

Shao-Nong CHEN, Ph.D.

Department of Pharmaceutic Sciences
Institute for Tuberculosis Research
College of Pharmacy
University of Illinois at Chicago
833 South Wood Street
Chicago, IL 60612, USA
Tel: 1-312-996-7253, Fax: 1-312-996-7107
Email: sc4sa@uic.edu

Hands on Lab Experiences

- Highly proficient at analysis of various natural products, extraction and purification of phytoconstituents from botanical sources by countercurrent separation (CCS), column chromatography (CC), high performance liquid chromatography (HPLC), ultra-high performance liquid chromatography (UHPLC), structural elucidation of natural products by spectroscopic methods (1D-, 2D-NMR, IR, and LC-MS/MS)
- Over ten years' hands on experience on Bruker high-field NMR instruments (360, 400, 500, 600, 900 MHz) including data acquisition and process as well as interpretation. Three years' hands on experience on routine maintenance and troubleshooting of Jeol NMR instrument (RT and SuperCool probes) to ensure it in the best condition along with data acquisition and process as well as interpretation. Expertise on structural elucidation and quantification of complex organic compounds with quantitative proton NMR (qHNMR) techniques, and purity evaluation of dietary supplement reference standards
- Development and implement qHNMR technique in dynamic residual complexity (DRC) of natural products to ensure reproducible of bioassay
- More than nine years' experience on Standardization Botanical Dietary Supplement for women's health
- More than 10 years' hands on experience in thin layer chromatography (TLC), CC, CCS including High Speed Countercurrent Chromatography (HSCCC) and Centrifugal Partition Chromatography (CPC), HPLC and UHPLC with different detectors (CAD, ELSD, PDA, DAD and fluorescence)
- More than 10 years hands on experience in GC-MS (Agilent 7890A GC, 5975 MSD&7000A Triple Quadrupole MS/MS) for analysis less-polar secondary metabolites of botanic extracts and LC-MSMS (AB Sciex QTrap 4000) for quantification and qualification of active components in botanic extracts, and impurity analysis of Reference Standards.
- Cross-platforms purity evaluation of Reference Standards (NMR, HPLC and LCMS). Combination of NMR and LCMSMS information for identification impurities in Reference Standards
- Propose and implemental Chemical Subtraction (CS) Concept with CCS technique – a methodology for single-/multi- target isolation from a complex matrix in Dietary Supplement efficacy and safety research
- Design and synthesize functional organic compounds for evaluation of its bioactivity

Research Experience

2000-present Research Associate (2000)/Specialist (2002)/Assistant Professor (2005-2016)/Associate Professor (2016-) of Pharmacognosy, University of Illinois at Chicago, College of Pharmacy, Department of Medicinal Chemistry & Pharmacognosy, UIC/NIH Center for Botanical Dietary Supplement Research in Women's Health (UIC/NIH Botanical Center) and Institute for Tuberculosis Research

As a new member of Botanical Center (2000), responsible for isolation and structural elucidation of phytochemicals by means of spectroscopic methods, and characterization the constituents of botanical extracts as well as quantitative comparisons of contents in different botanical extracts by PDA-ELSD-HPLC method

As a principal researcher (2002), develop new analytical procedures including new concepts of "Chemical Subtraction (CS)" and "Dynamic Residual Complexity (DRC)"; CS towards a loss-free bioassay-guided fractionation of botanicals, by means of minimizing the unavoidable loss of phytoconstituents experienced in traditional separation methods, allowing the selective removal of interfering substances that potentially hamper the bioassays such as benzoic acid, fatty acids and

polyphenols (e.g. tannins) that interfere with receptor assays; DRC for an explanation of phenomena associated with chemical instability and chemical reactivity, which can lead to variations in a biological response over time

As one of principal Co-Investigators of UIC/NIH Botanical Center (2005-), leads a group in Botanic Integrity Core for validating the botanical identity/taxonomy and integrity by means of organoleptic, microscopic, chromatographic analysis (UHPLC) and NMR profiles as well as DNA barcoding authentication; extended chemical subtraction (CS) concept to make **Deplete** and **Enrich Select Ingredients to Generate Normalized Extract Resources (DESIGNER)** extracts based on countercurrent separation (CCS), which enable to detect synergism/antagonism of single-/multi-components in a complicated matrix; developed a NMR data mining methodology for dereplication and exploration of new secondary metabolites from botanical extract

