Yue Xu, Ph.D.

Leslie Dan Faculty of Pharmacy, University of Toronto
144 College St, Toronto, Canada M5S 3M2 Email: york.xu@utoronto.ca
Google Scholar: Yue Xu GitHub: https://github.com/cpuxuyue

EDUCATION&TRAINING

PRiME-UHN Postdoc Fellow   2022-Present

University of Toronto, Leslie Dan Faculty of Pharmacy

Supervisor: Profs. Bowen Li & Co-Supervisor: Gang Zheng

Ph.D., Pharmaceutical Engineering   2017-2022

China Pharmaceutical University, College of Engineering

Supervisor: Prof. Haiyan Chen & Co-supervisor: Yueqing Gu

RESEARCH INTERESTS

Lipid Nanoparticles, Material science, Self-Driving lab, mRNA delivery

SERVICE TO JOURNAL

Frontiers Frontiers in Molecular Biosciences（Guest Associate Editor)	2024-2025
Biomaterials Translational (Youth Editorial Board）	2024-2026
Asian Journal of Pharmaceutical Sciences (Youth Editorial Board)	2023-2025

PEER REVIEWED FIRST AUTHOR ARTICLES (H-INDEX 17)

1. **Xu, Y.** [#], Gong, F.[#], Golubovic, A.[#], Strilchuk, A., Zhou. M., Chen, J., Li, B. *. Rational Design and Modular Synthesis of Biodegradable Ionizable Lipids via Passerini Reaction for mRNA delivery. ***Proc. Natl. Acad. Sci. U.S.A.**, **2025,** e2409572122. ([#]Co-first)

2. Cui, H. [#], **Xu, Y.**[#], Pang, K., Li, G., Gong, F., Wang, B. and Li, B., 2025. LUMI-lab: a Foundation Model-Driven Autonomous Platform Enabling Discovery of New Ionizable Lipid Designs for mRNA Delivery. *bioRxiv*, pp.2025-02. ([#]Co-first, Under Review in *Cell*)

3. **Xu, Y.**[#], Ma, S.[#], Cui, H.[#], Chen, J., Xu, S., Gong, F., Golubovic, A., Zhou, M., Wang, K. C., Varley, A., Lu, R. X. Z., Wang, B.*, Li, B*. AGILE Platform: A Deep Learning-Powered Approach to Accelerate LNP Development for mRNA Delivery. *Nature Communications.,* **2024**, 15, 6305. ([#]Co-first)

4. Xu, S.[#], **Xu, Y.**[#], Solek, N. C., Chen, J., Gong, F., Varley, A. J., Golubovic, A., Pan, A., Dong, S., Zheng, G., Li, B*, Tumor-Tailored Ionizable Lipid Nanoparticles Facilitate IL-12 Circular RNA Delivery for Enhanced Lung Cancer Immunotherapy, *Advanced Materials.*, **2024**, 36, 2400307. ([#]Co-first, Front Cover)

5. Chen, J.[#], **Xu, Y.**[#], Zhou, M., Xu, S., Varley, A. J., Golubovic, A., Lu, R. X. Z., Wang, K. C., Yeganeh, M., Vosoughi, D., & Li, B.*, Combinatorial Design of Ionizable Lipid Nanoparticles for Muscle-Selective mRNA Delivery with Minimized Off-Target Effects, *Proc. Natl. Acad. Sci. U.S.A.*, 120 (50) e2309472120, **2023.** ([#]Co-first)

6. **Xu, Y.**[#]; G. Alex.[#], Xu, S.; Pan, A.; Li, B*. Rational Design and Combinatorial Chemistry of Ionizable Lipids for RNA Delivery. *Journal of Materials Chemistry B* **2023,**11, 6527-6539. ([#]Co-first, Invited Review)

7. **Xu, Y.[#]**; Chen, H.[#]; Xu, S.[#]; Liu, J.; Chen, Y.; Gui, L.; Li, H.; Li, R.*; Yuan, Z.*; Li, B*. β-Lactamase-Responsive Probe for Efficient Photodynamic Therapy of Drug-Resistant Bacterial Infection. *ACS Sensors*. **2022**, *7* (5), 1361-1371. ([#]Co-first)

8. Qin, S.; **Xu, Y.**; Li, H.; Chen, H.*; Yuan, Z.*. Recent advances in in-situ oxygen-generating and oxygen-replenishing strategies for hypoxic-enhanced photodynamic therapy. *Biomaterials Science* **2022**,10, 51-84.

