University of Illinois at Urbana-Champaign

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Education Experiences

- **University of Illinois at Urbana-Champaign, US** **01/2016 to present**
  Postdoctoral Research Associate, Department of Bioengineering
  Research advisor: Professor. Andrew M Smith
- **University of Illinois at Urbana-Champaign, US** **11/2013 to 12/2015**
  Postdoctoral Research Assistant, Department of Materials Science and Engineering
  Research advisor: Professor. Jianjun Cheng
- **Fudan University, China** **09/2008 to 07/2013**
  Ph. D. in Pharmaceutics at School of Pharmacy
  Dissertation title: "Brain-targeted drug delivery system based on cationic dendritic polymers"
  Thesis advisor: Professor. Chen Jiang
- **Fudan University, China** **09/2004 to 06/2008**
  B.S. at School of Pharmacy
  GPA: 3.77 (scale 4.0) Rank: 1 out of 110

Research Experiences

- **Research on quantitative single mRNA molecules analysis in prostate cancer (UIUC)**
  Quantitative single mRNA molecules detection in single prostate cells using QDs-FISH
  Quantitative disease biomarker detection in liquid or tissue biopsy from prostate cancer patients
- **Research on *in vivo* gene delivery systems based on polypeptides (UIUC)**
  Rational project design and formulation optimization based on tumor microenvironment
  Brain targeted gene delivery via intranasal delivery
  In vitro evaluation including tumor spheroid modeling, flow cytometry, confocal microscope and real-time RCR
  In vivo evaluation including coordination with animal facility, *in vivo* distribution imaging, efficacy study and systemic toxicity evaluation
- **Research on *in vivo* biomarker imaging for Alzheimer's disease early detection (UIUC)**
  Aβ specific probe and two-step click imaging system design
  Development of Aβ injected Alzheimer's disease mice model by intracranial injection
  In vivo imaging strategy demonstration
- **Research on brain/glioma targeted drug delivery systems for brain diseases (Fudan University)**
  Development of brain/glioma dual targeted gene delivery system for cancer therapy
  Development of brain targeted gene delivery system for Alzheimer's disease/Parkinson's disease
  Development of targeted nano-probe for apoptosis activation detection based on FRET
- **Research on the stem cells therapy in Parkinson's disease**
  Development of Parkinson's disease rat model

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Evaluation of Pharmacodynamics after stem cells implantation in brain by multiple strategies

Research Skills

Sophisticated experimental skills in applied biology and pharmaceutics including 9 years' experience on cell culture and animal handling:

cell culture*, in vitro* BBB modeling, *in vitro* tumor spheroids modeling, BBB transportation evaluation, drug formulation, gene transfection/knock-down, western blot, ELISA, RT-PCR, single molecule RNA-FISH, UV and fluorescence analysis, flow cytometry, confocal microscope, MTT assay, animal modeling (xenografts/in situ tumor model, Parkinson's disease model and transgenic Alzheimer's disease model), in vivo distribution imaging, pharmacokinetic evaluation, i.v./i.p./intranasal/intracranial administration, frozen sections, immunohistochemistry sections, Matlab, etc.

Publications and Patents

https://scholar.google.com/citations?user=bih9IIwAAAAJ&hl=zh-CN

- **Liu Y**, An S, Li J, Kuang Y, He X, Guo Y, Ma H, Zhang Y, Ji B, Jiang C. Brain-targeted co-delivery of therapeutic gene and peptide by a multifunctional drug delivery platform in Alzheimer's disease mice. **Biomaterials. 2016,** 80, 33-45.
- **Liu Y**, Li J, Huang R, Ye L, Lou J, Jiang C. A leptin derived 30-amino-acid peptide modified pegylated poly-L-lysine dendrigraft for brain targeted gene delivery. **Biomaterials**. **2010**, 31:5246-5257.
- **Liu Y**, Huang R, Ke W, Jiang C. Brain-targeting gene delivery and cellular internalization mechanisms for modified rabies virus glycoprotein RVG29 nanoparticles. **Biomaterials**. **2009**, 30:4195-4202.
- **Liu Y**, Hu Y, Ma H, Guo Y, Li J, Jiang C. Targeted imaging of activated caspase-3 in the central nervous system by a dual functional nanodevice. **J Control Release**. **2012**, 163:203-210.
- **Liu Y**, He X, Kuang Y, An S, Wang C, Guo Y, Ma H, Lou J, Jiang C. A bacteria deriving peptide modified dendrigraft poly-L-Lysines (DGLs) self-assembling nano-platform for targeted gene delivery. **Mol Pharm. 2014,** 11:3330-3341.
- **Liu Y**, Guo Y, An S, Ma H, He X, Jiang C. Targeting caspase-3 as dual therapeutic benefits by RNAi facilitating brain-targeted nanoparticles in a rat model of Parkinson's disease. **Plos One**. **2013**, 8:62905.
- **Liu Y**, Huang R, Jiang C. Non-viral gene delivery and therapeutics targeting to brain. **Curr Nanosci**. **2011**, 7:55-70.
- Zheng N, Song Z, **Liu Y**, Yin L, Cheng J. Gene delivery into isolated Arabidopsis thaliana protoplasts and intact leaves using cationic, α-helical polypeptide. **Frontiers of Chemical Science and Engineering 2017,** 1-8.
- **[Book chapter]** Zheng N, **Liu Y**, Cheng J. Gene Delivery Method Using Photo-Responsive Poly (β-Amino Ester) as Vectors. **Non-Viral Gene Delivery Vectors: Methods and Protocols 2016,** 259-267.
- Wang H, Tang L, **Liu Y**, Dobrucka IT, Dobrucki LW, Yin LC, Cheng J. In Vivo Targeting of Metabolically Labeled Cancers with Ultra-Small Silica Nanoconjugates. **Theranostics 2016,** 6 (9): 1467.
- Li Y, Bai Y, Zheng N, **Liu Y**, Vincil GA, Pedretti BJ, Cheng J. Crosslinked dendronized polyols as

