Yi Li

yili2027@u.northwestern.edu · +1 (858)-203-8016 · hejlightyear.net
Biomedical Engineering Dept., Northwestern University, Evanston · IL 60208

EDUCATION

University of California, San Diego — La Jolla, US
M.S. in Nanoengineering — Jun, 2022

- **Foci:** Molecular materials & nanomaterials
- **GPA:** 4.00/4.00
- **Thesis:** A peptide-modified Au-polydopamine nanocapsule for cell/mitochondrion membrane dual-targeting and drug delivery

China Pharmaceutical University — Jiangsu, China
B.S. in Pharmaceutical Sciences, Honors Research Program — Jun, 2020

- **Foci:** Nano-delivery, drug combinations
- **GPA:** 3.79/4.00
- **Thesis:** A drug-delivery-drug strategy for overcoming paclitaxel-induced multidrug resistance (MDR) in non-small cell lung cancer

University of Strathclyde — Glasgow, UK
Undergraduate Visiting Research Program in Biomedical Science — Jul, 2018 – Aug, 2018

- **Courses:** Computer-aided drug discovery; PK/PD modeling

RESEARCH EXPERIENCE

Advisor: Prof. Jesse Jokerst | Bioimaging Lab — La Jolla, USA
University of California, San Diego — Oct, 2021 – Jun, 2022

Targeted responsive Au-polydopamine nanocapsules for cancer therapy

- Engineered an Au-PDA core-shell system, with tunable size, *via* supramolecular template-assisted assembly.
- Characterized the nanocapsules using UV-vis spectroscopy, TEM, and SEM.
- Designed and synthesized an αvβ3-targeting peptide and assembled peptide nanocapsules *via* Michael addition.

Biodegradable calcium phosphate nanoparticles for inducing cyto-osmotic pressure changes

- Used polyethylenimine as a patterning agent for Ca/P nanoparticles, *via a* precipitation method.
- Analyzed element compositions of Ca/P nanoparticles using ICP-MS and EDX.
- Studied the nanoparticles' *in vitro* release profile *via* a dynamic flow method to reduce particle accumulation.

A peptidic sulfhydryl for interfacing nanocrystals to sense SARS-CoV-2 protease

- Assembled peptide onto AuNP *via* ligand substitution and purified conjugates *via* electrophoresis.
- Monitored concentration- and protease-responsiveness of peptide-functionalized AuNPs *via* DLS.

Advisor: Prof. Liangfang Zhang | Nanomedicine Lab — La Jolla, USA
University of California, San Diego — Jul, 2021 – Oct, 2021

THP-1 cell membrane application in bio-detoxification

- Studied cell growth curves in different culture conditions and isolated membrane to make nano-sponge coating.
- Developed a method for efficient cell harvest *via* tangental flow filtration.
- Tested the *in vitro* stability of nano-sponge and its binding affinity with cytokines *via* ELISA.

Advisor: Prof. Lifang Yin | Key Laboratory for Druggability of Biopharmaceuticals — Jiangsu, China
China Pharmaceutical University — Apr, 2017 – Jul, 2020

A drug-delivery-drug strategy for overcoming paclitaxel-induced multidrug resistance in lung cancers

- Designed a carrier-material-free co-delivery platform *via* a hybrid nanocrystal formulation to enhance apoptosis and inhibit multi drug resistance in non-small cell lung cancers.
- Fabricated nanoparticles capable of carrying cargo with variable hydrophilicity and increased the drug loading capacity by 12% compared to that of previous systems.
- Investigated nanoparticle formation mechanisms *via* PXRD, AFM, CD and fluorescence quenching.
- Constructed an *in vitro* PK/PD model to simulate drug release profiles in different organs.

- Evaluated cytotoxicity and apoptosis induction in paclitaxel-resistant A549 cells.
- Investigated potential drug synergistic mechanisms by monitoring caspases expression *via* western blot and mitochondrial ROS level *via* flow cytometry.

Rod-shaped nanoparticles enable efficient biomacromole delivery by inducing non-lysosomal endocytosis

- Engineered nanorods capable of inducing *caveolin-mediated pathway*.
- Loaded caspase-3 protein and let-7 miRNA to nanorods, and tracked their cellular distribution *via* LSCM.

Dual-targeting strategies for cancer cell and tumor microenvironment

- Synthesized a hyaluronic acid-paclitaxel prodrug for CD44-targeting and anti-biofouling applications.
- Fabricated and intravenously injected marimastat-loaded thermosensitive liposomes into a murine 4T1 subcutaneous tumor model, then induced local hyperthermia to locate TME.