9. **Xu, Y.[#]**; Li, H.[#]; Xu, S.; Liu, X.; Lin, J.; Chen, H.*; Yuan, Z.*. Light-Triggered Fluorescence Self-Reporting Nitric Oxide Release from Coumarin Analogues for Accelerating Wound Healing and Synergistic Antimicrobial Applications. *Journal of Medicinal Chemistry* 2021, *65* (1), 424-435. ([#]Co-first Author)

10. **Xu, Y.[#]**; Li, H.[#]; Fan, L.; Chen, Y.; Li, L.; Zhou, X.; Li, R.; Cheng, Y.; Chen, H.*; Yuan, Z.*. Development of photosensitizer-loaded lipid droplets for photothermal therapy based on thiophene analogs. *Journal of Advanced Research* 2021, *28*, 165-174. ([#]Co-first Author)

11. Li, L.[#]; **Xu, Y.[#];** Chen, Y.; Zheng, J.; Zhang, J.; Li, R.; Wan, H.; Yin, J.*; Yuan, Z.*; Chen, H.*. A family of push-pull bio-probes for tracking lipid droplets in living cells with the detection of heterogeneity and polarity. *Anal. Chim. Acta* 2020, *1096*, 166-173. ([#]Co-first Author)

12. Zheng, J.[#]; **Xu, Y.[#];** Fan, L.; Qin, S.; Li, H.; Sang, M.; Li, R.; Chen, H.*; Yuan, Z.*; Li, B.*. A Bioresponsive Near-Infrared Fluorescent Probe for Facile and Persistent Live-Cell Tracking. *Small* 2020, 16 (33), 2002211. ([#]Co-first Author)

13. **Xu, Y.[#]**; Li, R.[#]; Zhou, X.; Li, W.; Ernest, U.; Wan, H.; Li, L.; Chen, H.*; Yuan, Z.*. A visible and near-infrared, dual-emission fluorescent probe based on thiol reactivity for selectively tracking mitochondrial glutathione in vitro. *Talanta* 2019, *205*, 120125. ([#]Co-first Author)

OTHER PARTICIPATED PEER-REVIEWED ARTICLES

14. Wang, K.C., Young, T.L., Chen, J., Tsai, S.N., **Xu, Y.**, Varley, A.J., Solek, N.C., Gong, F., Lu, R.X., Hubbard, B.P. and Li, B., 2025. A Reverse Transcription Nucleic-Acid-Based Barcoding System for In Vivo Measurement of Lipid Nanoparticle mRNA Delivery. *ACS Bio & Med Chem Au*.

15. Lin, J., Wang, S., Cao, M., Pan, Y., Dai, Z., Wang, Y., Jin, Z., **Xu, Y**., Wu, J., Liu, J. and Yuan, Z. Photoresponsive nitric oxide photocage/photodynamic integrated prodrug for advanced management of drug-resistant bacteria-infected wound therapy. *Bioorganic Chemistry* 154 (2025): 108062.

16. Li, B., Jiang, A. Y., Raji, I., Atyeo, C., Raimondo, T. M., Gordon, A. G. R., Rhym, L. H., Samad, T., MacIsaac, C., Witten, J., Mughal, H., Chicz, T. M., **Xu, Y.**, McNamara, R. P., Bhatia, S., Alter, G., Langer, R., & Anderson, D. G.. Enhancing the immunogenicity of lipid-nanoparticle mRNA vaccines by adjuvanting the ionizable lipid and the mRNA. *Nature Biomedical Engineering* 2023, 1-18.

17. Li, R., Guo, J., Duan, Y., Liu, X., Gui, L., **Xu, Y.**, Kong, X., Li, Y., Chen, H., Yuan, Z.. Monitoring inflammation-cancer progression by cell viscosity, polarity and leucine aminopeptidase using multicolor fluorescent probe. *Chemical Engineering Journal*, 2022, 435: 135043.

18. Li, R., Kassaye, H., Pan, Y., Shen, Y., Li, W., Cheng, Y., Guo, J., **Xu, Y.,** Yin, H., Yuan, Z. A visible and near-infrared dual-fluorescent probe for discrimination between Cys/Hcy and GSH and its application in bioimaging.

Biomaterials Science, 2020, 8(21), 5994-6003.

19. Li, R., Zhang, J., Guo, J., **Xu, Y.,** Duan, K., Zheng, J., Wan, H., Yuan, Z., Chen, H.. Application of Nitroimidazole–Carbobane-Modified Phenylalanine Derivatives as Dual-Target Boron Carriers in Boron Neutron Capture Therapy. *Molecular Pharmaceutics*, 2020, 17(1), 202-211.

20. Xu, Z., Zhang, M.-X., **Xu, Y.,** Liu, S. H., Zeng, L., Chen, H., Yin, J.. The visualization of lysosomal and mitochondrial glutathione via near-infrared fluorophore and in vivo imaging application. *Sensors and Actuators B: Chemical*, 2019, 290, 676-683.

21. Wang, F., Yuan, Z., McMullen, P., Li, R., Zheng, J., Xu, Y., Xu, M., He, Q., Li, B., & Chen, H.. Near-Infrared-Light-Responsive Lipid Nanoparticles as an Intelligent Drug Release System for Cancer Therapy. *Chemistry of Materials*, 2019, 31(11), 3948-3956.

22. Wei, C., Yuan, Z., Zheng, J., Kassaye, H., Gui, L., Wang, F., Wan, H., **Xu, Y.,** He, Q., Er, M., Ma, Y., & Chen, H. (2018). Methionine-Decorated Near Infrared Fluorescent Probe for Prolonged Tumor Imaging. *Molecular Pharmaceutics*, 15(8), 3167-3176.

