

LIU Liang



Position : Chair Professor, Honorary President of Macau University of Science and Technology, Director of State Key Laboratory of Quality Research in Chinese Medicines

Faculty : State Key Laboratory of Quality Research in Chinese Medicines (SKL)

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Teaching Modules: Internal Medicine of Traditional Chinese Medicine; Methodology of Pharmacological Experiment (DCTZ02, DCWZ16, ME1003)

Research Areas: Diagnosis and Treatment of Rheumatic Diseases by Chinese medicine; Clinical Pharmacy in Chinese Herbal Medicine, Research and Development of the Innovative Anti-arthritic and Anti-cancer drugs; Quality Control of Chinese Medicines

Chair Professor Liu Liang is the President of Macau University of Science and Technology (MUST) and Director of State Key Laboratory of Quality Research in Chinese Medicine. He also serves as a project advisor for traditional medicine of World Health Organization (WHO), the Convener of 1st Working Group and Member of the Technical Committee of ISO/TC249, the founding President of the Specialty Committee of Immunology of Traditional Chinese Medicine (SCITCM) and the Vice-president of the Specialty Committee of Education and 5 other Specialty Committees of the World Federation of Chinese Medicine Societies, as well as a series of academic and social concurrent positions including the standing member of China Association of Higher Education, Chair/member of the Grant Review Committee for Chinese Medicine Research funded by Natural Science Foundation of China (NSFC), member of Health Reform Advisory Committee of State Administration of Traditional Chinese Medicine, President of Macau International Collaboration Alliance for Rheumatology Research, member of Talents Development Committee and Science & Technology Committee of Macau Special Administrative Region (Macau SAR), member of Committee for Corporation between the Mainland and Macau on Science and Technology Development, Vice-president of the Association for Promotion of Science and Technology of Macau. As the President of the expert panel, Prof. Liu directed the formulation of “WHO Traditional Medicine Strategy in Western Pacific Region: 2010-2020” and “Cupping Therapy Practice”. Prof. Liu is meanwhile the member

and one of the Executive Committee of Consortium for Globalization of Chinese Medicine (CGCM) and the visiting Research Fellow of China Academy of Chinese Medical Sciences. He also holds the visiting professorship at Guangzhou University of Traditional Chinese Medicine, Hunan University of Traditional Chinese Medicine and Guangdong Academy of Medical Sciences.

Prof. Liu received his doctorate degree of Philosophy from Guangzhou University of Traditional Chinese Medicine in Medicine (Integration of Chinese and Western Medicine) in 1990. Then in 1992, he worked as a visiting scholar at the Institute of Molecular Pharmacology of Medical School Hannover and Max-Planck (MPG) Institute of Clinical Immunology and Rheumatism (German Academy of Sciences) at Erlangen-Nuremberg University in Germany, engaging in the research of anti-arthritis and anti-inflammation by Chinese herbal medicine. After his return from Germany, Prof. Liu was appointed as Vice-president of Guangzhou University of Traditional Chinese Medicine and supervisor for PhD students in 1997. Through the “Mainland’ Talents Scheme” launched by Honorary Consultant of the Department of Health of Special Administrative Region of Hong Kong (HKSAR), Prof. Liu joined Hong Kong Baptist University (HKBU) in August 2000 as the Founding Dean of the School of Chinese Medicine until June 2011. During this ten years, Prof. Liu was awarded his professorship in 2006 and promoted onto Chair Professorship in April 2007 at HKBU. In 2009, he established Shum Yiu Foon Shum Bik Chuen Memorial Centre for Cancer and Inflammation Research and took charge of the Directorship. From July 2011 to December 2012, Prof. Liu held the position of Vice-president at MUST responsible for Research & Development and the Director of State Key Laboratory of Quality Research in Chinese Medicine. Since January 2013, Prof. Liu started his leadership role as the President of MUST till now.

Prof. Liu has been a seasoned scholar in rheumatology by using integrative approach of Western & traditional Chinese medicine. He led a research team for the first time to invent a new diagnostic method using sulfated IgG N-glycans as biomarkers for rheumatoid arthritis. Nature Reviews Rheumatology published a new of research highlights appraising this work for solving the technical challenge of diagnosing rheumatoid arthritis regardless of seronegativity which helped confirm the extensive future application of potential serum biomarkers. By collaborating with Hunan Zhengqing Pharmaceutical Group, Prof. Liu successfully developed the new drug of Zhengqingfengtongning sustained release tablets which is the first controlled-release drug from Chinese herbal medicine in China. This drug has been widely used across China for the treatment of rheumatoid arthritis and other diseases and it also has been included in the drug list of National Medical Insurance and National Essential Medicine List. Zhengqingfengtongning is also the first drug to be able to suppress mPGES-1 which acts as the ultimate synthetase of prostaglandin E2. Since the mechanism of the drug is different from

those anti-inflammatory drugs inhibiting COX2, it would not induce cardiovascular side effects. In addition, the research team led by Prof. Liu first established the gene catalogue of the Sprague-Dawley rats gut metagenome which will serve as a valuable resource for future work using rats as a model for investigating the role of gut microbiota and the interactions with the host in health and disease. The newly-founded new drug binding site of Cystin-46 that IKK-beta acts on and the novel mouse mode fauna could provide a new technical platform for the research and development of anti-inflammatory drugs with new targets.

