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# Yazen M Alnouti, Ph.D.

Associate Professor

Department of Pharmaceutical Sciences

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**Teaching Activities:**

At the professional level, Dr. Alnouti lectures in the areas of Drug Metabolism and Pharmacokinetics in the "Introduction to Pharmaceutical Sciences" and "Pharmaceutical Sciences II & III" courses. At the graduate level, Dr. Alnouti provides lectures in "Advanced Pharmacokinetics and Pharmacodynamics" and the "Quantitative Pharmaceutical Analysis" courses.

**Research Activities/Interests:**

Research in Dr. Alnouti's laboratory is involved in the multidisciplinary area of drug metabolism and pharmacokinetics (DMPK). His research focuses on the application of Bioanalytical Chemistry, in vitro and in vivo animal models to support ADMET (absorption, distribution, metabolism, excretion, and toxicity) and pharmacokinetic (PK) studies. This is a technique-driven enterprise; therefore expertise in liquid chromatography-mass spectrometry (LC-MS) is heavily used in his research. Another area of interest in Dr. Alnouti's laboratory is the discovery of biomarkers for hepato-biliary diseases based on bile acid metabolism by sulfation, a phase II metabolic pathway.

### **High-Throughput Bioanalytical Chemistry:**

Qualitative and quantitative analysis of biologically active compounds in complex biological matrices using LC-MS/MS, Capillary Electrophoresis, HPLC, and robotic on-line sample preparation systems in support of high-throughput DMPK (drug metabolism and pharmacokinetics) and ADMET (absorption, distribution, metabolism, excretion, and toxicity) studies.

### **Drug Metabolism and Pharmacokinetics (DMPK):**

Study the expressional regulation and the kinetics of transporters, enzymes (phase I and II), and proteins involved in drug metabolism and disposition. Characterize the metabolic stability, metabolite identification, inhibition/induction kinetics, enzyme mapping, formation of reactive metabolites, and kinetics of reversible and irreversible protein binding of small molecules in in vitro cell lines, hepatocytes, hepatic microsomes, S9, and cytosolic fractions, and in In Vivo knock-out animal models using LC-QTRAP-MS analysis. Characterize the kinetics of drug transport and permeability across biological barriers using in vitro systems including Caco2 and lymphatic endothelial cells (LECs). Extrapolation of DMPK profiles between animal species and from in vitro to in vivo systems (IVIVE).

Study the influence of combinational therapy on the maternal/ fetal pharmacokinetics and placental transport of antiviral drugs in pregnant rats using compartmental and non-compartmental pharmacokinetic analysis with WinNonlin. Preclinical pharmacokinetic studies (toxicokinetics, bioavailability, dose proportionality, quantitative tissue distribution, and allometric scaling) in mouse, rat, and monkey animal models.

### **Biomarkers:**

Discovery and validation of biomarkers for hepato-biliary diseases and for drug-induced hepatotoxicity based on bile acid metabolism by sulfation, a phase II metabolic pathway

## Recently published articles

1. **Alnouti Y**, Klaassen CD. Mechanisms of gender-specific regulation of mouse sulfotransferases (Sults). *Xenobiotica*. **2011** Mar; 41(3):187-97. PMID: 21091322.
2. Huang J, Bathena SP, Csanaky IL, **Alnouti Y**. Simultaneous characterization of bile acids and their sulfate metabolites in mouse liver, plasma, bile, and urine using LC-MS/MS. *J Pharm Biomed Anal*. **2011** Jul 15; 55(5): 1111-9. PMID: 21530128. Not directly supported by NIH.
3. Bathena SP, Huang J, Nunn ME, Miyamoto T, Parrish LC, Lang MS, McVaney TP, Toews ML, Cerutis DR, **Alnouti Y**. Quantitative determination of lysophosphatidic acids (LPAs) in human saliva and gingival crevicular fluid (GCF) by LC-MS/MS. *J Pharm Biomed Anal*. **2011** Sep 10; 56(2): 402-7. PMCID: PMC3134166.
4. Huang J, Gautam N, Bathena SP, Roy U, McMillan J, Gendelman HE, **Alnouti Y**. UPLC-MS/MS quantification of nanoformulated ritonavir, indinavir, atazanavir, and efavirenz in mouse serum and tissues. *J Chromatogr B Analyt Technol Biomed Life Sci*. **2011** Aug 1; 879(23): 2332-8. PMCID: PMC3144699.
5. Bathena SP, Huang J, Epstein AA, Gendelman HE, Boska MD, **Alnouti Y**. Rapid and reliable quantitation of amino acids and myo-inositol in mouse brain by high performance liquid chromatography and tandem mass spectrometry. *J Chromatogr B Analyt Technol Biomed Life Sci*. **2012** Apr 15; 893-894: 15-20. PMCID: PMC3322302.
6. Gautam N, Bathena SP, Chen Q, Natarajan A, **Alnouti Y**. Pharmacokinetics, protein binding and metabolism of a quinoxaline urea analog as an NF- $\kappa$ B inhibitor in mice and rats by LC-MS/MS. *Biomed Chromatogr*. **2013** Jul; 27(7): 900-9. PMCID: PMC3760428.
7. Gautam N, Roy U, Balkundi S, Puligujja P, Guo D, Smith N, Liu XM, Lamberty B, Morsey B, Fox HS, McMillan J, Gendelman HE, **Alnouti Y**. Preclinical Pharmacokinetics and Tissue Distribution of Long-Acting Nanoformulated Antiretroviral Therapy. *Antimicrob Agents Chemother*. **2013** Jul; 57(7): 3110-20. PMCID: PMC3697338. **Featured by MDlinx in the area of Infectious Diseases.**
8. Epstein AA, Narayanasamy P, Dash PK, High R, Bathena SP, Gorantla S, Poluektova LY, **Alnouti Y**, Gendelman HE, Boska MD. Combinatorial assessments of brain tissue metabolomics and histopathology in rodent models of human immunodeficiency virus infection. *J Neuroimmune Pharmacol*. **2013** Dec; 8(5): 1224-38. PMCID: PMC3889226.
9. Bathena SP, Mukherjee S, Olivera M, **Alnouti Y**. The profile of bile acids and their sulfate metabolites in human urine and serum. *J Chromatogr B Analyt Technol Biomed Life Sci*. **2013** Dec; 942-943:53-62. PMID: 24212143. Not directly supported by NIH.
10. Wang L, Hartmann P, Haimerl M, Bathena SP, Sjöwall C, Almer S, **Alnouti Y**, Hofmann AF, Schnabl B. Nod2 deficiency protects mice from cholestatic liver disease by increasing renal excretion of bile acids. *J Hepatol*. **2014** Jun; 60(6): 1259-67. PMCID: PMC4028388.
11. Gautam N, Puligujja P, Balkundi S, Thakare R, Liu XM, Fox HS, McMillan J, Gendelman HE, **Alnouti Y**. Pharmacokinetics, Biodistribution, and Toxicity of Folic Acid-Coated Antiretroviral Nanoformulations. *Antimicrob Agents Chemother*. 2014 Oct 6. pii: AAC.04108-14. [Epub ahead of print]

# Journal of Molecular Pharmaceutics and Organic Process Research

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