



Position :

, State Key
Laboratory for Quality Research in
Chinese Medicine,
, Macau Institute for
Applied Research in Medicine and
Health, Macau University of Science
and Technology

Faculty :

, Dr. Neher's
Biophysics Laboratory for Innovative
Drug Discovery
Faculty of Chinese Medicine, State Key
Laboratory of Quality Research in
Chinese Medicine (SKL)

Email Address :

lhleung@must.edu.mo

Telephone :

(853) 8897-2409

Fax No. :

(853) 2888-0091

Office :

H701

Mailing Address :

Macau University of Science and
Technology, Avenida Wai Long, Taipa,
Macau

Biosketch

Dr. Elaine Leung is an Associate Professor of the State Key Laboratory of Quality Research in Chinese Medicine, Macau University of Science and Technology (MUST) and Assistant Director of the Macau Institute For Applied Research in Medicine and Health (MIAR). Her research focuses on new drug discovery and drug mechanism investigation from Traditional Chinese Medicines (TCM). Another scope of her research is about the investigation of the potential modulatory role of TCM in cancer metabolism and redox balance in cancer and inflammation. The results of these studies have been published in Nature (Outlook), Science (Supp), Pharmacology and therapeutics, Briefings in Bioinformatics, Antioxidants and redox signaling, Scientific Reports, Leukemia, Oncogene, Molecular Cancer Research, Molecular Cancer Therapeutics, Cancer etc. She has also obtained 39 international patents. Currently, she is appointed as the Associate Editor of the "Bioactive molecules derived from medicinal plants or natural products section" of the journal Pharmacological research (IF 5.574, Q1 in pharmacology and pharmacy area). She is also the Executive Council of the Speciality Committee on Immunology of Traditional Chinese Medicine of the World Federation of Chinese Medicine Societies, Macau Society of Clinical Oncology (MSCO) and honorary advisor of Macau Life Science Institute. She has achieved multiple funding supports from the China National Science Foundation, Macau Foundation, Macao Science and Technology Development Fund and the Ministry of Science and Technology of the People's Republic of China. She is also awardee from the Macau Bank of China Research Award (2013), the Macau Science and Technology Award (Natural Science Second Prize) (2014) and the Higher Education Outstanding Scientific Research Output Awards (Science and Technology) in the category of Natural Sciences from the Ministry of Education (First Prize) (2015&2018).

Biochemistry; Modern Biotechnology; Methodology of Pharmacological Experiment; Advances in Research into Chinese Materia Medica; Clinical Pharmacology; Medical English

Academic Qualifications

2006.07

Department of Physiology, The Chinese University of Hong Kong
Department of Obstetrics & Gynecology and Cellular & Molecular Medicine,
University of Ottawa

2003.08

Department of Biochemistry, The Chinese University of Hong Kong

2001.08

Molecular Biotechnology Programme, Department of Biology and Department of
Biochemistry, The Chinese University of Hong Kong

Teaching Experiences

2019.9- Present

/Dr. Neher's Biophysics Laboratory for Innovative Drug Discovery

2015.9-Present

/State Key Laboratory of Quality Research in Chinese Medicine,
Macau Institute for Applied Research in Medicine and Health, Macau University of
Science and Technology

/Department of Internal Medicine, Taihei Hospital, Hubei

2017.10-Present

/The first Affiliated Hospital of Guangzhou medical University

2017.11-Present

/Janssen Pharmaceuticals Inc (Pharmaceutical companies of
Johnson & Johnson)

2013.7-2015.8

/Macau Institute for Applied Research in Medicine and Health,
Macau University of Science and Technology

2011.9-2013.6

/State Key Laboratory of Quality Research in Chinese Medicine,
Macau Institute for Applied Research in Medicine and Health, Macau University of
Science and Technology

2011.3-2011.8

- /Supervisor: Prof. Liu Liang (Current: Rector of Macau
University of Science and Technology)

Former Dean, Chair Professor and Director of Shum Yiu Foon Shum Bik Chuen
Memorial Centre for Cancer and Inflammation Research,
School of Chinese Medicine, Hong Kong Baptist University

2006.7-2011.3

- /Supervisor: Dr. Maria Pik Wong Department of Pathology,
Queen Mary Hospital, The University of Hong Kong

Representative Publications

Journal Articles:

1. Zhong ZH, Yi ZL, Zhao YD, Wang J, Jiang ZB, Xu C, Xie YJ, He QD, Tong ZY, Yao XJ,
, Coghi PS, Fan XX, Chen M. "Pyronaridine induces apoptosis in Non - small cell lung
cancer cells by upregulating DR5 expression and inhibiting EGFR." Chem Biol Drug Des 2021

Jul 21.

