



## 罗培

职称：教授

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罗培博士于 2003 年和 2008 年分别获得四川大学华西药学院药学学士和药理学博士学位，其后在香港浸会大学中医药学院从事博士后研究（2008 年 12 月至 2011 年 8 月）。2011 年 9 月，她加入澳门科技大学中药质量研究国家重点实验室和澳门药物及健康应用研究院担任助理教授。2017 年 7 月晋升为副教授，2024 年 7 月晋升为教授。

罗培博士在心血管药理学和中药新产品开发方面经验丰富。她最近的研究重点是缺血性心脏病，线粒体动力学与缺血再灌注损伤的串扰、线粒体裂变调控的心脏保护作用、人参，黄芪，黄精等中药材来源活性成分对线粒体的新机制、化合物靶向线粒体融合/分裂的发现。迄今为止，她已获得多项澳门特别行政区科学技术发展基金（FDCT）和澳门特别行政区澳门基金会的研究资助，包括 1 项 FDCT-国家自然科学基金联合资助项目和 1 项 FDCT-广东省科技厅联合资助项目。她在 SCI/SCIE 期刊上发表了 100 多篇同行评审论文，包括 Journal of Controlled Release、Mitochondrion、Carbohydrate Polymers、Pharmacological Research、Journal of Pharmacology and Experimental Therapeutics、Journal of Ethnopharmacology、Phytomedicine。在中文核心期刊发表同行评议论文 20 篇，发表会议摘要或海报 50 余篇。罗博士因开发用于线粒体动力学的活细胞图像方法、鉴定具有抗缺血作用的新型人参皂苷而获得 5 项国际专利（美国和澳大利亚），以及 5 项中国专利用于治疗缺血性心脏病的新药的发现。

## 学历

2003- 2008 四川大学华西药学院 ，药理学博士，四川省成都市，中国

1999 - 2003 四川大学华西药学院 ，药学学士，四川省成都市，中国

## 教学经验

2024,7 – present 澳门科技大学中药质量研究国家重点实验室，教授

2017,7 - 2024.6 澳门科技大学中药质量研究国家重点实验室，副教授

2011,9 - 2017.6 澳门科技大学中药质量研究国家重点实验室，助理教授

2008,11 - 2011,8 香港浸会大学中医药学院 博士后研究员

## 教学和研究领域

主讲科目：药理与毒理学、临床药理学、药理实验方法学

研究领域：心血管药理学与线粒体动力学、中药药理学

## Recent 5 years Publications [\* , corresponding author(s); †, contribution

equally/sharing first authorship]

- 1) Xiao-Yi Chen, Tian-Tian Wang, Qing Shen, Hao Ma, Zhan-Hua Li, Xi-Na Yu, Xiao-Feng Huang, Lin-Sen Qing\*, **Pei Luo\***. Preclinical Investigations on Anti-fibrotic Potential of Long-Term Oral Therapy of Sodium Astragalosidate in Animal Models of Cardiac and Renal Fibrosis. *ACS Pharmacology & Translational Science*, 2024 7 (2), 421-431.
- 2) Xina Yu, Qingquan Kong, Ye Wu, Weilong Li, Dorje Rinchen, Zhifeng Zhang, Qing Shen\*, **Pei Luo\***. Impact of extraction method on the lipids of Himalayan marmot oil with ultrahigh-performance liquid chromatography Q-Exactive Orbitrap mass spectrometry analysis. *Rapid Communications in Mass Spectrometry*, May 2024.
- 3) Hao Ma, Lili He\*, Yi Yang, Tiantian Wang, Jiayao Li, Zhifeng Zhang, **Pei Luo\***. Branched fructo-oligosaccharides from Polygonatum Cyrtonema Hua as crosslinking agents for cellulose: A novel injectable and on-demand dissolution hydrogel for diabetic wound. *International Journal of Biological Macromolecules*. 254 (2024) 128028.