Prof. Liu has undertaken or participated in over 50 grants including the Key and General Research Grants founded by NSFC, the National Basic Research Project (973 Program) and National Climbing Program, and others supported by governmental foundations or industry cooperation schemes like the Research Scheme on Innovative New Drug Discovery, Guangdong Provincial Research Foundation, Research Grants Council of Hong Kong, Macau Science and Technology Fund, Innovative Technology Fund of Hong Kong, and Hong Kong Jockey Club Charity Trust etc. He has been prolific in academic publication with around 600 contributions published on a number of international SCI or national refereed journals, among those, more than 200 articles were published in prestigious SCI journals including Nature, Science, Nature Communications, Journal of Allergy and Clinical Immunology, Advanced Science, Pharmacology & Therapeutics, Analytical Chemistry, Cell Death & Diseases, Briefings in Bioinformatics summing up to over 850 impact factors, as well as delivered more than 180 invited talks in various domestic and overseas conferences and organizations. Moreover, Prof. Liu has been conferred 19 awards and honorary titles, including two awards of 2nd Class National Science and Technology Progress Award awarded by the State Council of China, nine departmental/provincial awards in science and technology progress (4 of them are 1st Class), the first National Innovation Pioneer Award (2017), Outstanding Young Scientists of China by Personnel Ministry of China (1998), Talents for 21 Century launched by the Ministry of Education of China (1999), Honorary Fellowship by Canadian Chartered Institute of Business Administration(2009), Annual National Scientist recognized by the journal of China Scientists (2013). He has been successfully granted with 50 patents by US, Australia and China Patent Agencies, of which 47 are International Patents and he has published 18 monographs and chapters as Editor-in-Chief or member of Editorial Boards, including a 3-volume set of Chinese medicine monograph titled "Essentials of Chinese Medicine" published by Springer in UK, which has been collected and used by over 600 national and institutional libraries. The monograph "Safe and Reasonable Application of Chinese Herbal Medicine" has been an important reference book for the registered Chinese medicine practitioners in Hong Kong and Macau SAR. Also, Prof. Liu is the Associate Editor-in-Chief or Editorial Board Member of more than 10 Chinese or English journals, including the renowned SCI journal "Phytomedicine" (Associate Editor-in-Chief), "Pharmacological Research" and "Frontiers of Medicine".

Prof. Liu once served as a member of Expert Committee on New Drug Discovery under Ministry of Science and Technology of China, Executive Member of Standing Committee of China Association of Chinese Medicine, Deputy Chair of Chinese Medicines Committee under Chinese Association of Integrative Chinese and Western Medicine, evaluation expert of Science and Technology Progress Award of State Administration of Traditional Chinese Medicine and Guangdong Province, member of Medical Council of Macau SAR, Honorary Consultant of the Department of Health, member of the Committee on Research and Development of Chinese Medicines of Hong Kong SAR, Director of the Board of Hong Kong Jockey Club Institute of Chinese Medicine, member of Chinese Medicine Council of Hong Kong and the Honorary Consultant of a series of professional associations in Chinese medicine.

Academic Qualifications

1992-1994	Visiting Scholar/ Hannover Medical School & Max-Planck (MPG) Institute for Clinical Immunology and Rheumatism/ Germany
1991-1992	Certificate Course/ German Language/ Shanghai Institute of Foreign Language Studies
1987-1990	PhD / Integration of Chinese and Western Medicine / Guangzhou University of Traditional Chinese Medicine
1983 – 1985	MPhil / Integration of Chinese and Western Medicine / Guangzhou University of Traditional Chinese Medicine
1978-1982	BSC / Chinese Medicine / Guangzhou College of Traditional Chinese Medicine
1975-1977	Diploma in Medicine/ Western Medicine/ Changde Medical School, Hunan

Working Experiences

2021.1– Present	Honorary President & Chair Professor / Macau University of Science and Technology, Macau
	Director / State Key Laboratory for Quality Research in Chinese Medicines (Macau University of Science and Technology), Macau
2013.1 – 2020.12	President & Chair Professor / Macau University of Science and Technology, Macau