2. Jiang ZB#, Wang WJ#, Xu C#, Xie YJ#, Wang XR, Zhang YZ, Huang JM, Huang M, Xie C, Liu P, Fan XX, Ma YP, Yan PY, Liu L, Yao XJ*, Wu QB*, - *. "Luteolin and its derivative apigenin suppress the inducible PD-L1 expression to improve anti-tumor immunity in KRAS-mutant lung cancer." *Cancer Lett* 2021 Sep 01;515.
3. Huang J#, Liu D#, Wang Y#, Liu L, Li J, Yuan J, Jiang Z, Jiang Z, Hsiao WW, Liu H, Khan I, Xie Y, Wu J, Xie Y, Zhang Y, Fu Y, Liao J, Wang W, Lai H, Shi A, Cai J, Luo L, Li R, Yao X, Fan X, Wu Q, Liu Z, Yan P, Lu J, Yang M, Wang L, Cao Y*, Wei H*, *. "Ginseng polysaccharides alter the gut microbiota and kynurenine/tryptophan ratio, potentiating the antitumour effect of antiprogrammed cell death 1/programmed cell death ligand 1 (anti-PD-1/PD-L1) immunotherapy." *Gut* 2021 May 18.
4. Chen HH#, Meng WY#, Li RZ#, Wang QY, Wang YW, Pan HD, Yan PY, Wu QB, Liu L, Yao XJ*, Kang M*, *. "Potential prognostic factors in progression-free survival for patients with cervical cancer." *BMC cancer* 21.1 (2021): 1-10.
5. Jiang ZB#, Xu C#, Wang W#, Zhang YZ#, Huang JM, Xie YJ, Wang QQ, Fan XX, Yao XJ, Xie C, Wang XR, Yan PY, Ma YP*, Wu QB*, *. "Plumbagin suppresses non-small cell lung cancer progression through downregulating ARF1 and by elevating CD8+ T cells." *Pharmacological Research* 169 (2021): 105656.
6. Deng J, Han J, Chen J, Zhang Y, Huang Q, Wang Y, Qi X, Liu Z, , Wang D, Feng Q, Lu L. "Comparison of analgesic activities of aconitine in different mice pain models." *PloS one* 16.4 (2021): e0249276.
7. Wang J, Xu C, Chen Y, Shao L, Li T, Fan X, Yu L, Zhang R, Chen B, Chen H, Sui X, *, Wu Q*. " -elemene enhances the antitumor activity of erlotinib by inducing apoptosis through AMPK and MAPK pathways in TKI-resistant H1975 lung cancer cells." *Journal of Cancer* 12.8 (2021): 2285.
8. Song Q, He X, Xiong Y, Wang J, Zhang L, , Li G*. The functional landscape of Golgi membrane protein 1 (GOLM1) phosphoproteome reveal GOLM1 regulating P53 that promotes malignancy. *Cell Death Discovry*.2021 Mar 01;71(1)
9. Shen C, Weng G, Zhang X, , Yao X, Pang J, Chai X, Li D, Wang E, Cao D, Hou T. Accuracy or novelty: what can we gain from target-specific machine-learning-based scoring functions in virtual screening?. *Briefings Bioinformatics*.2021 Jan 08
10. Wu Z, Zhu M, Kang Y, , Lei T, Shen C, Jiang D, Wang Z, Cao D, Hou T. Do we need different machine learning algorithms for QSAR modeling? A comprehensive assessment of 16 machine learning algorithms on 14 QSAR data sets. *Briefings Bioinformatics*.2020 Dec 14
11. Wang Y, Tang S, Lai H, Jin R, Long X, Li N, Tang Y, Guo H, Yao X*, *. Discovery of Novel IDH1 Inhibitor Through Comparative Structure-Based Virtual Screening. *Frontiers in Pharmacology*.2020 Nov 11;11:1583.
12. Jiang JB, Huang JM, Xie YJ, Zhang YZ, Chan C, Lai HL, Wang WJ, Yao XJ, Fan XX, Wu QB, Xie C, Wang MF*, *. Evodiamine suppresses non-small cell lung cancer by elevating CD8+ T cells and downregulating the MUC1-C/PD-L1 axis. *Journal of Experimental & Clinical Cancer Research*.2020 Dec;39(1):1-6.