- 4) Xiao-Feng Huang, Ying Xue, Li Yong, Tian-Tian Wang, **Pei Luo\***, Lin-Sen Qing\*. Chemical derivatization strategies for enhancing the HPLC analytical performance of natural active triterpenoids. *Journal of Pharmaceutical Analysis*, Volume 14, Issue 3, March 2024, Pages 295-307.
- 5) Xiaoxue Li, Aiting Liu, Chen Xie, Yanlian Chen, Kuan Zeng, Changming Xie, Zhengzhipeng Zhang, **Pei Luo**, Hui Huang\*. The transcription factor GATA6 accelerates vascular smooth muscle cell senescence-related arterial calcification by counteracting the role of anti-aging factor SIRT6 and impeding DNA damage repair. *Kidney International*, 2023 Oct 30.
- 6) Pan Liang, Tao Bi, Yanan Zhou, Yining Ma, Xinyue Liu, Wei Ren, Sijin Yang\*, and **Pei Luo\***. Insights into the Mechanism of Supramolecular Self-Assembly in the Astragalus membranaceus-Angelica sinensis Codecoction. *ACS Applied Materials & Interfaces*, 2023, 15, 41, 47939-47954.
- 7) Ying Zhang, Ping Liu, Li-Jia Tang, Pei-Min Lin , Run Li , Huai-Rong Luo\*, **Pei Luo\***. Basing on the machine learning model to analyse the coronary calcification score and the coronary flow reserve score to evaluate the degree of coronary artery stenosis. *Computers in Biology and Medicine*, 2023 Sep:163:107130.
- 8) Qianlong Wang, Tiantian Wang, Chonkit Lio, Xina Yu, Xiaoyi Chen, Lancong Liu, Youjiao Wu, Hui Huang, Linsen Qing\*, **Luo P\***. Surface hydrolysis-designed AuNPs-zwitterionic-glucose as a novel tool for targeting macrophage visualization and delivery into infarcted hearts. *Journal of Controlled Release*, 2023 Apr;356:678-690.
- 9) Lin-Sen Qing\*, Tian-Tian Wang, Han-Yue Luo, Jia-Lan Du, Run-Yue Wang, **Luo P\***. Microfluidic strategies for natural products in drug discovery: Current status and future perspectives. *Trends in Analytical Chemistry*, Volume 158, January 2023, 116832.
- 10) Aiting Liu, **Luo P**, Hui Huang\*. New insight of complement system in the process of vascular calcification. *Journal of Cellular and Molecular Medicine*. 2023 Apr 1.
- 11) Zhang, M, Wang, PY, Jin, DP, Jian, SK, Wu, JH, Huang, M, Xie, HJ, Zhao, QL, Yang, HC, **Luo P**, Yuan, H\*, Xue, J\*, Shen, Q\*. Chain-locked precursor ion scanning based HPLC-MS/MS for in-depth molecular analysis of lipase-catalyzed transesterification of structured phospholipids containing  $\omega$ -3 fatty acyl chains. *Food Chemistry*, 2023 Volume 399.

- 12) Liu, LC<sup>†</sup>, Ding, WF<sup>†</sup>, \*, He, LL, Yang, Y, Guan, FY, Sun, XL, Peng, Y, Chen, X, Zhao, WH, Xiao, Y, **Luo P\***. RGD and Scutellarin Conjugate (WK001) Targeting Platelet Glycoprotein IIb/IIIa Receptor Protects from Myocardial Ischemia/ Reperfusion Injury: Synthesis, Characterization, and Bioactivity Evaluation. *Bioconjugate Chemistry*. 2023 Mar 15;34(3):477-488.
- 13) Shan-Shan Song<sup>†</sup>, Run-Yue Wang<sup>†</sup>, Zhan-Hua Li, Yi Yang, Tian-Tian Wang, Lin-Sen Qing\*, **Luo P\***. Role of simulated in vitro gastrointestinal digestion on biotransformation and bioactivity of astragalosides from Radix Astragali. *Journal of Pharmaceutical and Biomedical Analysis*. 2023 Volume 231, 5 July.
- 14) Xu, J, Tang, CK, Din, AU, Lu, Y, Ma, XY, Zhang, T, Wu, JQ, Du, ZQ, **Luo P**, Wu, JB\* Oligosaccharides of Polygonatum Cyrtonema Hua ameliorates dextran sulfate sodium-induced colitis and regulates the gut microbiota. *Biomedicine & Pharmacotherapy*, 023, Volume 161.
- 15) Ren, XC, Zhang, N, Chen, XY, Huang, H, **Luo P\***. Drp1 is essential for PINK1/Parkin signaling in H9c2 cardiomyocytes. *MedComm*, 2023 Mar 17;4(2): e231.
- 16) Cui, YW, Ge, LJ, Lu, WB, Wang, ST, Li, YY, Wang, HF, Huang, M, Xie, HJ, Liao, J, Tao, Y\*, **Luo P\***, Ding, YY\*, Shen, Q\*. Real-Time Profiling and Distinction of Lipids from Different Mammalian Milks Using Rapid Evaporative Ionization Mass Spectrometry Combined with Chemometric Analysis. *Journal of Agricultural and Food Chemistry*, 2022 Jun 29;70(25).
- 17) Wu, YJ<sup>†</sup>, Li, ZH<sup>†</sup>, Li, JY, Zhou, Y, Wang, RY, Chen, XY, Qing, LS\*, **Luo P\***. Elucidation of the binding mechanism of astragaloside IV derivative with human serum albumin and its cardiotoxicity in zebrafish embryos. *Frontiers in Pharmacology*. 2022 Sep 23; 13:987882.
- 18) Wu, YJ, He, LL, Yang, Y, Yan, ZG, Zhang, ZF, Yao, XJ, **Luo P\***. Influence of heat processing on the anti-inflammatory activity of fresh Smilax glabra based on PDE4 inhibition. *Food Chemistry-X*, 2022 Aug 10;15:100425.
- 19) Shen, Q, Wang, HX, Quan, B, Sun, XH, Wu, GH, Huang, DR, Wang, QC\*, **Luo P\***. Rapid quantification of bioactive compounds in Salvia miltiorrhiza Bunge derived decoction pieces, dripping pill, injection, and tablets by polarity-switching UPLC-MS/MS. *Frontiers in Chemistry*. 2022 Jul 15; 10:964744.

