chemical Communications* **2008**, *5*, 544-557. [Impact Factor \* 2010: 5.787]
2. Murphy, C. J.; Gole, A. M.; Stone, J. W.; Sisco, P. N.; **Alkilany, A. M.**; Goldsmith, E. C.; Baxter, S. C. "Gold Nanoparticles in Biology: Beyond Toxicity To Cellular Imaging" *Accounts of Chemical Research* **2008**, *41*, 1721-1730. [Impact Factor \* 2010: 21.852]

3. **Alkilany, A. M.**; Frey, R. L.; Ferry, J. L.; Murphy, C. J. “Gold Nanorods as Nanoadmicelles: 1-Naphthol Partitioning Into a Nanorod-Bound Surfactant Bilayer” *Langmuir* **2008**, *24*, 10235-10239. [Impact Factor\* : 4.269]
4. **Alkilany, A. M.**; Nagaria, P. K.; Hexel, C. R.; Shaw, T. J.; Murphy, C. J.; Wyatt, M. D. “Cellular Uptake and Cytotoxicity of Gold Nanorods: Molecular Origin of Cytotoxicity and Surface Effects” *Small* **2009**, *5*, 701-708. [Impact Factor\* : 7.336]
5. **Alkilany, A. M.**; Murphy, C. J. “Gold Nanoparticles with a Polymerizable Surfactant Bilayer: Synthesis, Polymerization, and Stability Evaluation” *Langmuir* **2009**, *25*, 13874-13879. [Impact Factor\* : 4.269]
6. **Alkilany, A. M.**; Murphy, C. J. “Toxicity and Cellular Uptake of Gold Nanoparticles: What Have We Learned So Far?” *Journal of Nanoparticle Research* **2010**, *12*, 2313-2333. [Impact Factor\* : 3.253]
7. **Alkilany, A. M.**; Nagaria, P. K.; Wyatt, M. D.; Murphy, C. J. “Cation Exchange on The Surface of Goldnanorods with a Polymerizable Surfactant: Polymerization, Stability, and Toxicity Evaluation” *Langmuir* **2010**, *26*, 9328-9333. [Impact Factor\* : 4.269]
8. Murphy, C. J.; Thompson, L. B.; **Alkilany, A. M.**; Sisco, P. N.; Boulos, S. P.; Sivapalan, S. T.; Yang, J. A.; Chernak, D. J.; Huang, J. “The Many Faces of Gold Nanorods” *Journal of Physical Chemistry Letters* **2010**, *1*, 2867-2875. [Impact Factor\* : 3.396]
9. **Alkilany, A. M.**; Thompson, L. B.; Murphy, C. J. “Polyelectrolytes Coating Provides a Facile Route to Suspend Gold Nanorods in Polar Organic Solvents and Hydrophobic Polymers” *ACS Applied Material & Interfaces* **2010**, *2*, 3417-3421. [Impact Factor\* : 2.925]
10. Zill, A.; Rutz, A. L.; Kohman, R. E.; **Alkilany, A. M.**; Murphy, C. J. Kong, H.; Zimmerman, S. C. “Clickable Polyglycerol Hyperbranched Polymers and Their Application to Gold Nanoparticles and Acid-Labile Nanocarriers” *Chemical Communications* **2011**, *47*, 1279-1281. [Impact Factor\* : 5.787]
11. Murphy, C. J.; Thompson, L. B.; Chernak, D. J.; Yang, J. A.; Sivapalan, S. T.; Boulos, S. P.; Huang, J.; **Alkilany, A. M.**; Sisco, P. N. “Gold Nanorod Crystal Growth: From Seed-Mediated Synthesis To Nanoscale Sculpting” *Current Opinion in Colloid & Interface Science* **2011**, *16*, 128-134. [Impact Factor\* : 6.142]
12. Chandra, S.; Romero, M. J.; Shatanawi, A.; **Alkilany, A. M.**; Caldwell, R. B.; Caldwell, R. W. “Oxidative Species Increase Arginase Activity in Endothelial Cells through RhoA/Rho Kinase Pathway” *British Journal of Pharmacology* **2011**, *165*, 506-519 [Impact Factor\* : 4.925]
13. Shatanawi, A.; Alkilany, A. M.; Caldwell, R. B.; Caldwell, R. W. “Angiotensin II Limits NO Production by Upregulating Arginase through a Mitogen Activated Protein Kinase-

