

Drug Discovery Based on Plant Biodiversity and Herbal Medicines

Research Group of Dr. Hongjie Zhang

Our Goals

our goal to discover and develop new chemical entity (i.e. drugs) and medicines from natural resources, including medicinal plants and other organisms.

Identify active components through bioassay-directed fractionation from natural plants or other natural source (animal, insect, fungi, etc.)

Establish a library of natural source potential extracts and compounds for easy studies.

Every year drug discovery chemical biology of studying in collaborative work with...

Current disease targets include:

- Bird Flu, HIV, H1N1, Ebola (Marburg)
- Alzheimer and cancer (overexpression)
- AIDS, hepatitis (including TB) and bacillus
- etc.

General Approach

Collection of Source Materials (50-150 g) (from Field/Garden)

Mechanism of Action

Active Compounds

Evaluation of Bioactivity and Mechanism Study

To Discover Anticancer Compounds

Compound	IC50 (µM)	IC50 (nM)	IC50 (pM)	IC50 (fM)	IC50 (aM)
1	2.5	2.5	2.5	2.5	2.5
2	1.2	1.2	1.2	1.2	1.2
3	3.5	3.5	3.5	3.5	3.5
4	4.2	4.2	4.2	4.2	4.2
5	5.0	5.0	5.0	5.0	5.0

To Discover Antimalarial Compounds

Compound	IC50 (µM)	IC50 (nM)	IC50 (pM)	IC50 (fM)	IC50 (aM)
1	1.5	1.5	1.5	1.5	1.5
2	2.0	2.0	2.0	2.0	2.0
3	2.5	2.5	2.5	2.5	2.5
4	3.0	3.0	3.0	3.0	3.0
5	3.5	3.5	3.5	3.5	3.5

Institute of Materials Research and Engineering

Artificial Cell Membranes for Drug Discovery

Research Scientist: Esther Liu, Jeffrey, Hara-Park, Ho Hong, Manikandan, Kalanti

Membrane proteins are implicated in many diseases such as Alzheimer's disease, HIV, and obesity, making the study of proteins within a key target for drug discovery.

GPCRs (G-protein-coupled receptors)

- Major class of druggable membrane proteins
- Targeted by 50% of all existing commercial drugs
- 80% as yet unexploited

Unfortunately, cells are highly difficult to study.

Added with the cell membrane to factors that facilitate the access for drug agents.

Our Solution:

Artificial Cell Membranes

Protein Translocation

Targeting

Internal Validation of Performance

Protein Capabilities

CURRICULUM VITAE of Dr. ZHANG HONGJIE (zhanghj@hkbu.edu.hk)

Name: Zhang Hongjie

Academic qualifications:

1981.9-1985.7 B.S. Yunnan University, Kunming, China
1985.9-1988.8 M.S. Kunming Institute of Botany, The Chinese Academy of Sciences, Kunming, China
1991.9-1994.9 Ph.D. Kunming Institute of Botany, The Chinese Academy of Sciences, Kunming, China

Previous academic positions held:

1988.9-1991.4 NMR Research Fellow Kunming Institute of Botany, The Chinese Academy of Sciences
1991.5-1995.4 Assistant Professor Kunming Institute of Botany, The Chinese Academy of Sciences
1995.5-1997.10 Associate Professor Kunming Institute of Botany, The Chinese Academy of Sciences
1997.11-2002.12 Professor Kunming Institute of Botany, The Chinese Academy of Sciences
1999.4-2003.10 Research Associate College of Pharmacy, University of Illinois at Chicago, USA
2003.11-2007.7 Research Assistant Professor College of Pharmacy, University of Illinois at Chicago, USA
2007.8-2011.11 Research Associate College of Pharmacy, University of Illinois at Chicago, USA
Professor

Present academic position:

2011.12-present Associate Hongjie Zhang's Lab
Professor (http://scm.hkbu.edu.hk/en/expertise/faculty_staff/full_list/index_id_96.html),
Teaching Division, School of Chinese Medicine, Hong Kong Baptist University

Previous relevant research work:

Technical expertise Natural Product Chemistry
Research area Drug discovery and development from natural products

Publication Records: 115 peer-reviewed publications; total number of cited: >1200

Ten Representative publications in the past ten years

1. Zou J, Pan LT*, Li QJ, Pu JX, Yao P, Zhu M, Banas JA, **Zhang HJ***, Sun HD. Rubesanolides C-E: The abietane diterpenoids isolated from *Isodon rubescens* and evaluation of their anti-biofilm activity. **Organic & Biomolecular Chemistry** 2012, 10 (26), 4989-5152.
2. **Zhang HJ***, Qiu MH, Chen YG, Chen JX, Sun Y, Wang CF, Fong HHS. Plant Terpenes, in Natural Products, edited by Pezzuto, John and Kato, Massuo Jorge, in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK, [<http://www.eolss.net>], 2011.
3. Rumschlag-Booms E, **Zhang HJ**, Soejarto DD, Fong HHS, Rong LJ. Development of an antiviral screening protocol: One-Stone-Two-Birds. **Journal of Antivirals & Antiretrovirals** 2011; 3: 8-10.
4. Zou J, Pan LT*, Li QJ, Zhao JH, Pu JX, Yao P, Gong NB, Lu Y, Kondratyuk TP, Pezzuto JM, Fong HHS, **Zhang HJ***, Sun HD. Rubesanolides A and B: diterpenoids from *Isodon rubescens*. **Organic Letters** 2011; 13: 1406-9.
5. Yang JH, Kondratyuk TP, Jermihov K, Marler LE, Qiu X, Choi YS, Cao HM, Yu R, Pegan S, Hung R, Liu Y, Wang LQ, Mesecar AD, van Breemen RB, Pezzuto JM, Fong HHS, Chen YG*, **Zhang HJ***. Bioactive compounds from the Fern *Lepisorus contortus*. **Journal of Natural Products** 2011; 74: 129-36.
6. Truong NB, Pham CV, Mai HDT, Hung NV, Cuong NM, Nguyen HT, **Zhang HJ**, Fong HHS, Franzblau SG, Soejarto DD, Chau MV. Chemical constituents from *Xylosma longifolia* and their anti-tubercular activity. **Phytochemistry Letters** 2011; 4: 250-253.
7. Cao HM, Yu R, Choi YS, Ma ZZ, **Zhang HJ**, Xiang W, Lee DYW, Berman BM, Moudgil KD, Fong HHS, van Breemen RB. Discovery of cyclooxygenase inhibitors from medicinal plants used to treat inflammation. **Pharmacological Research** 2010; 61: 519-524.
8. Michel JL, Chen YG, **Zhang HJ**, Huang Y, Kronic A, Orjala J, Veliz M, Soni KK, Soejarto DD, Caceres A, Perez A, Mahady GB. Estrogenic and serotonergic butenolides from the leaves of *Piper hispidum* Swingle (Piperaceae). **Journal of Ethnopharmacology** 2010; 129: 220-226. (supported by: US NIH R21-AT02381)
9. **Zhang HJ***, Rothwangl K, Mesecar AD, Sabahi A; Rong LJ*, Fong HHS. Lamiridosins, hepatitis C virus entry inhibitors from *Lamium album*. **Journal of Natural Products** 2009; 72: 2158-62.
10. Ma CY, Musoke FS, Tan GT*, Sydara K, Bouamanivong S, Southavong B, Soejarto DD, Fong HHS, **Zhang HJ***. Study of antimalarial activity of chemical constituents from *Diospyros quaesita* Thw. (Ebenaceae). **Chemistry & Biodiversity** 2008; 5: 2442-8.