2009-2011 As one of two key co-investigators in a NIH NCCAM supported "Spectrometric Validation of Botanical Materials and Reference Standards (**PI: Dr. Guido F Pauli**)". This project seeks to establish new NMR and MS spectrometric technologies for the assessment of the quality and integrity of popular botanical reference standards and dietary supplements. Established qHNMR protocol and improved qHNMR methodology from simply analysis NMR spectrum to produce digital spectrum by means of computer-aid using quantum mechanism calculation: ¹H iterative full spin analysis (HiFSA)

2011-present As a key co-investigator in a NIH/NIDCR supported "Biomodification of Dentin Matrix Structure (**PI: Dr. A. Bedran-Russo**)". In this project, natural products were expanded into a new application field: dentin biomodifiers to enhance the strength and stability of the dentin

1999-2000 Res Associate, University of Virginia, Department of Chemistry, **Dr. Sydney Hecht's group**
Search for DNA cleavaging and damaging agents and Myt-1 Kinase Inhibitor from natural sources via bioassay guided fractionation

1997-1999 Postdoctoral fellow & Associate Professor, Chinese Academy of Sciences, Shanghai Institute of Materia Medica, Shanghai, China, **Prof. Guo-Wei Qin's group**
Establish Brine Shrimp Lethality (BSL) bioassay platform for bioassay-guided fractionation, isolation and identification of several active components from poisonous plants; structure modification of andrographolide, an active component of *Andrographis paniculata*, to increase its aqueous solubility and bioavailability

1994-1997 Research Assistant, Lanzhou University, Lanzhou and Chinese Academy of Sciences, Kunming Institute of Botany, Kunming, Yunnan, **Advisors: Profs. Yao-Zu Chen and Han-Dong Sun**
Systematic investigated chemical components from aerial parts of *Isodon* species; isolation of secondary metabolites with TLC, CC, and structural elucidation by means of spectroscopic methods including 1D- and 2D-NMR, IR, MS; evaluation of content variation of major active components of *Isodon eriocalyx* by geoenvironment

1986-1994 Res Assistant, Chinese Academy of Sciences, Lanzhou Institute of Chemical Physics, Lanzhou
Synthesis of intermediates of organosilicon material for making enriching oxygen membranes, evaluation of difference gases' permeability through these membranes

Affiliations

American Pharmacognosy Society
Chinese Chemical Society

Education

Ph.D., Organic Chemistry, Lanzhou University, Lanzhou, China, 1997
Dissertation: "Studies on the Chemical Constituents of Four *Isodon* species"
Advisors: Profs. Yao-Zu Chen & Han-Dong Sun
B.S., Chemistry, Lanzhou University, Lanzhou, China, 1986

Presentations and Talks

- The Phytochemistry of Black Cohosh – Inventory and Challenges of an Herb Dietary Supplement, Annual meeting of the American Society of Pharmacognosy, Corvallis, OR, USA, July 23-27, 2005
- Spectrometric Evaluation of Natural Products Reference Standards, Annual meeting of the American Society of Pharmacognosy & the Phytochemical Society of North America, Tampa Bay, FL, USA, July 10-14, 2010
- Generation of Knock-Out Extracts By Countercurrent Chemical Subtraction, 7th International Conference Countercurrent Chromatography, Hangzhou, China, August 5-8, 2012
- NMR Data Mining --- A New Phytochemical Approach for Herbal Dietary Supplements Research, College of Pharmacy, Zhejiang University, July, 2014
- Pharmacognosy of Black Cohosh: The Phytochemical and Biological Profile of a Major Botanical Dietary Supplement at “Across Life’s Stages for All Ages: Natural Products with Medicinal Benefits for Women’s Health” Symposium, AAPS, San Diego, Nov., 2014
- Can We Establishing Phytochemical Standards for Black Cohosh? Guilin, China, Nov, 2014
- Bio-modifier - Natural Products Application in Dental Restoration, Chengdu, China, March, 2017
- Turn Lime to Lemon: New Thoughts on Sustainable Natural Products Research, Lanzhou, China, Aug 2018