Activating Transcription Factor-2 pathway” *Circulation* **2011**; *124*: A16962 [Impact Factor\* : 15.221]

14. **Alkilany, A. M.**; Thompson, L. B.; Boulos, S. P.; Sisco, P. N.; Murphy, C. J. “Gold Nanorods: Their Potential For Photothermal Therapeutics and Drug Delivery, Tempered By The Complexity of Their Biological Interactions” *Advanced Drug Delivery Reviews* **2012**, *64*, 190-199 (Invited contribution). [Impact Factor\* : 13.577]
15. Dreaden, E. C.; **Alkilany, A. M.**; Huang, X.; Murphy, C. J.; El-Sayed, M. A. “The Golden Age: Gold Nanoparticles for Biomedicine” *Chemical Society Reviews* **2012**, *41*, 2740-2779 (Invited critical review, **most accessed** article in ChemSocRev of the month: <http://blogs.rsc.org/cs/2012/02/02/top-ten-most-accessed-articles-in-december-2> ). [Impact Factor\* : 26.585]
16. **Alkilany, A. M.**; Shatanawi, A.; Caldwell, R. B.; Caldwell, R. W. “Toxicity and Cellular Uptake of Gold Nanorods in Vascular Endothelium and Smooth Muscles of Isolated Rat Blood Vessel: Importance of Surface Modification” *Small* **2012**, *8*, 1270-1278 [Impact Factor\* : 7.336]
17. **Alkilany, A. M.**; Lohse, S. E.; Murphy, C. J. “The Gold Standard: Gold Nanoparticle Libraries To Understand the Nano-Bio Interface” *Accounts of Chemical Research* **2013**, *46*, 650-661 [Impact Factor\* : 21.852]
18. Sakhtianchi, R.; Minchin, R. F.; Lee, K. B.; **Alkilany, A. M.**; Serpooshan, V.; Mahmoudi, M. “Exocytosis of Nanoparticles From Cells: Role in Cellular Retention and Toxicity” *Advances in Colloid and Interface Science* **2013**, *201-202*, 18-29 [Impact Factor **6.169**]
19. Boulos, S.; Davis, T.; Yang, J.; Lohse, S. E.; **Alkilany, A. M.**; Holland, I. A.; Murphy, J. C. “Nanoparticle-Protein Interactions: A Thermodynamic and Kinetic Study of The Adsorption of Bovine Serum Albumin to Gold Nanoparticle Surfaces” *Langmuir* **2013**, *29*, 14984-14996 [Impact Factor\* : 4.19]
20. **Alkilany, A. M.**; Boulos, S. P. Lohse, S. E.; Thompson, L. B.; Murphy, C. J. “Homing Peptide-Conjugated Gold Nanorods: The Effect of Amino Acid Sequence Display on Nanorod Uptake and Cellular Proliferation” *Bioconjugate Chemistry* **2014**, *25*, 1162-1171 [Impact Factor\* : 4.58]
21. **Alkilany, A. M.**; Bani Yaseen A. I.; Park, J. E.; Eller, J. R and Murphy, C. J. “Facile phase transfer of gold nanoparticles from aqueous solution to organic solvents with thiolated poly(ethylene glycol)” *RSC Advances* **2014**, *4*, 52676-52679 [Impact Factor\* : 3.70]
22. **Alaaldin, A. M.**; Abulateefeh, S. R.; Mills, K. K.; Bani Yaseen, A. I.; Hamaly, M. A.; Alkhatib, H. S.; Aiedeh, K. M.; Stone, J. W. “Colloidal Stability of Citrate and Mercaptoacetic Acid Capped Gold Nanoparticles upon Lyophilization: Effect of Capping