- 20) Shi, YC, Zhang, HJ, Huang, SL, Yin, L, Wang, F, **Luo P**, Huang, H\*. Epigenetic regulation in cardiovascular disease: mechanisms and advances in clinical trials. *Signal Transduction and Targeted Therapy*. 2022 Jun 25;7(1):200.
- 21) Yang, HuaYi, Liu, MenLan, **Luo P\***, Yao, XinSheng\*, Zhou, Hua\*. Network pharmacology provides a systematic approach to understanding the treatment of ischemic heart diseases with traditional Chinese medicine. *Phytomedicine*. 2022 Sep; 104:154268.
- 22) Wang, HF, Wang, PY, Shen, Q\*, Yang, HJ\*, Xie, HJ, Huang, M, Zhang, J, Zhao, QL, **Luo P**, Jin, DP, Wu, JH, Jian, SK, Chen, X\*. Insight into the effect of ultrasound treatment on the rheological properties of myofibrillar proteins based on the changes in their tertiary structure. *Food Research International*. Volume 157, July 2022, 111136.
- 23) Li, ZY, Yang, W, Yang, Y, Wu, JB, **Luo P**, Liu, Y\*. The Astragaloside IV Derivative LS-102 Ameliorates Obesity-Related Nephropathy. *Drug Design, Development and Therapy*. 2022 Mar 14; 16:647-664.
- 24) Wang QL, Liu LC, Chen X, Wang TT, Zhou H, Huang H, Qing LS\*, **Luo P\***. Noninvasive Prognosis of Postmyocardial Infarction Using Urinary miRNA Ultratrace Detection Based on Single-Target DNA-Functionalized AuNPs. *ACS Applied Materials & Interfaces*. 2022 Jan 26;14(3):3633-3642.
- 25) Wen-Xia Sun, Chuan-tao Zhang, Xi-Na Yu, Jia-bin Guo, Hao Ma, Ke Liu, **Luo P\***, Jing Ren\*. Preparation and pharmacokinetic study of diosmetin long-circulating liposomes modified with lactoferrin. *Journal of Functional Foods*. 2019 Oct 15;14(1):321.
- 26) Chen XY, Wang QL, Huang WX\*, Li LW, Liu LC, Yang Y, Wu YJ, Song SS, Ma H, Zhou H, **Luo P\***. Application of serum exosomal hypoxia-inducible factor-1 alpha (HIF-1 $\alpha$ ) as potential circulating biomarker for bacterial peritonitis. *Bioengineered*. 2022 Feb;13(2):1975-1987.
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- 28) Yu X, Wang Q, Lu W, Zhang M, Chen K, Xue J, Zhao Q, Wang P, **Luo P\***. Shen Q\*. Fast and Specific Screening of EPA/DHA-Enriched Phospholipids in Fish Oil Extracted from Different Species by HILIC-MS. *Journal of Agricultural and Food Chemistry*. 2021 Jul 21;69(28):7997-8007.