- Director / State Key Laboratory for Quality Research in Chinese Medicine (Macau University of Science and Technology), Macau
- 2011.7-2012.12 Vice-president & Chair Professor / Macau University of Science and Technology, Macau
- Director / State Key Laboratory for Quality Research in Chinese Medicine (Macau University of Science and Technology), Macau
- 2009.9-2011.6 Dean & Chair Professor / School of Chinese Medicine / Hong Kong Baptist University, Hong Kong
- Director & Fellow / Shum Yiu Foon Shum Bik Chuen Memorial Centre for Cancer and Inflammation Research / School of Chinese Medicine / Hong Kong Baptist University, Hongkong
- 2007.4-2009.8 Dean & Chair Professor / School of Chinese Medicine / Hong Kong Baptist University, Hong Kong
- 2001.1-2007.3 Dean & Professor / School of Chinese Medicine / Hong Kong Baptist University, Hong Kong
- 2000.8-2000.12 Executive Associate Dean & Professor / School of Chinese Medicine / Hong Kong Baptist University, Hong Kong
- 1997.9-2000.7 Vice-president & Professor / Guangzhou University of Traditional Chinese Medicine, Guangzhou
- 1996.6-1997.8 Assistant President & Associate Professor / Guangzhou University of Traditional Chinese Medicine, Guangzhou
- 1991.8-1996.5 Deputy-Director & Associate Professor/ Pharmacology Division of the Institute for Chinese Medicine Development, Guangzhou University of Traditional Chinese Medicine, Guangzhou
- 1990.8-1991.7 Lecturer / Guangzhou College of Traditional Chinese Medicine, Guangzhou
- 1986.1-1987.8 Lecturer / Guangzhou College of Traditional Chinese Medicine, Guangzhou

Representative Publications:

Selected articles published in SCI journals in the recent past years: (Corresponding author)*

1. Fan XX, Pan HD, Li Y, Guo RJ, Leung Elaine LH, Liu L*. Novel therapeutic strategy for cancer and autoimmune conditions: Modulating cell metabolism and redox capacity. *Pharmacology and Therapeutics*. June 2018.

2. Li RZ, Fan XX, Duan FG, Jiang ZB, Pan HD, Luo LX, Zhou YL, Li Y, YaoXJ, Leung EL*, Liu L*. Proscillaridin A induces apoptosis and suppresses non-small-cell lung cancer tumor growth via calcium-induced DR4 upregulation. *Cell Death Dis.* 2018 Jun 13;9(6):696.
3. Pan HD, Guo RJ, Zhu J, Wang Q, Ju YM, Xie Y, Zheng YF, Wang ZF, Li T, Liu ZQ, Lu LL, Li F, Tong B, Xiao L, Xu X, Li RZ, Yuan ZW, Yang HM, Wang J, Kristiansen K, Jia HJ* and Liu L*. A gene catalogue of the Sprague-Dawley rat gut metagenome. *GigaScience*, May, 2018.
4. Zhu GY, Yang J, Yao X, Yang X, Fu J, Liu X, Bai LP, Liu L, Jiang ZH. (±)-sativamides a and b, two pairs of racemic nor-lignanamide enantiomers from the fruits of *cannabis sativa* (hemp seed) [J]. *The Journal of organic chemistry*, 2018, 83 (4), pp 2376–2381.
5. Wang QQ, Xu JH, Li Y, Huang JM, Jiang ZB, Wang YW, Liu L, Leung EL, Yao XJ. Identification of a novel protein arginine methyltransferase 5 inhibitor in non-small cell lung cancer by structure-based virtual screening [J]. *Frontiers in pharmacology*, 2018, 9:173.
6. Wan HY, Chen JL, Zhu XZ, Liu L, Wang JF, Zhu XM. Titania-coated gold nano-bipyramids for blocking autophagy flux and sensitizing cancer cells to proteasome inhibitor-induced death [J]. *Advanced Science*, 2018, 5 (3):1700585.
7. Su XH, Li T, Liu ZQ, Huang QC, Liao KS, Ren RT, Lu LL, Qi XX, Wang MJ, Chen JY, Zhou H, Leung EL, Pan HD, Liu J, Wang H, Huang LF, Liu L*. Licochalcone activates keap1-nrf2 signaling to suppress arthritis via phosphorylation of p62 at serine 349 [J]. *Free Radical Biology and Medicine*, 2018, 115:471-483.
8. Liu XY, Yang KY, Wang MQ, Kwok JSL, Zeng X, Yang ZY, Xiao XJ, Lau CPY, Li Y, Huang ZM, Ba JG, Yim AK, Quyang CY, Ngai SM, Chan TF, Leung EL, Liu L, Liu ZG, Tsui SK. High-quality assembly of *dermatophagoides pteronyssinus* genome and transcriptome reveals a wide range of novel allergens [J]. *Journal of Allergy and Clinical Immunology*, 2018 Jan 2. pii: S0091-6749(17)33013-0.
9. Wu JJ, Guo ZZ, Zhu YF, Huang ZJ, Gong X, Li YH, Son WJ, Li XY, Lou YM, Zhu LJ, Lu LL, Liu ZQ, Liu L*. A systematic review of pharmacokinetic studies on herbal drug fuzi: Implications for fuzi as personalized medicine [J]. *Phytomedicine*, 2018, Mar 1. doi: 10.1016/j.phymed.2018.03.001
10. Chen TB, Zuo YH, Dong GT, Liu L*, Zhou H. An integrated strategy for rapid discovery and identification of quality markers in *guanxin kangtai* preparation using uhplc-tof/ms and multivariate statistical analysis [J]. *Phytomedicine*, 2018 Mar 6. doi: 10.1016/j.phymed.2018.03.005.
11. Leung EL, Luo LX, Liu ZQ, Wong VK, Lu LL, Xie Y, Zhang N, Qu YQ, Fan XX, Li Y, Huang M, Xiao DK, Huang J, Zhou YL, He JX, Ding J, Yao XJ, Ward DC, Liu L*. Inhibition of kras-dependent lung cancer cell growth by deltarasin: Blockage of autophagy increases its cytotoxicity [J]. *Cell death & disease*, 2018, 9 (2):216.
12. Fan XX, Leung EL, Xie Y, Liu ZQ, Zheng YF, Yao XJ, Lu LL, Wu JL, He JX, Yuan ZW, Fu J, Wei CL,