a general approach to brighter and more stable fluorophores. **Chemical Communications 2016**, 52 (19):3781-3784

- Huang S, Shao K, **Liu Y**, Kuang YY, Li JF, Guo YB, Ma HJ, Jiang C. Tumor-Targeting and microenvironment-responsive smart nanoparticles for combination therapy of antiangiogenesis and apoptosis. **ACS Nano**. **2013**, 7: 2860-2871.
- Ke W, Shao W, Huang R, Han L, **Liu Y**, Li J, Kuang Y, Ye L, Lou J, Jiang C. Gene delivery targeted to the brain using an Angiopep-conjugated polyethyleneglycol-modified polyamidoamine dendrimer. **Biomaterials 2009** 30 (36), 6976-6985
- Huang R, Ke W, **Liu Y**, Jiang C, Pei Y. The use of lactoferrin as a ligand for targeting the polyamidoamine-based gene delivery system to the brain. **Biomaterials 2008,** 29 (2), 238-246
- Huang R, Ke W, Han L, **Liu Y**, Jiang C, Pei Y. Lactoferrin-modified nanoparticles could mediate efficient gene delivery to the brain in vivo. **Brain Research Bulletin 2010,** 81 (6), 600-604
- Huang R, Ke W, Han L, **Liu Y**, Ye L, Lou J, Jiang C, Pei Y. Brain-targeting mechanisms of lactoferrin-modified DNA-loaded nanoparticles **Journal of Cerebral Blood Flow & Metabolism 2009,** 29 (12), 1914-1923
- Huang R, Liu S, Shao K, Han L, Ke W, **Liu Y**, Li J, Huang S, Jiang C. Evaluation and mechanism studies of PEGylated dendrigraft poly-L-lysines as novel gene delivery vectors. **Nanotechnology 2010,** 21 (26), 265101
- Huang R, Ma H, Guo Y, Liu S, Kuang Y, Shao K, Li J, **Liu Y**, Han L, Jiang C. Angiopep-conjugated nanoparticles for targeted long-term gene therapy of Parkinson's disease. **Pharmaceutical Research 2013,** 30 (10), 2549-2559
- Li J, Huang S, Shao K, **Liu Y**, An S, Kuang Y, Guo Y, Ma H, Wang X, Jiang C. A choline derivate-modified nanoprobe for glioma diagnosis using MRI. **Scientific Reports 2013,** 3, 1623
- Kuang Y, An S, Guo Y, Huang S, Shao K, **Liu Y**, Li J, Ma H, Jiang C. T7 peptide-functionalized nanoparticles utilizing RNA interference for glioma dual targeting. **International Journal of Pharmaceutics 2013,** 454 (1), 11-20
- Zheng N, Song Z, **Liu Y**, Zhang R, Yao C, Uckun FM, Yin L, Cheng J. Redox-responsive, reversibly-crosslinked thiolated cationic helical polypeptides for efficient siRNA encapsulation and delivery. **J Controlled Release**, **2015**, 205, 231-239
- Wang H, Wang R, Cai K, He H, **Liu Y**, Yen J, Wang Z, Xu M, Sun Y, Zhou X, Yin Q, Tang L, Dobrucka IT, Cheng J, et al. Selective in vivo metabolic cell labeling mediated cancer targeting. **Nature Chemical Biology 2016**, accepted
- **Liu Y**, Jiang C. Research advances in brain-targeted nanoscale drug delivery system. Yao Xue Xue Bao, **2013**, 48:1532-1543. <Article in Chinese>
- COMPOSITIONS AND METHODS FOR IN VIVO DETECTION OF AMYLOID β. Cheng J, Cai K, **Liu Y**. **2016,** US Patent in application.
- **[Book chapter]** Jiang C, Jiang X, **Liu Y**, Shao K, Huang R. Microspheres for targeting delivery to brain. **Microspheres and Microcapsules in Biotechnology: Design, Preparation and Applications**, **2013,** 399-464.
- Huang R, Ke W, **Liu Y**, Wu D, Feng L, Jiang C, Pei Y. Gene therapy using lactoferrin-modified nanoparticles in a rotenone-induced chronic Parkinson model**. Journal of the Neurological Science 2010**, 290, 123-130.
- Huang S, Shao K, Kuang Y, **Liu Y**, Li J, An S, Guo Y, Ma H, He X, Jiang C. Tumor targeting and

microenvironment-responsive nanoparticles for gene delivery. **Biomaterials, 2013**, 34, 5294-5302.