- 29) Lili He, Bingxiong Yan, Caiyun Yao, Xiaoyi Chen, Longwei Li, Youjiao Wu, Zhijun Song, Shanshan Song, Zhifeng Zhang, **Luo P\***. Oligosaccharides from Polygonatum Cyrtonema Hua: Structural characterization and treatment of LPS-induced peritonitis in mice. *Carbohydrate Polymers*. 2021 Mar 1; 255:117392.
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- 31) Xin Li<sup>†</sup>, Lancong Liu<sup>†</sup>, Yi Yang, Xuefeng Yang, Cencen Wang, Yan Li, Yanyan Ge, Yuxin Shi, Ping Lv, Hua Zhou, **Luo P\***, Shilong Huang\*. Gender-Associated Difference following COVID-19 virus infection: Implications for Thymosin alpha-1 Therapy. *International Immunopharmacology*. 2021 Jan; 90:107022.
- 32) Wei N, Zhao J, Wu G, Cao W, **Luo P**, Zhang Z, Chen G\*, Wen L\*. Rapid Screening and Identification of Antitumor Ingredients from the Mangrove Endophytic Fungus Using an Enzyme-Immobilized Magnetic Nanoparticulate System. *Molecules*. 2021 Apr 13;26(8):2255.
- 33) Gao WJ, Liu JX, Xie Y, **Luo P**, Liu ZQ, Liu L\*, Zhou H\*. Suppression of macrophage migration by down-regulating Src/FAK/P130Cas activation contributed to the anti-inflammatory activity of sinomenine. *Pharmacological Research*. 2021 May; 167:105513.
- 34) Xie, Jing, Gong, YiXinYue, Ding, LiSheng, Qing, LinSen\*, **Luo P\***. Progress in clinical and pharmacological studies of Astragali Radix and its active components against sepsis. *Chinese Traditional and Herbal Drugs*. 2021,52(8):2502-2510.
- 35) Wang TT, Lio CK, Huang H, Wang RY, Zhou H, **Luo P\***, Qing LS\*. A feasible image-based colorimetric assay using a smartphone RGB camera for point-of-care monitoring of diabetes. *Talanta*. 2020 Jan 1; 206:120211.
- 36) Youjiao Wu, Zhifeng Zhang, Tingbo Chen, Chunsong Cheng, Ziling Zhang, Hua Zhou, **Luo P\***. Comparison of two Polygonum chinense varieties used in Chinese cool tea in terms of chemical profiles and antioxidant/anti-inflammatory activities. *Food Chemistry*. 2020 Apr 25; 310:125840.
- 37) Li Chen, Xiao-Yi Chen, Qian-Long Wang, Si-Jin Yang, Hua Zhou, Li-Sheng Ding, Lin-Sen Qing\*, **Luo P\***. Astragaloside IV Derivative (LS-102) Alleviated Myocardial Ischemia