- Huang J, Xiao DK, Luo LX, Jiang ZB, Zhou YL, Kam RK, Liu L*. Suppression of lipogenesis via reactive oxygen species–ampk signaling for treating malignant and proliferative diseases [J]. *Antioxidants & redox signaling*, 2018, 28 (5):339-357.
13. Zhuo Y, Wu JL, Yan X, Guo MQ, Liu N, Zhou H, Liu L*, Li N*. Strategy for hepatotoxicity prediction induced by drug reactive metabolites using human liver microsome and online 2d-nano-lc-ms analysis [J]. *Analytical chemistry*, 2017, 89 (24):13167-13175.
 14. Zhu MZ, Li N, Wang YT, Liu N, Guo MQ, Sun BQ, Zhou H, Liu L*, Wu JL*. Acid/salt/ph gradient improved resolution and sensitivity in proteomics study using 2d scx-rp lc–ms [J]. *Journal of proteome research*, 2017, 16 (9):3470-3475.
 15. Yu J, Kong L, Zhang A, Han Y, Liu Z, Sun H, Liu L, Wang X. High-throughput metabolomics for discovering potential metabolite biomarkers and metabolic mechanism from the appswe/ps1de9 transgenic model of alzheimer’s disease [J]. *Journal of proteome research*, 2017, 16 (9):3219-3228.
 16. Zhou H, Liu JX, Luo JF, Cheng CS, Leung EL, Li Y, Su XH, Liu ZQ, Chen TB, Duan FG, Dong Y, Zuo YH, Li C, Lio CK, Li T, Luo P, Xie Y, Yao XJ, Wang PX, Liu L*. Suppressing mpges-1 expression by sinomenine ameliorates inflammation and arthritis [J]. *Biochemical pharmacology*, 2017, 142:133-144.
 17. Yuan ZW, Li YZ, Liu ZQ, Feng SL, Zhou H, Liu CX, Liu L*, Xie Y*. Role of tangeretin as a potential bioavailability enhancer for silybin: Pharmacokinetic and pharmacological studies [J]. *Pharmacological research*, 2018, 128:153-166.
 18. Wu AG, Zeng W, Wong VK, Zhu YZ, Lo AC, Liu L*, Law BY*. Hederagenin and α -hederin promote degradation of proteins in neurodegenerative diseases and improve motor deficits in mptp-mice [J]. *Pharmacological research*, 2017, 115:25-44.
 19. Wu JJ, Zhu YF, Guo ZZ, Lou YM, He SG, Guan Y, Zhu LJ, Liu ZQ, Lu LL*, Liu L*. Aconitum alkaloids, the major components of aconitum species, affect expression of multidrug resistance-associated protein 2 and breast cancer resistance protein by activating the nrf2-mediated signalling pathway. *Phytomedicine*, 2017 Dec 8. doi: 10.1016/j.phymed.2017.12.
 20. Wang Y, Zhou C, Gao H, Li C, Li D, Liu P, Huang M, Shen X*, Liu L*. Therapeutic effect of cryptotanshinone on experimental rheumatoid arthritis through downregulating p300 mediated-stat3 acetylation [J]. *Biochemical pharmacology*, 2017, 138:119-129.
 21. Wang QQ, Li Y, Xu JH, Wang YW, Leung EL, Liu L*, Yao XJ*. Selective inhibition mechanism of rvx-208 to the second bromodomain of bromo and extraterminal proteins: Insight from microsecond molecular dynamics simulations. *Scientific reports*, 2017, 7 (1):8857.
 22. Wang JR, Gao WN, Grimm R, Jiang S, Liang Y, Ye H, Li ZG, Yau LF, Huang H, Liu J, Jiang M, Meng Q, Tong TT, Huang HH, Lee S, Zeng X, Liu L*, Jiang ZH*. A method to identify trace sulfated igg n-glycans as biomarkers for rheumatoid arthritis. *Nature communications*,