Ligand Attachment and Type of Cryoprotectants”. *Langmuir* **2014**, *30*, 13799-13808  
[Impact Factor\* : **4.19**]

\* Impact factors were obtained via ISI Web of Knowledge<sup>SM</sup> (Thompson Reuters-Web of Science for the year of publication)

### Conference Abstracts:

1. **Alkilany, A. M.**; Burrow, N.; Boulos, S.P.; “Cryo-TEM characterization of gold nanorod growth in solutions of CTAB with trace Ag<sup>+</sup>” Oral presentation, *246<sup>th</sup> National Meeting of the American Chemical Society*, Indianapolis, Indiana, USA (**2013**).
2. Boulos, S.P.; **Alkilany, A.M.**; Thompson, L.B.; Lohse, S.E.; Murphy, C.J. “YSA-Conjugated Gold Nanorods as Anti-cancer Therapeutics: Rate of Cellular Uptake and Photothermal Treatment”. Poster presentation, *243<sup>th</sup> National Meeting of the American Chemical Society*, San Diego, CA, USA (**2011**).
3. Shatanawi, A.; **Alkilany, A. M.**; Caldwell, B. R.; Caldwell, R. W. “Angiotensin II Limits NO Production by Upregulating Arginase through a Mitogen Activated Protein Kinase-Activating Transcription Factor-2 pathway”. Oral presentation, *American Heart Association Scientific Section*, Orlando, FA, USA (**2011**).
4. Soto-Ortega<sup>1</sup>, D.; Paolini, S.; Alkilany, A. M.; Mahtab, R.; Murphy, C. J.; Moss, A. M. “Negatively Charged Gold Nanoparticles Can Inhibit the Formation of Alzheimer's Disease Amyloid- $\beta$  Protein Aggregates in a Mechanism-Specific Fashion”. *AICHE*, Salt Lake City, UT, USA (**2010**).
5. **Alkilany, A. M.**; Murphy, C. J. “Cation Exchange on The Surface of Gold nanorods with a Polymerizable Surfactant: Polymerization, Stability, and Toxicity Evaluation”. Poster presentation, *239<sup>th</sup> National Meeting of the American Chemical Society*, San Francisco, CA, USA (**2010**).
6. **Alkilany, A. M.**; Murphy, C. J. “Gold Nanoparticles with a Polymerizable Surfactant Bilayer: Synthesis, Polymerization, and Stability Evaluation”. Oral presentation, CNST annual workshop, the University of Illinois Center for Nanoscale Science and Technology (CNST), Urbana, IL, USA (**2010**).
7. **Alkilany, A. M.**; Nagaria, P. K.; Hexel, C. R.; Shaw, T. J.; Murphy, C. J.; Wyatt, M. D. “Cellular Uptake and Cytotoxicity of Gold Nanorods: Molecular Origin of Cytotoxicity and Surface Effects”. Poster presentation, *237<sup>th</sup> National Meeting of the American Chemical Society*, Salt Lake City, UT, USA (**2009**).
8. **Alkilany, A. M.**; Frey, R. L.; Ferry, J. L.; Murphy, C. J. “Gold Nanorods as Nanoadmicelles: 1-Naphthol Partitioning Into a Nanorod-bound Surfactant Bilayer”. Poster presentation, *235<sup>th</sup> National Meeting of the American Chemical Society*, New Orleans, LA, USA (**2008**).