- Reperfusion Injury by Inhibiting Drp1Ser616 Phosphorylation-Mediated Mitochondrial Fission. *Frontiers in Pharmacology*. 2020 Sep 17; 11:1083.
- 38) Ji-Zhong Zhang, Xiao-Yi Che, You-Jiao Wu, Li-Min Li, Li Huang, Qiao-Zhi Yin, **Luo P\***, Yuan Liu\*. Identification of Active Compounds from Yi Nationality Herbal Formula Wosi Influencing COX-2 and VCAM-1 Signaling. *Frontiers in Pharmacology*. 2020 Nov 9; 11:568585.
- 39) Xin Li<sup>†</sup>, Yi Yang<sup>†</sup>, Lancong Liu, Xuefeng Yang, Xiaobo Zhao, Yan Li, Yanyan Ge, Yuxin Shi, Ping Lv, Jianchu Zhang, Tao Bai, Hua Zhou, **Luo P\***, Shilong Huang\*. Effect of combination antiviral therapy on hematological profiles in 151 T adults hospitalized with severe coronavirus disease 2019. *Pharmacological Research*. 2020 Oct; 160:105036.
- 40) Wang, CanJian, He, Fan, Huang, YuFeng, Cheng, ChunSong, Lao, ChiChou, Chen, DiAn, Zhang, ZhiFeng, **Luo P**, Xie, Ying\*, Zhou, Hua\*. Discovery of chemical markers for identifying species, growth mode and production area of Astragali Radix by using ultra-high-performance liquid chromatography coupled to triple quadrupole mass spectrometry. *Phytomedicine*. 2020 Feb; 67:153155.
- 41) Ma, XB, Wu, YJ, Li, Y, Huang, YF, Liu, Y, **Luo P**, Zhang, ZF\*. Rapid discrimination of *Notopterygium incisum* and *Notopterygium franchetii* based on characteristic compound profiles detected by UHPLC-QTOF-MS/MS coupled with multivariate analysis. *Phytochemical Analysis*. 2020 May;31(3):355-365.
- 42) Yi-Han Zuo, Yong-Bei Liu, Chun-Song Cheng, Yu-Pei Yang, Ying Xie, **Luo P**, Wei Wang\*, Hua Zhou\*. Isovaleroylbinankadsurin A ameliorates cardiac ischemia/reperfusion injury through activating GR dependent RISK signaling. *Pharmacological Research*. 2020 Aug; 158:104897.
- 43) Yu-Feng Huang, Fan He, Can-Jian Wang, Ying Xie, Yan-Yu Zhang, Zhen Sang, Ping Qiu, **Luo P**, Sheng-Yuan Xiao, Jing Li, Fei-Ci Wu, Liang Liu\*, Hua Zhou\*, Discovery of chemical markers for improving the quality and safety control of *Sinomenium acutum* stem by the simultaneous determination of multiple alkaloids using UHPLC-QQQ-MS/MS. *Scientific Reports*. 2020 Aug 25;10(1):14182.
- 44) Qian-Long Wang, Wei-Xue Huang, Pu-Juan Zhang, Li Chen, Chon-Kit Lio, Hua Zhou, Lin-Sen Qing\*, **Luo P\***. Colorimetric determination of the early biomarker hypoxia-inducible factor-1 alpha (HIF-1 $\alpha$ ) in circulating exosomes by using a gold seed-coated with

- aptamer-functionalized Au@Au core-shell peroxidase mimic. *Microchimica Acta*. 2019 Dec 18;187(1):61.
- 45) Chon-Kit Lio, Jin-Fang Luo, Xiu-Yu Shen, Yi Dai, Jorge Machado, Ying Xie, Yun-Da Yao, Yang Yue, Jian-Xin Liu, Xin-Sheng Yao, **Luo P\***, Hua Zhou\*. Nardosinone N suppresses LPS-induced macrophage activation by modulating the Nrf2 pathway and mPGES-1. *Biochemical Pharmacology*. 2020 Mar; 173:113639.
- 46) Meng XY, Yau LF, Huang H, Chan WH, **Luo P**, Chen L, Tong TT, Mi JN, Yang Z, Jiang ZH1, Wang JR\*. Improved approach for comprehensive profiling of gangliosides and sulfatides in rat brain tissues by using UHPLC-Q-TOF-MS. *Chemistry and Physics of Lipids*. 2019 Aug 20; 225:104813.
- 47) Yuqing Chen, Wei Sun, **Luo P**, Min Zhang\*, Yuerong Wang, Hongyang Zhang, Ping Hu\*. A new circular-shape microfluidic network for generating gradients of multiple substances-design, demonstration and application. *Sensors and Actuators, B: Chemical*. 2019, Volume 283, Pages 247-254.
- 48) Yao Y-D, Shen X-Y, Machado J, Luo J-F, Dai Y, Lio C-K, Yu Y, Xie Y, **Luo P**, Liu J-X, Yao X-S, Liu Z-Q\*, Zhou H\* Nardochinoid B Inhibited the Activation of RAW264.7 Macrophages Stimulated by Lipopolysaccharide through Activating the Nrf2/HO-1 Pathway. *Molecules*. 2019 Jul 6;24(13):2482.
- 49) Wang QL, Xie J, Liang J, Dong GT, Ding LS, **Luo P\***, Qing LS\*. Competitive Protein Binding Assay of Naproxen by Human Serum Albumin Functionalized Silicon Dioxide Nanoparticles. *Molecules*. 2019 Jul 17;24(14).
- 50) Liu Y, Wang L, Luo M, Chen N, Deng X, He J, Zhang L, **Luo P**, Wu JB. Inhibition of PAI-1 attenuates perirenal fat inflammation and the associated nephropathy in high-fat diet-induced obese mice. *American Journal of Physiology-Endocrinology and Metabolism*. 2019 Feb 1;316(2): E260-E267.
- 51) Zhou, XB<sup>†</sup>, Chen, L<sup>†</sup>, Jiang, ZH, Chen, XY, **Luo, P\***; Bai, LP\*, Synthesis of 21-Alkylidenes and 21-Alkylol Analogues of Uscharin and Their Effects on Intracellular Calcium in Cardiac Cells. *Chemistry select*. 2019, 4 (19), 5512-5517.
- 52) Su X, Wu Y, Li Y, Huang Y, Liu Y, **Luo P**, Zhang ZF\*. Effect of Different Post-Harvest Processing Methods on the Chemical Constituents of *Notopterygium franchetii* by an UHPLC-QTOF-MS-MS Metabolomics Approach. *Molecules*. 2019 Sep 2;24(17).