- 2017, 8 (1):631.
23. Luo LX, Li Y, Liu ZQ, Fan XX, Duan FG, Li RZ, Yao XJ, Leung EL, Liu L*. Honokiol induces apoptosis, G1 arrest, and autophagy in kras mutant lung cancer cells. *Frontiers in pharmacology*, 2017, 8:199.
 24. Ren X, Chen L, Xie J, Zhang Z, Dong G, Liang J, Liu L, Zhou H, Luo P. Resveratrol ameliorates mitochondrial elongation via drp1/parkin/pink1 signaling in senescent-like cardiomyocytes [J]. *Oxidative medicine and cellular longevity*, 2017, 2017: 4175353.
 25. Li X, Fan XX, Jiang ZB, Loo WT, Yao XJ, Leung EL*, Chow LW*, Liu L*. Shikonin inhibits gefitinib-resistant non-small cell lung cancer by inhibiting trxr and activating the egfr proteasomal degradation pathway. *Pharmacological research*, 2017, 115:45-55.
 26. Law BY, Mok SW, Chen J, Michelangeli F, Jiang ZH, Han Y, Qu YQ, Qiu CL, Xu SW, Xue WW, Yao XJ, Javed MH, Coghi P, Liu L*. N-desmethyldauricine induces autophagic cell death in apoptosis-defective cells via ca²⁺ mobilization. *Frontiers in pharmacology*, 2017, 8:388.
 27. Huang L, Dong Y, Wu J, Wang P, Zhou H, Li T, Liu L*. Sinomenine-induced histamine release-like anaphylactoid reactions are blocked by tranilast via inhibiting nf-kb signaling. *Pharmacological research*, 2017, 125:150-160.
 28. He F, Wang CJ, Xie Y, Cheng CS, Liu ZQ, Liu L*, Zhou H*. Simultaneous quantification of nine aconitum alkaloids in aconiti lateralis radix praeparata and related products using uhplc–qqq–ms/ms. *Scientific reports*, 2017, 7 (1):13023.
 29. Dias IRDSR, Mok SW, Gordillo-Martínez F, Khan I, Hsiao WW, Law BY, Wong VK*, Liu L*. The calcium-induced regulation in the molecular and transcriptional circuitry of human inflammatory response and autoimmunity. *Frontiers in Pharmacology*, 2018, 8:962.
 30. Wu WJ, Jia WW, Liu XH, Pan LL, Zhang QY, Yang D, Shen XY, Liu L, Zhu YZ. S-propargyl-cysteine attenuates inflammatory response in rheumatoid arthritis by modulating the nrf2-are signaling pathway. *Redox biology*, 2016, 10:157-167.
 31. Wu J, Lin N, Li F, Zhang G, He S, Zhu Y, Ou R, Li N, Liu S, Feng L, Liu L, Liu Z, Lu L. Induction of p-glycoprotein expression and activity by aconitum alkaloids: Implication for clinical drug–drug interactions. *Scientific reports*, 2016, 6:25343.
 32. Wong VK, Law BY, Yao XJ, Chen X, Xu SW, Liu L*, Leung EL*. Advanced research technology for discovery of new effective compounds from chinese herbal medicine and their molecular targets. *Pharmacological research*, 2016, 111:546-555.
 33. Su X, Huang Q, Chen J, Wang M, Pan H, Wang R, Zhou H, Zhou Z, Liu J, Yang F, Li T*, Liu L*. Calycosin suppresses expression of pro-inflammatory cytokines via the activation of p62/nrf2-linked heme oxygenase 1 in rheumatoid arthritis synovial fibroblasts. *Pharmacological research*, 2016, 113:695-704.