13. Xie Y#, Meng WY#, Li RZ#, Wang YW, Qian X, Chan C, Yu ZF, Fan XX, Pan HD, Xie C, Wu QB, Yan PY, Liu L, Tang YJ, Yao XJ*, Wang MF* and *. Early lung cancer diagnostic biomarker discovery by machine learning methods. *Translational Oncology*.2020 Nov 17;14(1):100907.
14. Zhang YZ#, Lai HL#, Chen PP#, Li D, Khan I, Hsiao WL, Fan XX, Yao XJ, Wu QB*, Wang MF* & *. Clinical significance of LSECtin and its association with PVR in non-small-cell lung cancer patients. *Annals of Translational Medicine*.2020 Nov;8(21).
15. Lai HL#, Fan XX#, Liu RZ#, Wang YW, Zhang JM, Liu L, Neher E*, Yao XJ* and *. Roles of ion fluxes, metabolism, and redox balance in cancer therapy. *Antioxidants and redox signaling*.2020 Oct 29(ja).
16. Liu Y, Wang M, Luo G, Qian X, Wu C, Zhang Y, Chen B, *, Tang Y*. Experience of N-acetylcysteine airway management in the successful treatment of one case of critical condition with COVID-19. *Medicine*.2020 Oct 16;99(42).
17. #, Lai HL#, Li RZ, Pan HD, Jiang ZB Li Y, Duan FG, Xu JH, Zhang YZ, Shi AX, Wei CL, Zhang FY, Yao XJ and Liang Liu. Roles of serum amyloid A1 protein isoforms in rheumatoid arthritis. *Engineering*.2020
18. Wu QB*, Yao XJ, Chen HW, Li T, Fan XX, Zhang GL, Yu LL, Chen M, Xu C, Zhang RN, Chen B, Sui XB*, *. Long-term aspirin use for primary cancer prevention: An updated systematic review and subgroup meta-analysis of 29 randomized clinical trials. *Journal of Cancer*.2020;11(21):6460.
19. , Pan HD, Huang YF, Fan XX, Wang WY, He F, Cai J, Zhou H, Liu L. The scientific foundation of Chinese herbal medicine against COVID-19. *Engineering*.2020 Oct;610(10)
20. *, Xu S*. Traditional Chinese Medicine in Cardiovascular Drug Discovery. *Pharmacological Research*.2020 Oct 1;160:105168.
21. Wang WJ, Mao LF, Lai HL, Wang YW, Jiang ZB, Li W, Huang JM, Xie YJ, Xu C, Liu P, Li YM, *, Yao XJ*. Dolutegravir derivative inhibits proliferation and induces apoptosis of non-small cell lung cancer cells via calcium signaling pathway. *Pharmacological Research*.2020 Nov 1;161:105129.
- 22.

Oct 1;54:1-0.

27. Luo S, Xu J, Jiang Z, Liu L, Wu Q, , Leung AP*. Artificial Intelligence-Based Collaborative Filtering Method with Ensemble Learning for Personalized Lung Cancer Medicine without Genetic Sequencing. *Pharmacological Research*.2020 Oct 1;160:105037.
28. Hu B, Ye C, , Zhu L, Hu H, Zhang Z, Zheng J, Liu H. Bletilla striata oligosaccharides improve metabolic syndrome through modulation of gut microbiota and intestinal metabolites in high fat diet-fed mice. *Pharmacological Research*.2020 Jun 3:104942.
29. Xie YJ, Gao WN, Wu QB, Yao XJ, Jiang ZB, Wang YW, Wang WJ, Li W, Hussain S, Liu L, *, Fan XX*. Chelidonine Selectively Inhibits the Growth of Gefitinib-resistant Non-small Cell Lung Cancer Cells through the EGFR-AMPK Pathway. *Pharmacological Research*.2020 May 25:104934.
30. Huang F, Li Y, , Liu X, Liu K, Wang Q, Lan Y, Li X, Yu H, Cui L, Luo H, Luo L. A review of therapeutic agents and Chinese herbal medicines against SARS-COV-2 (COVID-19). *Pharmacological Research*.2020 May 20:104929.
31. Zheng Y, Xiong C, Liu Y, Qian X, Tang Y, Liu L, , Wang M. Epidemiological and Clinical Characteristics Analysis of COVID-19 in the Surrounding Areas of Wuhan, Hubei Province in 2020. *Pharmacological Research*.2020 Apr 30:104821.
32. Song Q, Zhang J, Wu Q, Li G*, . Kanglaite injection plus Fluorouracil-based chemotherapy on the reduction of adverse effects and improvement of clinical effectiveness in patients with advanced malignant tumors of the digestive tract: A meta-analysis of 20 RCTs following the PRISMA guidelines. *medicine*.2020 Apr 1;99(17):e19480.
33. You H, Zhang YZ, Lai HL, Li D, Liu YQ, Li RZ, Khan I, Hsiao WW, Duan FG, Fan XX, Yao XJ, Cao YB, Wu QB*, , Wang MF*. Prognostic significance of tumor poliovirus receptor and CTLA4 expression in patients with surgically resected non-small-cell lung cancer. *Journal of Cancer Research and Clinical Oncology*.2020 Apr 4:1-0.
34. Yan LE, Zhang HY, Wada M, Fang L, Feng J, Zhang WL, Chen Q, Cao YZ, Pinz KG, Chen KH, Petrov JC, Chen X, , Fan XX, Senzel L, Jiang X, Ma YP. Targeting two antigens associated with B-all with CD19-CD123 compound CART cell therapy. *Stem Cell Reviews and Reports*.2020 Jan 22:1-2.
35. * & Wu QB*. Association of Dietary Fiber and Yogurt Consumption With Lung Cancer Risk. *JAMA Oncology*.2020 May 1;6(5):788-.
36. Xu C, Yao XJ, Li T, Wang J, Sue XB, * and Wu QB*. Pretreatment neutrophil-to-lymphocyte ratio is a predictive biomarker for EGFR TKI-treated patients with advanced EGFR-mutant Non-small cell lung cancer. *Translational Cancer Research*.2020 Apr 1;9(4):2875-83.
37. Fan XX, Xu MZ, , Cai J, Yuan Z & Liu L. ROS-Responsive Berberine Polymeric Micelles Effectively Suppressed the Inflammation of Rheumatoid Arthritis by Targeting Mitochondria. *Nano-Micro Letters*.2020 Mar;12(1):1-4.
38. Mok SW, Wong VK, Lo HH, de Seabra Rodrigues Dias IR, , Law BY, Liu L. Natural products-based polypharmacological modulation of the peripheral immune system for the treatment of neuropsychiatric disorders. *Pharmacology & Therapeutics*.2020 Apr 1;208:107480.