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- 58) Xie J, Xiong J, Ding LS, Chen L, Zhou H, Liu L, Zhang ZF, Hu XM, **Luo P\***, Qing LS\*. A efficient method to identify cardioprotective components of Astragali Radix using a combination of molecularly imprinted polymers-based knockout extract and activity evaluation. *J Chromatography A.* 2018 Sep 17.
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- 60) Luo JF, Shen XY, Lio CK, Dai Y, Cheng CS, Liu JX, Yao YD, Yu Y, Xie Y, **Luo P**, Yao XS, Liu ZQ, Zhou H\*. Activation of Nrf2/HO-1 Pathway by Nardochinoid C Inhibits Inflammation and Oxidative Stress in Lipopolysaccharide-Stimulated Macrophages. *Frontiers in Pharmacology.* 2018 Sep 4; 9:911.
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- Discovery of markers for discriminating the age of cultivated ginseng by using UHPLC-QTOF/MS coupled with OPLS-DA. *Phytomedicine*. 2018 Jun 1; 45:8-17.
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- 64) He L, Zhang Z, Liu Y, Chen D, Yuan M, Dong G, **Luo P\***, Yan Z\*. Rapid discrimination of raw and sulfur-fumigated Smilax glabra based on chemical profiles by UHPLC-QTOF-MS/MS coupled with multivariate statistical analysis. *Food Research International*. 2018, Jun;108:226-236.
- 65) Li Y, Ren X, Lio C, Sun W, Lai K, Liu Y, Zhang Z, Liang J, Zhou H, Liu L, Huang H, Ren J\*, **Luo P\***, A chlorogenic acid-phospholipid complex ameliorates post-myocardial infarction inflammatory response mediated by mitochondrial reactive oxygen species in SAMP8 mice. *Pharmacological Research*. 2018, Apr;130:110-122.

## Research Project as Principal Investigator (as PI)

- 1) *Project title:* 小分子串聯親和技術靶向獲取天然別構劑治療冠心病的研究  
At Macau University of Science and Technology. Science & Technology Development Fund of Macao SAR (澳門科學技術發展基金).  
*Project No:* 0157/2019/A3, 2020~2022.
- 2) *Project title:* 燈盞花素-RGD類肽聚合物的中試關鍵技術和藥效作用機制的研究  
“2020年廣東省科技創新戰略專項項目”(文號:粵科科公示〔2020〕5號).  
*Project No:* 0028/2019/AGJ. 2020~2021.
- 3) *Project title:* 組蛋白去乙酰化酶 Sirt6 失調導致慢性腎臟病動脈鈣化的分子機制及人參炔醇幹預的保護作用。2020年度國家自然科學基金委員會與澳門科學發展基金聯合科研資助合作研究項目(全國共11項)。  
*Project No:* 0050/2020/AFJ, 2020~2021.
- 4) *Project title:* 基於活細胞可視化技術線粒體動態變化的評價及原人參三醇型人參皂苷

治療缺血性心臟病作用機制的研究.

At Macau University of Science and Technology. Science & Technology Development Fund of Macao SAR (澳門科學技術發展基金).

*Project No:* 073/2011/A3, 2012~2015.

- 5) *Project title:* 微管馬達連接器與老化心肌缺血預適應的關係及白皮杉醇型萜類化合物的幹預作用.

At Macau University of Science and Technology. Science & Technology Development Fund of Macao SAR (澳門科學技術發展基金).

*Project No:* 052/2013/A2, 2013~2017.

- 6) *Project title:* Bruker in vivo small animal image platform (布魯克活體動物成像系統).

At Macau. University of Science and Technology. Science & Technology Development Fund of Macao SAR (澳門科學技術發展基金).

*Project No:* 053/2015/A3, 2015~2016.

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