Advisor: Prof. Wanliang Lu | State Key Laboratory of Natural and Bio-mimetic Drugs — Beijing, China
Peking University — Jul, 2018 – Aug, 2019

Treating triple-negative breast cancer via Slug gene silencing

- Utilized TargetScan to investigate the regulator of Slug gene that is involved in TNBC initiation.
- Edited the target gene using CRISPR-Cas9, and tested its gene expression in *E.coli.*

Treating carcinogen-induced lung cancer via inducing KRAS4A protein degradation

- Used AutoDock to design KRAS4-targeting ligand based on substrate mimicry.
- Engineered target protein and assembled to proteolysis-targeting chimeras (PROTACs).

SELECTED PUBLICATIONS

1. **Li, Y.**, Teng, C.‡, Azevedo, H. S., Yin, L., & He, W. (2021). Cocrystallization-like strategy for the code-livery of hydrophobic and hydrophilic drugs in a single carrier material-free formulation. *Chinese Chemical Letters*. 32(10), 3071–3075.
2. **Li, Y.**, & He, W. (2020). Comparative efficacy and safety of current drugs against COVID-19: a systematic review and net-work meta analysis. *MedRxiv*.
3. Jin, Z.‡, **Li, Y.‡**, Li, K.‡, Zhou, J., Yeung, J., Yim, W., He, T., Cheng, Y., Xu, M., Creyer, M. N., Chang, Y., Retout, M., Qi, B., Loh, X., O'Donoghue, A. J. & Jokerst, J. V. (2022). Peptide Amphiphile co-assembly for Nanoplasmonic Sensing. *Angewandte Chemie*.
4. Jin, Z., Ling, C., **Li, Y.**, Li, K., Zhou, J., Yim, W., Yeung, J., Chang, Y., Cheng, Y., Fajtová, P., Ling, C., O'-Donoghue, A. J. & Jokerst, J. V. (2022). Spacer Matters: All-Peptide-Based Ligand for Promoting Interfacial Proteolysis and Plasmonic Coupling. *Nano Letters*, *22*(22), 8932-8940.
5. Lyu, Y., Xiao, Q., **Li, Y**., Wu, Y., He, W., & Yin, L. (2019). "Locked" cancer cells are more sensitive to chemotherapy. *Bioengineering & translational medicine. 4*(2), e10130.
6. Xiao, Q., Li, X., **Li, Y.**, Wu, Z., Xu, C., Chen, Z., & He, W. (2020). Biological drug and drug delivery-mediated immunotherapy. *Acta Pharmaceutica Sinica B*. 11(4), 941–960.
7. Jin, Z., Yeung, J., Zhou, J., Cheng, Y., **Li, Y.**, Mantri, Y., He, T., Yim, W., Xu, Ming; Wu, Z., Fajtová, P., Creyer, M., Moore, C., Fu, L., Penny, W., O'Donoghue, A., & Jokerst, J. (2022). Peptidic sulfhydryl for interfacing nanocrystals and subsequent sensing of SARS-CoV-2 protease. *Chemistry of Materials,* Accepted article.
8. He, T., Bradley, D., Xu, M., Ko, S., Qi, B., **Li, Y.**, Cheng, Y., Jin, Z., Zhou, J., Fu, L., Wu, Z., Zhou, J., Hanna, J., Luo, J., & Jokerst, J. (2022). Biomimetic synthesis of versatile biodegradable polyethylenimine/calcium phosphate micro/nano-composites for transient photoluminescent and ultrasound imaging, under peer review.
9. Xie, L., Ruan, D., Zhang, J., **Li, Y.**, Chen, L., Yan, M., Luo, J. & Zhang, H. Z. (2021). Mutational analysis of a familial adenomatous polyposis pedigree with bile duct polyp phenotype. *Canadian Journal of Gastroenterology and Hepatology*. 2021, 1–8.
10. Li, D., Yu, Z., Wang, T., **Li, Y.**, Chen, X., & Wu, L. (2020). The role of the novel lncRNA uc002jit. 1 in NF-kB-mediated DNA damage repair in acute myeloid leukemia cells. *Experimental cell research. 391*(2), 111985.
11. Qi, B., Hariri, A., Khazeinezhad, R., Fu, L., **Li, Y.**, Jin, Z., Yim, W., He, T., Cheng, Y., Zhou, J. and Jokerst, J. V., 2022. A miniaturized ultrasound transducer for monitoring full-mouth oral health: a preliminary study. Accepted by *Dentomaxillofacial Radiology*.

Full publication list: https://scholar.google.com/citations?hl=en&user=vWavkyIAAAAJ