39. Liu Y, Chen X, Choi YJ, Yang N, Song Z, Snedecor ER, Liang W, , Zhang L, Qin C, Chen J. GORAB promotes embryonic lung maturation through antagonizing AKT phosphorylation, versican expression and mesenchymal cell migration. *FASEB Journal*.2020 Apr;34(4):4918-33.
40. Chen H, Yao X, Li T, Lam CW, Zhang R, Zhang H, Wang J, Zhang W, *, Wu Q*. Compound Kushen injection combined with platinumbased chemotherapy for stage III/IV non-small cell lung cancer: A meta-analysis of 37 RCTs following the PRISMA guidelines. *Journal of Cancer*.2020;11(7):1883.
41. * & Wu QB*. Commentary on Ge et al. “Insomnia and risk of mortality form all-cause, cardiovascular disease, and cancer: Systematic review and meta-analysis of prospective cohort studies. *Sleep Medicine Reviews*.2020 Jan 8;50:101257.
42. Li JX, Huang JM, Jiang ZB, Li RZ, Sun A, * & Yan PY*. Current clinical progress of PD-1/PD-L1 immunotherapy and potential combination treatment in non-small cell lung cancer. *INTEGRATIVE CANCER THERAPIES*.2019 Dec;18:1534735419890020.
43. Ren T#, Fan XX#, Wang MF#, Duan FG, Wei CL, Li RZ, Jiang ZB, Wang YW, Yao XJ, Chen MW, Tang YJ*, *. miR 20b promotes growth of non small cell lung cancer through a positive feedback loop of the Wnt/ catenin signaling pathway. *International Journal of Oncology*.2020 Feb 1;56(2):470-9.
44. Chen H#, Yao X#, Li T, Lam CW, Zhang H, Wang J, Zhang W, *, Wu Q*. Compound Kushen injection plus platinum-based chemotherapy for stage IIIB/IV non-small cell lung cancer: A protocol for meta-analysis of randomized clinical trials following the PRISMA guidelines. *Medicine (Baltimore)*.2019 Dec;98(52).
45. * & Wu QB*.

efficacy of Chinese medicine Bushen Capsule on cognition and brain activity in patients with amnestic mild cognitive impairment. *Pharmacological Research*.2019 Aug 1;146:104319.

52. Zhang Y#, Han CY#, Duan FG, Fan XX, Yao XJ, Parks RJ, Tang YJ, Wang MF, Liu L, Tsang BK*,
*. p53 sensitizes chemoresistant non-