## Invited Talks

1. Joint Egyptian-Jordanian Workshop on Technical and Research Collaboration, **Dec 2014**, Le Royal Hotel, Amman, Jordan “Fighting Cancer with Nanobullets”.
2. TEDxUJ workshop, **Oct 2014**, The University of Jordan, Amman, Jordan “Nanotechnology: An Emerging Discipline”.
3. The 2<sup>nd</sup> Pharmacy Students Research Training Workshop/ The University of Jordan, Sep **2014**, Amman, Jordan “Seminar on Seminars”.
4. The 1<sup>st</sup> Pharmacy Students Research Training Workshop/ The University of Jordan, Sep **2013**, Amman, Jordan “Effective Scientific Presentation: Critical Tips”.
5. The 15<sup>th</sup> Scientific Congress of the Association of Pharmacy Colleges in the Arab World & The 3<sup>rd</sup> International Conference of The Faculty of Pharmacy / The University of Jordan, Oct **2012**, Amman, Jordan “*Tiny Particles with Big Applications: Gold Nanotechnology*”.
6. The 14<sup>th</sup> Jordanian Pharmaceutical Association (JPA) Conference, Apr **2012**, Amman, Jordan “*Biomedical Applications of Gold nanotechnology*”.
7. Jordanian Association of Manufacturers of Pharmaceuticals and Medical Appliances (JAPM), Pharmaceutical Innovation Conference, Feb **2012**, Amman, Jordan “*Pharmaceutical Nanotechnology in Jordan: Status & Future Directions*”.
8. School of Medicine, Georgia Regents University, Scientific Diversity Day, May **2011**, Augusta, Georgia (USA) “*Small Mater Does Mater: Killing cancer with Nano-bullets*”

## Awards

- “Speaker recognition award”, Faculty of Pharmacy, The University of Jordan, Sep **2014**, Amman, Jordan.
- JPA Recognition Award, **2012**, Jordan Pharmaceutical Association (JPA), Amman, Jordan.
- Recipient NIH/NHLBI Post-Doctoral Research Training Grant in Integrative Cardiovascular Biology, **2010**, Georgia Health Sciences University, Augusta, Georgia, USA.
- Recipient USC Graduate School Research Award, **2007**, University of South Carolina, Columbia, South Carolina, USA.

## Affiliations:

- American Chemical Society
- Jordanian Pharmaceutical Association

### Training courses and workshops:

- Tulip Int'l & Kerry Technical Pharmaceutical Seminar, (**May 2014**), Millennium Hotel, Amman, Jordan
- STAFF: Academic Development Workshop (Sep **2013**), Center of Human Resources Development, The University of Jordan, Amman-Jordan.
- The 5<sup>th</sup> MENA Bioequivalence Conference (June **2013**), The Jordanian Association of Pharmaceutical Manufacturers, Crowne Plaza Hotel, Amman, Jordan
- Alphabetical grading System (Jan **2013**), The University of Jordan, Center for Human Resources Development, Amman-Jordan.
- *Interactive Ethics Session For Post-Doctoral Scientists* (Nov **2011**), Georgia Health Sciences University, Augusta, GA, USA
- *3<sup>rd</sup> Advanced Materials Characterization Workshop* (Jun **2010**), University of Illinois at Urbana-Champaign, IL, USA
- *Scientific Writing Workshop* (Jan **2010**), University of Illinois, IL, USA.
- *Bioavailability and Bio-Equivalence Studies Workshop* (Jan **2005**), EJADA, Amman, Jordan.
- *Project Management* (Mar **2005**), Project Management Institute, Amman, Jordan.
- *Pharmaceutical Tablet Coating Training Course* (Dec **2003**), Colorcon<sup>®</sup> Coating School, Arona, Italy.
- *Strategic Presentation Workshop* (May **2001**), Hikma Pharmaceutical Training Department, Amman, Jordan.

### Committee Services

- Bioequivalence studies Evaluation Committee, Jordanian Food & Drug Administration (JFDA), (**Mar 2013**-present)
- Nanotechnology Committee, The University of Jordan, (**Oct 2013**-present)

### References:

- Professor Catherine J. Murphy (PhD advisor); phone: 217-333-7680; email: [murphycj@illinois.edu](mailto:murphycj@illinois.edu)  
University of Illinois at Urbana-Champaign  
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- Professor Mike Wyatt (PhD committee member); phone: 803-777-0856  
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- Professor R. William Caldwell (postdoctoral research mentor); phone: 706-721-2347  
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