- Li J, Zhou L, Ye D, Huang S, Shao K, Huang R, Han L, **Liu Y**, Liu S, Ye L, Lou J, Jiang C. Choline-derivate-modified nanoparticles for brain-targeting gene delivery. **Advanced Materials, 2011**, 23, 4516-4520.
- Zheng N, Song Z, **Liu Y**, Cheng J, Yin L. Manipulating the Membrane Penetration Mechanism of Helical Polypeptides via Aromatic Modification for Efficient Gene Delivery. **Acta Biomaterialia**, **2017**, 58, 146-157.

Manuscripts in Preparation

- **Liu Y**, Cheng J, et al. Systemic siRNA Delivery to Tumor by Cell-Penetrating Peptide and Poly(L-glutamic acid)-Based Metastable Nanoparticles. ***To be submitted***
- **Liu Y**, Cheng J, et al. *In vivo* Aβ imaging via two-step click chemistry. ***Submitted***
- **Liu Y**, Cheng J, et al. Cell-penetrating polypeptides mediated brain-targeted gene delivery through intranasal administration. ***In preparation***

Reviewer of Journals

International Journal of Nanomedicine (**Consulting Editor**)

ACS Nano; Oncotarget; Journal of Biomaterials Science: Polymer Edition; Pharmaceutical Nanotechnology; Journal of Drug Targeting; Drug Design, Development and Therapy; Journal of Colloid and Interface Science

Conferences and Presentations

- **Liu Y, et al. "Brain-targeted co-delivery of therapeutic gene drugs and peptide by multifunctional drug delivery nanoparticles in Alzheimer's disease mice", oral presentation as contributed speaker** at The 10th Anniversary of the Lindau-Program of the Sino-German Center for Research Promotion, Beijing, China, 2014
- **Liu Y, et al. "Brain-targeted imaging of activated caspase-3 in vivo by a dual functional nano-device", oral presentation as contributed speaker** at The 61st Meeting of the Nobel Laureates in Lindau, Germany, 2011
- **Liu Y, et al. "Non-viral gene delivery system and its application to brain diseases", oral presentation as contributed speaker** at Dutch Life Science Week Gene Therapy Seminar, Shanghai EXPO, China, 2010
- **Liu Y, et al. "Quantum dot-FISH for measuring PTEN mRNA mutations in prostate cancer biopsies", poster presentation** at Individualizing Medicine Conference in Rochester, US, 2016
- **Liu Y, et al. "Detecting MicroRNA in Dried Blood Spots for Real-time Monitoring of Treatment Response in Prostate Cancer", poster presentation** at Biomedical Engineering Society Annual Conference in Minneapolis, US, 2016
- **Liu Y, et al. "Tumor microenvironment de-coating nanoparticles for efficient siRNA delivery based on cationic helical polypeptides", poster presentation** at Peck Symposium, Purdue University, US, 2015
- **Liu Y, et al. "Targeting caspase-3 as dual therapeutic benefits by RNAi facilitating brain-targeted nanoparticles in a rat model of Parkinson's disease", poster presentation** at Miami Winter Symposium on nanotechnology in Miami, US, 2012
- **Liu Y, et al. "RVG peptide modified brain-targeted gene delivery system", poster presentation** at 5th AAPS@Asia Symposium in Shanghai, China, 2010

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Honors and Awards

Year	Name	Source
2013	Excellent Graduate of Shanghai higher education institutes	Bureau of Education, Shanghai, China
2012	National scholarship for graduates (top 3% students)	Fudan University
2011	Nature and Science Award, 1st Prize,	Ministry of Education, China
2010	Young Scholar Award for doctoral candidates	Ministry of Education, China
2009	Shengda Scholarship	Fudan University
	Excellent doctor student scholarship (1st award)	Fudan University
2008	Guanghua Scholarship (1st award)	Fudan University
2008	Excellent Graduate of Shanghai higher education institutes	Bureau of Education, Shanghai, China
2007	Renmin Scholarship (1st award)； Fuhua Scholarship	Fudan University
2006	Dongshidongfang Scholarship (1st award)；	Fudan University
	Excellent Students	Fudan University
2005	China Petroleum Scholarship (1st award)；	Fudan University
	Excellent Students	Fudan University