64. Wang YW, Lai HL, Fan XX, Luo LX, Duan FG, Jiang ZB, Wang QQ, ¹, Liu L*, Yao XJ*. Gossypol inhibits non-small cell lung cancer cells proliferation by targeting EGFR L858R/T790M. *Frontiers in Pharmacology*.2018 Jul 9;9:728.
65. Li RZ, Fan XX, Shi DF, Zhu GY, Wang YW, Luo LX, Pan HD, Yao XJ*, ¹ & Liu L*. Identification of a new Pyruvate kinase M2 isoform (PKM2) activator for the treatment of non-small cell lung cancer (NSCLC). *Chemical Biology & Drug Design*.2018 Nov;92(5):1851-8.
66. Li RZ#, Fan XX#, Duan FG, Jiang ZB, Pan HD, Luo LX, Zhou YL, Li Y, Yao YJ, ¹ & Liu L*. Proscillaridin A induces apoptosis and suppresses non-small cell lung cancer tumor growth via calcium-induced DR4 up-regulation. *Cell Death & Disease*.2018 Jun 13;9(6):1-4.
67. Wei C, Yang L, Cheng J, Imani S, Fu S, Lv H, Li Y, Chen R, ¹, Fu J*. A novel homozygous variant of GPR98 causes usher syndrome type IIC in a consanguineous Chinese family by next generation sequencing. *BMC Medical Genetics*.2018 Dec;19(1):1-8.
68. Liu XY, Yang KY, Wang MQ, Kwok JS, Zeng X, Yang Z, Xiao XJ, Lau CP, Li Y, Huang ZM, Ba JG, Yim AK, Ouyang CY, Ngai SM, Chan TF, ¹, Liu L, Liu ZG, Tsui SKW. High-quality assembly of *Dermatophagoides pteronyssinus* genome and transcriptome reveals a wide range of novel allergens. *Journal of Allergy and Clinical Immunology*.2018 Jun 1;141(6):2268-71.
69. Dai X, Li RZ, Jiang ZB, Wei CL, Luo LX, Yao XJ*, Li GP* & ¹. Honokiol inhibits proliferation, invasion and induces apoptosis through targeting Lyn kinase in human lung adenocarcinoma cells. *Frontiers in Pharmacology*.2018 May 28;9:558.
70. Wang QQ#, Xu JH#, Li Y, Huang JM, Jiang ZB, Wang YW, Liu L*, ¹ * and Yao XJ*. Identification of a novel protein arginine methyltransferase 5 inhibitor in non-small cell lung cancer by structure-based virtual screening. *Frontiers in Pharmacology*.2018 Mar 1;9:173.
71. Petrov JC, Wada M, Pinz KG, Yan LE, Chen KH, Shuai X, Liu H, Chen X, ¹, Salman H, Hagag N, Liu F, Jiang X, Ma Y. Compound CAR T-cells as a double-pronged approach for treating acute myeloid leukemia. *Leukemia*.2018 Jun;32(6):1317-26.
72. ¹ #, Luo LX#, Liu ZQ, Wong VKW, 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. *Cell Death & Disease*.2018 Feb 13;9(2):1-5.
73. Fan XX#, ¹ #, Xie Y, Liu ZQ, Zheng YF, Yao XJ, Lu LL, Wu JL, He JX, Yuan ZW, Fu JJ, 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. *Antioxidants & Redox Signaling*.2018 Feb 10;28(5):339-57.
74. Dai X, Li GP, Yang XQ, Wang XY, Wu J, ¹ *. Effects of Lyn kinase on EGFR signaling pathway in lung adenocarcinoma/Lyn. *China Oncology*.2018 Feb 7;28(1):43-9.
75. Su X, Li T, Liu Z, Huang Q, Liao K, Ren R, Lu L, Qi X, Wang M, Chen J, Zhou H, ¹, Pan HD, Liu J, Wang H, Huang L, Liu L. Licochalcone A activates Keap1-Nrf2 signaling to suppress arthritis via phosphorylation of p62 at serine 349. *Free Radical Biology & Medicine*.2018 Feb 1;115:471-83.
76. Lv S, Ji L, Chen B, Liu S, Lei C, Liu X, Qi X, Wang Y, ¹, Wang H, Zhang L, Yu X, Liu Z, Wei Q, Lu L. Histone methyltransferase KMT2D sustains prostate carcinogenesis and metastasis via epigenetically activating LIFR and KLF4. *Oncogene*.2018

Mar;37(10):1354-68.

77. Pinz K, Yakaboski E, Jares A, Liu H, Firor A, Chen K, Wada M, Salman H, Tse W, Hagag N, Lan FS, , Jiang S, Ma YP. Targeting T-cell malignancies using anti-CD4 CAR NK-92 cells. *Oncotarget*.2017 Dec 22;8(68):112783.
78. Li Y#, , Pan HD, Yao XJ, Huang QC, Wu M, Xu T, Wang YW, Cai J, Li RZ, W Liu, Liu L*. Identification of potential genetic causal variants for rheumatoid arthritis by whole-exome sequencing. *Oncotarget*.2017 Dec 19;8(67):111119.
79. Xie C#, Li Y#, Li LL, Fan XX, Wang YW, Wei CL, Liu L*, *, Yao XJ*. Identification of a New Potent Inhibitor Targeting KRAS in Non-small Cell Lung Cancer Cells. *Frontiers in Pharmacology*.2017 Nov 14;8:823.
80. Zhou H, Liu JX, Luo JF, Cheng CS, , 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. *Biochemical Pharmacology*.2017 Oct 15;142:133-44.
81. Chen X, Xie C, Fan XX, Jiang ZB, Wong VKB, Xu JH, Yao XJ*, Liu L*, *. Novel direct AMPK activator suppresses non-small cell lung cancer through inhibition of lipid metabolism. *Oncotarget*.2017 Nov 10;8(56):96089.
82. Chen KH, Wada M, Pinz KG, Liu H, Shuai X, Chen X, Yan LE, Petrov JC, Salman H, Senzel L, , Jiang X and Ma YP. A compound chimeric antigen receptor strategy for targeting multiple myeloma. *Leukemia*.2018 Feb;32(2):402-12.
83. Wang QQ, Li Y, Xu JH, Wang YW, *, 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 Aug 18;7(1):1-1.
84. Zhao L, , Wang J, Li H, Che J, Liu L, Yao X*, Cao B*. Association between Charlson comorbidity index score and outcome in patients with stage IIIB-IV non-small cell lung cancer. *BMC pulmonary medicine*.2017 Dec 1;17(1):112.
85. Luo LX, Li Y, Niu YZ, Fan XX, Xu JH, Liu L*, *, Yao XJ*. Identification of a potent kinase inhibitor targeting EML4-ALK fusion protein in non-small cell lung cancer. *MedChemComm*.2017;8(10):1914-8.
86. Wong VKW, Zeng W, Chen J, Yao XJ, , Wang QQ, Chiu P, Ko BCB, Law BYK. Tetrandrine, an Activator of Autophagy, Induces Autophagic Cell Death via PKC- Inhibition and mTOR-Dependent Mechanisms. *Frontiers in Pharmacology*.2017 Jun 8;8:351.
87. Li XG, Tang S, Wang QQ, , Jin HY, Huang YZ, Liu J, Geng MY, Huang M, Yuan ST, Yao XJ, Ding J. Identification of Epigallocatechin-3- Gallate as an Inhibitor of Phosphoglycerate Mutase 1. *Frontiers in Pharmacology*.2017 May 30;8:325.
88. Luo LX, Li Y, Liu ZQ, Fan XX, Duan FG, Li RZ, Yao XJ*, *, Liu L*. Honokiol Induces Apoptosis, G1 Arrest, and Autophagy in KRAS Mutant Lung Cancer Cells. *Frontiers in Pharmacology*.2017 Apr 11;8:199.
89. Yang N, , Liu CB, Li L, Eguether T, Yao XJ, Jones E, Norris D, Liu A, Clark R, Roop DR, Pazour GJ, Shroyer KR, Chen J. INTU is essential for oncogenic Hh signaling through regulating primary cilia formation in basal cell carcinoma. *Oncogene*.2017 Aug;36(35):4997-5005.
90. Zong XX, Yan G Y, Wu JL, , Zhou H, Li N, Liu L. New C 19 -diterpenoid alkaloids