34. Liu J, Tang J, Zuo Y, Yu Y, Luo P, Yao X, Dong Y, Wang P, Liu L*, Zhou H*. Stauroside b inhibits macrophage activation by inhibiting nf-kb and erk mapk signalling. *Pharmacological research*, 2016, 111:303-315.
35. Leung EL, Fan XX, Wong MP, Jiang ZH, Liu ZQ, Yao XJ, Lu LL, Zhou YL, Yau LF, Tin VP, Liu L*. Targeting tyrosine kinase inhibitor-resistant non-small cell lung cancer by inducing epidermal growth factor receptor degradation via methionine 790 oxidation. *Antioxidants & redox signaling*, 2016, 24 (5):263-279.
36. Huang Z, Huang Q, Ji L, Wang Y, Qi X, Liu L, Liu Z, Lu L. Epigenetic regulation of active Chinese herbal components for cancer prevention and treatment: A follow-up review [J]. *Pharmacological research*, 2016, 114:1-12.
37. Huang L, Pi J, Wu J, Zhou H, Cai J, Li T*, Liu L*. A rapid and sensitive assay based on particle analysis for cell degranulation detection in basophils and mast cells [J]. *Pharmacological research*, 2016, 111:374-383.
38. Feng S-L, Yuan Z-W, Yao X-J, Ma W-Z, Liu L, Liu Z-Q, Xie Y. Tangeretin, a citrus pentamethoxyflavone, antagonizes abcb1-mediated multidrug resistance by inhibiting its transport function [J]. *Pharmacological research*, 2016, 110:193-204.
39. Zhang X, Zhang D, Jia H, Feng Q, Wang D, Liang D, Wu X, Li J, Tang L, Li Y, Lan Z, Chen B, Li Y, Zhong H, Xie H, Jie Z, Chen W, Tang S, Xu X, Wang X, Cai X, Liu S, Xia Y, Li J, Qiao X, Al-Aama JY, Chen H, Wang L, Wu QJ, Zhang F, Zheng W, Li Y, Zhang M, Luo G, Xue W, Xiao L, Li J, Chen W, Xu X, Yin Y, Yang H, Wang J, Kristiansen K, Liu L, Li T, Huang Q, Li Y, Wang J. The oral and gut microbiomes are perturbed in rheumatoid arthritis and partly normalized after treatment [J]. *Nature medicine*, 2015, 21 (8):895.
40. Yuan ZW, Leung EL, Fan XX, Zhou H, Ma WZ, Liu L*, Xie Y*. Quantitative evaluation of berberine subcellular distribution and cellular accumulation in non-small cell lung cancer cells by uplc–ms/ms [J]. *Talanta*, 2015, 144:20-28.
41. Yang ZF, Leung EL, Liu L, Jiang ZH, Zhong N. Developing influenza treatments using traditional chinese medicine [J]. *Science*, 2015, 347 (6219):S35-S37.
42. Wu AG, Wong VK, Zeng W, Liu L*, Law BY*. Identification of novel autophagic radix polygalae fraction by cell membrane chromatography and uhplc-(q) tof-ms for degradation of neurodegenerative disease proteins [J]. *Scientific Reports*, 2015, 5:17199.
43. Lu LL, Liu XH, Leung EL, Wang Y, Shi J, Hu M, Liu L*, Liu ZQ*. The bioavailability barrier and personalized traditional chinese medicine [J]. *Science*, 2015, 350 (6262):S79-S81.
44. Fan XX, Yao XJ, Xu SW, Wong VK, He JX, Ding J, Xue WW, Mujtaba T, Michelangeli F, Huang M, Huang J, Xiao DK, Jiang ZB, Zhou YL, Kam RK, Liu L*, Leung EL*. (z) 3, 4, 5, 4'-trans-tetramethoxystilbene, a new analogue of resveratrol, inhibits gefitinb-resistant non-small cell lung cancer via selectively elevating intracellular calcium level [J]. *Scientific reports*,

2015, 5:16348.

45. Wang JR, Zhang H, Yau LF, Mi JN, Lee S, Lee KC, Hu P, Liu L*, Jiang ZH*. Improved sphingolipidomic approach based on ultra-high performance liquid chromatography and multiple mass spectrometries with application to cellular neurotoxicity [J]. Analytical chemistry, 2014, 86 (12):5688-5696.
46. Leung EL, Wong VK, Jiang ZH, Li T, Liu L*. Integrated network-based medicine: The role of traditional chinese medicine in developing a new generation of medicine [J]. Science, 2014, 346 (6216):S16-S18.
47. Law BY, Chan WK, Xu SW, Wang JR, Bai LP, Liu L*, Wong VK*. Natural small-molecule enhancers of autophagy induce autophagic cell death in apoptosis-defective cells [J]. Scientific reports, 2014, 4:5510.
48. Wong VK, Li T, Law BY, Ma ED, Yip N, Michelangeli F, Law CK, Zhang M, Lam KY, Chan PL, Liu L*. Saikosaponin-d, a novel serca inhibitor, induces autophagic cell death in apoptosis-defective cells [J]. Cell death & disease, 2013, 4 (7):e720.
49. Leung EL, Cao Z-W, Jiang Z-H, Zhou H, Liu L*. Network-based drug discovery by integrating systems biology and computational technologies [J]. Briefings in bioinformatics, 2012, 14 (4):491-505.
50. Liu L*, Leung EL, Tian X. Perspective: The clinical trial barriers [J]. Nature, 2011, 480 (7378):S100-S100.