23. Yuan, Z., Qu, S., He, Y., **Xu, Y.,** Liang, L., Zhou, X., Gui, L., Gu, Y., & Chen, H. (2018). Thermosensitive drug-loading system based on copper sulfide nanoparticles for combined photothermal therapy and chemotherapy in vivo. *Biomaterials Science*, 6(12), 3219-3230.

PRESENTATIONS AND INVITED TALKS

02/2025	"AI-Guided Self-Driving Laboratory for Accelerated Discovery of LNPs for Nucleic Acid Delivery" SCBA, Toronto, Canada.
06/2024	"Tumor-Tailored Ionizable Lipid Nanoparticles Facilitate IL-12 Circular RNA Delivery for Enhanced Lung Cancer Immunotherapy" Centre for Pharmaceutical Oncology, University of Toronto
06/2024	"AGILE Platform: A Deep Learning-Powered Approach to Accelerate LNP Development for mRNA Delivery" Online, The Division of Pharmacoengineering and Molecular Pharmaceutics (DPMP), University of North Carolina at Chapel Hill
05/2024	"AGILE Platform: A Deep Learning-Powered Approach to Accelerate LNP Development for mRNA Delivery" PRiME Symposium, University of Toronto
01/2024	"AGILE Platform: A Deep Learning-Powered Approach to Accelerate LNP Development for mRNA Delivery" PRiME Research Round, University of Toronto
12/2023	"Accelerated Discovery of Lipid Nanoparticles for mRNA Delivery using Active Machine Learning" School of Medicine, Yangzhou University, China
12/2023	"Accelerated Discovery of Lipid Nanoparticles for mRNA Delivery using Active Machine Learning" Chemistry and Biomedicine Innovation Center, Nanjing University, China
08/2023	"AGILE Platform: A Deep Learning-Powered Approach to Accelerate LNP Development for mRNA Delivery" The Data Sciences Institute (DSI), University of Toronto

PATENTS&DISCLOURES

1. Amino Acid-Derived Lipids and Uses thereof (Disclosure No. 10004603)

2. Multicomponent Ionizable Lipids, Compositions and Use thereof (Disclosure No. 10004561)

3. Biodegradable Ionizable Lipid Synthesis Method for RNA Delivery (Disclosure No. 10004495)

4. Ionizable Lipids for RNA Delivery (Disclosure No 10004378)

5. Systems And Methods For AI-Based Ionizable Lipid Development For Lipid Nanoparticle (LNP)-Based Cargo Molecule Delivery (PCT/CA2024/050644)

6. Lipid Compounds For Gene Delivery And Use Thereof (PCT/P11869)

TEACHING AND MENTORSHIP EXPERIENCE

TEACHING ASSISTANT *(Taught weekly tutorials and problem-solving sessions)*

2017-2018	Analytical Chemistry, China Pharmaceutical University
2018-2019	Application of Spectral Analysis in Chemistry, China Pharmaceutical University
2019-2022	Organic Chemistry in Medicine, China Pharmaceutical University

LAB MENTORSHIP *(Led monthly meetings; Trained in lab skills; Supervised in the design and improvement of experiments)*

2024-Pre	Breanna-Seto (MSc Student, Chemistry Department at University of Toronto)
Fall 2023	Annie Li (Undergraduate chemistry researcher at the University of Toronto)
Summer 2022	Justin Keung (PharmD student at the University of Toronto)
Summer 2022	Kidus Estifanos Biru (PhD student at University College London)

PROFESSIONAL EXPERIENCE

Post-Doctoral Fellow, University of Toronto, Leslie Dan Faculty of Pharmacy   2022-present

- Self-Driving Lab for Lipid Nanoparticle Discovery
- Ionizable Lipid Engineering platform for mRNA delivery
- Combinatorial Chemistry for ionizable lipids high throughput synthesis

PRiME-UHN Clinical Catalyst Program   2023-2024

- Tumor-Tailored Ionizable Lipid Nanoparticles for IL-12 Circular RNA Delivery

Graduate Program   2017-2022

Design, synthesis and biological evaluation of dual-targeted boron drugs for BNCT

- Development of photosensitizer-loaded lipid droplets for photothermal therapy
- Light-triggered nitric oxide release drug for synergistic antimicrobial applications

Academic Exchange Program   2019

- An academic exchange between China Pharmaceutical University, Cambridge University, Addenbrooke's Hospital

Graduate Research Innovation Program   2017

Jiangsu Graduate Research Innovation Program Project (CX10316)

- β-Lactamase-Responsive Probe for Efficient Photodynamic Therapy of Drug-Resistant Bacterial Infection

HONORS

SCBA Toronto Chapter 2024 Paper Award	2025
PRiME-UHN Clinical Catalyst Program Postdoc Fellowship	2023

Outstanding Graduate of China Pharmaceutical University	2022
The Fifth "Aotianli" Scholarship of China Pharmaceutical University	2022
China National Scholarship for Doctoral Students	2020
First-Class Professional Scholarship of China Pharmaceutical University	2019
First-Class Professional Scholarship of China Pharmaceutical University	2018
Outstanding Graduate of the College of Biological Engineering	2017