from the parent roots of *Aconitum carmichaelii*. *Tetrahedron letters*. 2017 Apr 19;58(16):1622-6.

91. Luo LX, Fan XX, Li Y, Peng X, Ji YC, Hsiao WW, Liu L*, *, XJ* Yao. Identification

105. Zhang YZ#, Chen X#, Fan XX, He JX, Huang J, Xiao DK, Zhou YL, Zheng SY, Xu JH, Yao XJ, Liu L*, *. Compound Library Screening Identified Cardiac Glycoside Digitoxin as an Effective Growth Inhibitor of Gefitinib-Resistant Non-Small Cell Lung Cancer via Downregulation of alpha-Tubulin and Inhibition of Microtubule Formation. *Molecules*.2016 Mar;21(3):374.
106. , Fan XX, Wong MP, Jiang ZH, Liu ZQ, Yao XJ, Lu LL, Zhou YL, Yau LF, Tin PC, 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 Feb 10;24(5):263-79.
107. Wong VK, Dong H, Liang X, Bai LP, Jiang ZH, Guo Y, Kong AN, Wang R, Kam RK, Law BY, Hsiao WW, Chan KM, Wang J, Chan RW, Guo J, Zhang W, Yen FG, Zhou H, , Yu Z, Liu L. Rh2E2, a novel metabolic suppressor, specifically inhibits energy-based metabolism of tumor cells. *Oncotarget*.2016 Mar 1;7(9):9907.
108. Lu LL, Liu XH, , Wang Y, Shi J, Hu M, Liu L, Liu ZQ. The bioavailability barrier and personalized traditional Chinese medicine. *Science*.2015;350(6262):S79-81.
109. 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*, *. (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. *Scientific reports*.2015 Nov 6;5:16348.
110. Yuan ZW, , Fan XX, 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. *Talanta*.2015 Nov 1;144:20-8.
111. Li T, Wong VK, Jiang ZH, Jiang SP, Liu Y, Wang TY, Yao XJ, Su XH, Yan FG, Liu J, , Yi XQ, Wong YF, Zhou H, Liu L. Mutation of cysteine 46 in IKK-beta increases inflammatory responses. *Oncotarget*.2015 Oct 13;6(31):31805.
112. Gu WY, Li N, , Zhou H, Yao XJ, Liu L, Wu JL. Rapid identification of new minor chemical constituents from *Smilacis Glabrae Rhizoma* by combined use of UHPLC-Q-TOF-MS, preparative HPLC and UHPLC-SPE-NMR-MS techniques. *Phytochemical analysis*.2015 Nov;26(6):428-35.
113. Liu L, Liu L, , Cooney AJ, Chen C, Rosengart TK, Ma YP, Yang JC. Knockdown of SALL4 Protein Enhances All-trans Retinoic Acid-induced Cellular Differentiation in Acute Myeloid Leukemia Cells. *Journal of biological chemistry*.2015 Apr 24;290(17):10599-609.
114. Wang R, Zhang CY, Bai LP, Pan HD, Shu LM, Kong AN, , Liu L, Li T. Flavonoids derived from liquorice suppress murine macrophage activation by up-regulating heme oxygenase-1 independent of Nrf2 activation. *International immunopharmacology*.2015 Oct 1;28(2):917-24.
115. Gu WY, Li N*, , Zhou H, Luo GA, L Liu, Wu JL*. Metabolites software-assisted flavonoid hunting in plants using ultra-high performance liquid chromatography-quadrupole-time of flight mass spectrometry. *Molecules*.2015 Mar;20(3):3955-71.
116. Yang ZF#, #, Liu L, ZH Jiang, Zhong NS*. Developing influenza treatments using traditional Chinese medicine. *Science*.2015;347(6219):S35-7.
117. , Wong VK, Jiang ZH, T Li, Liu L*. Integrated network-based medicine: The role of