Membership of Academic Association and Community Services

Membership in journal editorial boards:

1. Journal of Chinese Medicine (English), 2012-Present
2. Journal of Traditional and Complementary Medicine (English), 2011-Present
3. Journal of Chinese Materia Medica, 2008-Present
4. Journal of Chinese Medicine Modernization, 2008-Present
5. Journal of Chinese Herbal Medicine (English), 2008-Present
6. Chinese J. of Integrative Western and Chinese Medicine (English), 2006-Present
7. Chinese Medicine (English), 2006-Present
8. Journal of Chinese Evidence-based Medicine, 2006-Present
9. Chinese J. of Natural Products, 2003-Present
10. Chinese J. of Immunology, 2002-Present
11. Chinese J. of Chinese Materia Medica, 2002-Present
12. J. of Guangzhou University of Traditional Chinese Medicine, 1999-2001
13. J. Hubei Integrated Chinese Medicine with Western Medicine, 1999-2001

Membership and community services:

1. Project Advisor, World Health Organization (WHO), 2003 - Present
2. Member, Expert Panel for WHO ICD-TM, 2008 – Present
3. Convener, Working Group One of ISO/TC249 on Traditional Medicine, 2011- Present
4. Member, Technical Committee for ISO/TC249 on Traditional Medicine, 2010 - Present
5. Member, Science and Technology Committee of Macau Special Administrative Region, 2013.1. – Present
6. Member, Committee for the Corporations between the Mainland and Macau on Science and Technology, 2013.1 – Present
7. Member, Expert Advisory Committee for Developing Overseas Collaboration in Chinese Medicine, State Administration in Chinese Medicine, 2011 – Present
8. Member, Expert Panel on the Chinese Medicine Project under the National 973 Research Scheme, 2012 - Present
9. Member, Expert Panel for the Assessment of Chinese Medicine Research, Natural Science Foundation of China, 1998 – Present
10. Vice-Chair of the Educational Committee, Federation of World Chinese Medicine Societies, 2006 - Present
11. Vice-Chair of the Advisory Expert Committee, Federation of World Chinese Medicine Societies, 2011 - Present
12. Vice-President of the Chinese Medicine and Immunology Association, China Immunology Society, 2005 - Present
13. Founding and Executive Member of the Consortium for Globalization of Chinese Medicine, 2003 - Present
14. Executive President, The Collaborative Centre of Science and Technology on Chinese Medicine for the Mainland, Taiwan, Hong Kong and Macau, 2011.12 - Present
15. Honorary Consultant, Department of Health of Hong Kong Special Administrative Region (HKSAR), 2011.6 - Present
16. Member, Working Group on Primary Care, Health and Medical Development Advisory Committee, HKSAR, 2008.10 - Present
17. Honorary Chairman, The Hong Kong Scientist Association, HKSAR, 2009.1 - Present
18. Distinguished Guest Researcher, Chinese Medical Academy of China, 2011.11 – Present
19. Distinguished Guest Professor, Guangzhou University of Chinese Medicine, 2011.11- Present
20. Distinguished Guest Professor, Hunan University of Chinese Medicine, 2007 - Present
21. Advisor, Hong Kong Idea Centre, 2010.3 – Present
22. Permanent Member, China Immunology Society, 2002 - Present
23. Member, China Pharmacological Society, 1994 - Present
24. International Chinese Medicine Society of Macau, 2001- Present
25. Member, Association of Integrative Chinese and Western Medicine, 2004 - Present

26. Chairman, Expert Panel Meeting for 2020 Strategy of Traditional Medicine in the West Pacific Region, Western Pacific Regional Office, WHO, 2011
27. Member, Grant Review Board, Health and Health Services Research Fund (HHSRF) and Research Fund for the Control of Infectious Diseases (RFCID), HKSAR, 2011. 2 - 2013
28. Member, Committee on Review of Intellectual Property Issues, Innovation and Technology Commission (ITC), HKSAR, 2010.11 - 2012.10
29. Member, Technical Committee, Hong Kong Jockey Club Institute of Chinese Medicine Limited, HKSAR, 2009.8 - 2011.11
30. Member, Council of Chinese Medicine of Hong Kong, 2008.9 – 2011.8
31. Directors of Hong Kong Jockey Club Institute of Chinese Medicine Limited, HKSAR, 2009.8-2011.11
32. Standing Member, Standing Committee of the World Federation of Chinese Medicine Societies, 2007 – 2011.10
33. Guest PhD Candidate Supervisor at Tianjin University of Traditional Chinese Medicine, 2006-2011
34. Advisor and Co-Chair, Expert Panel for Establishment of Traditional Medicine Practice Guidelines, Western Pacific Regional Office, WHO, 2006-2007
35. Proof Reading Reviewer for International Basic Terms of Traditional Medicine, Western Pacific Regional Office, WHO, 2006
36. Member, Japanese Pharmaceutical Society, 2003-2006
37. Member, Association of Registered Chinese Medicine Practitioners, HKSAR, 2011-Present
38. Temporary Advisor for Establishment of Guidelines for Academic Education Guidelines, Western Pacific Regional Office, WHO, 2003
39. Academic Advisor, Association of Registered Chinese Medicine Practitioners, 2003-Present
40. Academic Advisor, Xinhua Association for Promotion of Chinese Medicine, 2002-Present
41. Chairman, The Liaison Group for Formulation of Guidelines on the Insurance of Sick Leave Certificates by Registered Chinese Medicine Practitioners, Practitioners Board of Chinese Medicine Council of Hong Kong, HKSAR, 2002 -2003
42. Member, Expert Committee on Regulation of Health Claims, Department of Health of Hong Kong, HKSAR, 2002-2003
43. Member of the Practitioners Board of Chinese Medicine Council of Hong Kong, HKSAR, 2002-2008
44. Member of the Expert Committee on New Drug Discovery, Ministry of Science and Technology of China, 1998-2001
45. Executive Member, Standing Committee of Guangdong Association of Traditional Chinese Medicine, Guangdong Province, China, 1998-2003
46. Standing Member, Standing Committee of Guangdong Chinese Medicine Society, 1998-