- traditional Chinese medicine in developing a new generation of medicine. *Science*.2014;346(6216):S16-8.
- 118.Fan XX, Li N, Wu JL, Zhou YL, He JX, Liu L, *. Celastrol induces apoptosis in gefitinib-resistant non-small cell lung cancer cells via caspases-dependent pathways and Hsp90 client protein degradation. *Molecules*.2014 Mar;19(3):3508-22.
 - 119.Wu JL, , Zhou H, L Liu, Li N. Metabolite analysis of toosendanin by an ultra-high performance liquid chromatography-quadrupole-time of flight mass spectrometry technique. *Molecules*.2013 Oct;18(10):12144-53.
 - 120.Wang TY, Zhou H, Wong YF, Wu PK, Hsiao WL, *, Liu L*. The Predicted Proteomic Network Associated with the Antiarthritic Action of Qingfu Guanjiesshu in Collagen-II-Induced Arthritis in Rats. *Evidence-Based Complementary and Alternative Medicine*.2013 Jan 1;2013.
 121. , Cao ZW, Jiang ZH, Zhou H, Liu L. Network-based drug discovery by integrating systems biology and computational technologies. *Briefings in bioinformatics*.2013 Jul 1;14(4):491-505.
 - 122.Liu L, , Tian X. PERSPECTIVE The clinical trial barriers. *Nature*.2011 Dec;480(7378):S100-.
 - 123.Wong DW, , Wong SK, Tin VP, Sihoe AD, Cheng LC, Au JS, Chung LP, Wong MP. A novel KIF5B-ALK variant in nonsmall cell lung cancer. *Cancer*.2011 Jun 15;117(12):2709-18.
 124. , Fiscus RR, Tung JW, Tin VP, Cheng LC, Sihoe AD, Fink LM, Ma Y, Wong MP. Non-small cell lung cancer cells expressing CD44 are enriched for stem cell-like properties. *PloS one*.2010 Nov 19;5(11):e14062.
 125. , Wong JC, Johlfs MG, Tsang BK, Fiscus RR. Protein kinase G type Ialpha activity in human ovarian cancer cells significantly contributes to enhanced Src activation and DNA synthesis/cell proliferation. *Molecular Cancer Research*.2010 Apr 1;8(4):578-91.
 - 126.Gai H, , Costantino PD, Aguila JR, Nguyen DM, Fink LM, Ward DC, Ma Y. Generation and characterization of functional cardiomyocytes using induced pluripotent stem cells derived from human fibroblasts. *Cell biology international*.2009 Nov 1;33(11):1184-93.
 - 127.Tam IY#, #, Tin VP, Chua DT, Sihoe AD, Cheng LC, Chung LP, Wong MP. Double EGFR mutants containing rare EGFR mutant types show reduced in vitro response to gefitinib compared yoR6mpMn r t v ng L c nd Ms t# nd

Book Chapters:

1. Ahmed Y. Ali, Lee Farrand, Ji Young Kim, Sanguine Byun, Elaine Lai-Han Leung, Hyong Joo Lee and Benjamin K. Tsang. Chapter for “New Perspectives in Chemoresistant Ovarian Cancer”, Ovarian Toxicology. 2012 (Accepted)
2. Ronald R. Fiscus, Elaine L. Leung, Janica C. Wong and Mary G. Johlfs. Chapter for “ Ovarian Cancer/Book 1 ”, ed. Samir Farghaly, INTECH Open Access Publisher, Rijeka, Croatia, Accepted – August 16, 2011, Scheduled Publication – October 2011. Nitric oxide/protein kinase G-Ia promotes c-Src activation, proliferation and chemoresistance in ovarian cancer

Patents:

1. A novel treatment of Gefitinib-resistant non-small-cell lung cancer using sanguinarine. , Fan XX, Liu L. (US patent provisional filed; Australia patent awarded for 8 years-2014100435)
2. The new application of an alkaloid derived from a Chinese herbal for treatment of cancer by inhibiting cholesterol synthesis and fatty acid oxidation. , Fan XX, Liu L, Wu JL. (US patent provisional filed; Australia patent awarded for 8 years-2014100831)
3. Methods for Novel Drug Discovery, Treatment and Selective Targeting for Gefitinib-Resistant Non-Small-Cell Lung Cancer Harboring T790M Mutation. , Liu L and Fan XX (US patent awarded-US 9439898 B2; Australia patent awarded for 8 years-2014100614)
4. The application of (Z) 3,4,5,4'-tetramethoxystilbene (TMS) in Gefitinib-resistant non-small-cell lung cancer cells. , Fan XX, Liu L and Jiang ZB (US patent-awarded-9597299; Australia patent awarded for 8 years-2015100187)
5. Oncogene ROS1 kinase inhibitor. Yao XJ, , Luo LX, Zhou YL and Liu L. (US patent awarded-9526722B1; Australia patent awarded for 8 years-2015100840)
6. Identification of new AMPK activator for treatment of lung cancer. , Yao XJ, Wong VKW, Liu L and Chen X (US patent awarded-US 9364469 B1; Australia patent awarded for 8 years-2015101612)
7. Identification of New Chemical Structure as AMPK Activator for Treatment at EGFR^{L858R/T790M} Double Mutation Non-Small Cell Lung Cancer. (Method to treat lung cancer) Liu L, , Yao XJ, Wong VKW and Chen Ci (US patent awarded- Patent No. 9,855,250 B1)
8. Identification of new role of mitoxantrone as a direct ROS1 oncogenic kinase inhibitor. Yao XJ, , Luo LX, Hsiao WL and Liu L (US patent awarded for 8 years-US 9522125 B1; Australia patent awarded for 8 years- 2015101712)
9. C498-0065, a novel ROS1 inhibitor, demonstrates potent inhibition activity against ROS1 fusion oncoprotein. Yao XJ, , Luo LX and Liu L (US patent awarded-9782400B2; Australia patent awarded for 8 years- 2015101598)
10. PDE inhibitor for the treatment of cancer. Yao XJ, , Luo LX and Liu L (US patent awarded US 2017/0135979A1; Australia patent awarded for 8 year-2015101666)
11. ALK kinase inhibitor and its use. Yao XJ, , Luo LX and Liang L (US patent filed; Australia patent awarded for 8 year- 2016101467)
12. Hydroxynaphthoquinone compounds (shikonin) for treating of non-small cell lung cancer. Liu L, , Li X, Fan XX (US patent awarded 15/186,795; Australia patent awarded for 8 year-2016100891)
13. Methods for treating lung cancer (PKM2 activator). Liu L, **Leung EL**, Yao XJ and Li RZ (US patent awarded-9744145, Australia patent awarded for 8 year- 2017100105)
14. Methods of identifying a gene associated with a disease or pathological condition of the disease. Liu L, , Yao XJ, Li Y and Pan HD.(US Patent No. 15/647,414 filed on 12 July 2017; Australia patent awarded for 8 year-2017100960)
15. Bufadienolide for treatment of non-small cell lung cancer. Liu L, , Yao XJ, Li RZ and Fan XX. (US patent field, Australia awarded for 8 years-2017100644)

16. Method for treating cancer (BPTF small molecule). , Xiao XJ, Liu L, Xu JH, Li Y and Wang QQ (US patent filed, Australia patent awarded for 8 years-2018100077)
17. Method of treating cancer (PRMT5). Yao XJ, , Liu L, Wang QQ, Xu JH & Li Y. (US patent filed, Australia patent awarded for 8 years-2018100078)
18. Method of treating cancer (KRAS SOS inhibitor 1). Yao XJ, , Liu L, Fan XX, Xie C. (US patent awarded 15/84046).
19. Method of treating lung cancer (KRAS SOS inhibitor 2). Yao XJ, , Liu L, Fan XX, Xie C. (US patent awarded 15/84047)
20. Combinational treatment of Ras-positive diseases with PDE delta inhibitor and direct autophagy inhibitor. Liang Liu, Ward DC, , Yao XJ, Wong VKW, Luo LX. (US patent awarded US9861623B1)

Research Grants/Projects

2020-2023	Dr. Neher's Biophysics Laboratory for Innovative Drug Discovery
2019-2022	Modulation of gut microbiota to enhance efficacy of anti-PD1 immunotherapy in non-small cell lung cancer
2018	Targeting T cell metabolic checkpoint to restore anti-cancer activity using Chinese herbal medicine
2016-2019	Role and therapeutic intervention of reactive oxygen species and redox balance in regulation of non-small cell lung cancer
2015-2016	Next Seq TM 500 Next generation DNA sequencer
2015-2016	Next Seq TM 500 Next generation DNA sequencer work station
2014-2015	Identification of novel metabolic biomarkers associated with lung adenocarcinoma target-based therapy resistance for network-based drug discovery with Chinese herbal medicine
2013-2015	Investigation on the novel candidate anti-cancer drug from Chinese herbal medicine by modulating metabolic profiles of cancer cells

Academic and Professional Membership

- Macau Life Science Institute / Honorary Advisor
- The Speciality Committee on Immunology of Traditional Chinese Medicine of the World Federation of Chinese Medicine Societies / Executive Council

Professional Qualifications and Awards

2018	Science and Technology Award of Higher Education of China (First Class), Ministry of Education, China
2018	Zhong Zhu Medicine & Life Science Excellent Teacher Award (Research Award-Special Class)
2017	Zhong Zhu Medicine & Life Science Excellent Teacher Award (Research Award-Special Class)
2015	Science and Technology Award of Higher Education of China (First Class), Ministry of Education, China 2014
2014	Macau Science and Technology Award (Natural Science Second Prize 2014)