2003

47. Deputy Chair, Sub-committee on Chinese Medicines, Chinese Association of Integrative Chinese and Western Medicine, 1998-2003
48. Standing Member, Guangzhou Association of Scientists and Technologists, Guangzhou, China, 1998-2001
49. Deputy-Director , Educational Program Development, Guangdong Province, China 1998-2001
50. Vice-President, Guangdong Association of Overseas Returned Scientists, Guangdong Province, China, 1998-2000
51. Standing Member, Standing Committee of the Chinese Association of Medicine-Doctorate Fellows, Beijing, China, 1997-2005

Professional Qualifications and Awards

Selected academic awards and honors:

1. First prize of the Nature and Science Category of 2014 Ministry of Education Higher Education Outstanding Scientific Research Output Awards (the sixth awardee) for Studies on the network-based modulatory mechanism of the holistic therapy of traditional Chinese medicine, the Ministry of Education of the People's of Republic China, 1 Dec. 2014, Beijing, China.
2. Third Prize of Science & Technology Progress Category of the 2016 Macau Science and Technology Award (the second awardee) for R&D and Application of the Home Indoor Air Disinfectant from Chinese Herbal Medicine, Macau SAR, Oct. 2016, Macau SAR, China.
3. First Prize of the Nature and Science Category of the 2016 Macau Science and Technology Award (the second awardee) for Discovery of New Factors of Pathogenesis and Treatment Strategy in Rheumatoid Arthritis, Macau SAR, Oct. 2016, Macau SAR, China.
4. Special prize of the 2014 Macau Science and Technology Award (the second awardee) for Innovative methods in quality control and bioactivity evaluation for research and development of anti-arthritic proprietary Chinese medicine, Macau SAR, 8 Oct. 2014, Macau SAR, China.
5. Innovation of quality control and bioactivity assessment for R&D of anti-arthritic product from Chinese medicine, 2012 National Science & Technology Progress Award (Second Class), The People's Republic of China, 2012, Beijing
6. Investigation on Pi-deficiency Pattern of TCM, 2000 National Science & Technology Progress Award (Second Class), The People's Republic of China, 2000, Beijing
7. Studies on the authentication and standardization of 83 species of Chinese materia medica, National Science & Technology Progress Award (Third Class), The People's Republic of China, 1996, Beijing

8. "National Outstanding Young Scientist Award", Personnel Ministry of China, 1998, Beijing
9. Award of "Chinese Excellent Young Scholars for 21 Century", awarded by the Ministry of Education of China, 1999, Beijing
10. Studies of Innovative Methodologies on Quality Control and Efficacy Evaluation of Anti-arthritic Chinese Herbal Medicine and R&D of the Products, Li Shi Zhen Innovative Medical Science Award, awarded by the China Association of Chinese Medicine, 2011, Beijing
11. Honorary Fellowship of the Canadian Chartered Institute of Business Administration, awarded by the Canadian Chartered Institute of Business Administration, 2009, Canada
12. Studies on the drug actions and underlying mechanisms of Tong-Bi-Ling capsules and sinomenine on treatment of rheumatoid arthritis, Provincial Science & Technology Progress Award, awarded by Guangdong Province Government, 2006, Guangzhou
13. Studies on the effective ingredients and pharmacological mechanisms of Si-Jun-Zi Decoction on Tonifying Qi and Strengthening Pi, Provincial Science & Technology Progress Award, awarded by Guangdong Province Government, 2002, Guangzhou
14. Studies of Quality Evaluation on South Medicinal Herbs, Science and Technology Progress Award in Chinese Medicine (Second Class), awarded by Administration of Traditional Chinese Medicine of Guangdong Province, 1998, Guangzhou
15. Awarded "The Leading Person in the Ninth-Fifth Development Scheme of Health in Guangdong Province" by Department of Health of Guangdong Province, 1996, Guangzhou
16. "Outstanding Young Scholar in Chinese Medicine and Integrative Medicine Award", awarded by the Administration of Traditional Chinese Medicine of Guangdong Province, 1995, Guangzhou
17. Studies of the pharmacological effects and mechanisms of Chinese medicinal herbs and their formulas on Tonifying-Qi and Strengthening-Pi , Science and Technology Progress Award in Chinese Medicine (First Class), awarded by the Administration of Traditional Chinese Medicine of Guangdong Province, 1994, Guangzhou