

YONG (TIGER) ZHANG

University of Southern California
1985 Zonal Avenue
Los Angeles, CA 90089
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E-mail: yongz@usc.edu

Education:

- 08/2006 – 06/2011 **Ph.D. in Biochemistry**, Department of Biochemistry
Albert Einstein College of Medicine, Bronx, New York, USA
Advisor: Professor Vern L. Schramm
Transition State Analysis, Enzyme Catalytic Mechanism,
Development of Transition State Analogue Inhibitors for Human
and *Plasmodium falciparum* Orotate Phosphoribosyltransferases
- 05/2004 – 05/2006 **M.Sc. in Biophysics**, Department of Molecular and Cellular Biology
University of Guelph, Guelph, Ontario, Canada
Advisor: Professor A. Rod Merrill
Characterization of Diphthamide Modification and ADP-ribosylation
of Eukaryotic Elongation Factor-2 by *Pseudomonas aeruginosa* Exotoxin A
- 09/1999 – 06/2003 **B.Sc. in Biological Sciences**, School of Life Sciences
Shandong University, Jinan, Shandong, China
Advisor: Professor Jinxing Wang
Cloning of Toll-like Receptor 6 Gene and Extraction of Genomic DNA
from *Panaeus chinensis*

Postdoctoral Experience:

- 07/2011 – 11/2014 Department of Chemistry, The Scripps Research Institute (07/2011-04/2012)
California Institute for Biomedical Research (05/2012-11/2014)
La Jolla, California, USA
Advisor: Professor Peter G. Schultz
Structural, Functional, and Engineering Studies of Antibodies with Novel
CDR3H Architecture; Development of HIV Vaccine, Therapeutic Bi-Specific
Antibodies, Antibody-Drug Conjugates Using Genetically Encoded
Unnatural Amino Acids

Appointment:

- 12/2014 – Present Assistant Professor of Pharmacology and Pharmaceutical Sciences
School of Pharmacy, University of Southern California
Los Angeles, California, USA
- 12/2014 – Present Full Member of Translational and Clinical Sciences Program
USC Norris Comprehensive Cancer Center
- 01/2016 – Present Member of USC Research Center for Liver Diseases
- 06/2016 – Present Assistant Professor of Chemistry, Dornsife College of Letters, Arts and Sciences
University of Southern California, Los Angeles, California, USA
- 04/2017 – Present Director of the Pharmaceutical Sciences Program
School of Pharmacy, University of Southern California

Awards and Honors:

- 07/2020 NIGMS Maximizing Investigators' Research Award (MIRA)
- 06/2019 TRDRP New Investigator Award
- 06/2019 CBCRP Innovative Development and Exploratory Award
- 04/2019 AACR-Bayer Innovation and Discovery Grant
- 03/2019 Department of Defense CDMRP Career Development Award

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| 01/2019 | The V Scholar PLUS Award, the V Foundation for Cancer Research |
| 04/2018 | PhRMA Foundation Research Starter Grant in Translational Medicine and Therapeutics |
| 11/2017 | STOP CANCER Research Career Development Award |
| 08/2017 | New Investigator Grant, American Association of Pharmaceutical Scientists Foundation |
| 09/2016 | The V Scholar Award, the V Foundation for Cancer Research |
| 03/2012 | Julius Marmur Research Award for Outstanding Achievement in Graduate Research |
| 12/2010 | Sponsored Membership in AAAS/Science for Excellence in Science |
| 05/2004 | University of Guelph Entrance Scholarship |
| 09/2000 – 06/2001 | The Honor of “Excellent Student of Shandong University” |
| 03/2001 – 06/2001 | Shandong University Scholarship |
| 09/2000 – 01/2001 | Shandong University Scholarship |
| 03/2000 – 06/2000 | Shandong University Scholarship |
| 09/1999 – 01/2000 | Shandong University Scholarship |

Teaching:

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| 11/2014 – Present | Biological Systems I (PHRD503) Biological Systems II (PHRD504) Drug Design and Discovery (PSCI664) Principal Research Approaches and Scientific Writing (PSCI 556) Molecular Pharmacology and Toxicology (MPTX501) Pharmacology (MPTX502) Introduction to Tools and Techniques for Chemical Biology (PSCI557) Immunopharmaceutics (PSCI655) Protein Chemistry – Structure and Function (BIOC549) Protein Engineering and Drug Discovery (PSCI599) Immunology and Immunotherapeutics (RXRS408) Undergraduate Research Seminar (CHEM294), Directed Research (CHEM490) |
| 09/2004 – 05/2006 | Graduate Teaching Assistant for Immunology (MICR*3230), Introductory Biochemistry Laboratory (BIOC*2580), Introductory Cell Biology (MCB*2210) Department of Molecular and Cellular Biology, University of Guelph, Guelph, Ontario, Canada |
| 02/2001 – 06/2001 | Undergraduate Teaching Assistant for Plant Biology, School of Life Sciences, Shandong University, Jinan, Shandong, China |

Professional Memberships:

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|----------------|---|
| 2009 – Present | American Chemical Society |
| 2015 – Present | American Association of Pharmaceutical Scientists |
| 2018 – Present | American Association for Cancer Research |

Peer Review for Professional Journals:

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| ACS Catalysis | ACS Nano | Anal. Biochem. |
| Anal. Chem. | BBA - Proteins and Proteomics | Biomaterials |
| Cell. Mol. Life Sci. | Chem. Commun. | Chem. Sci. |
| FEBS J. | J. Am. Chem. Soc. | J. Mol. Catal. B Enzym. |
| J. Org. Chem. | Mol. Pharm. | Mol. Ther. |
| Nat. Chem. Biol. | Org. Biomol. Chem. | Phys. Chem. Chem. Phys. |
| PLOS ONE | Protein Expr. Purif. | Protein Sci. |
| RSC Adv. | Sci. Adv. | Theranostics |

Peer Review for Funding Agencies:

Wright Foundation
Keck School of Medicine of University of Southern California
Norris Comprehensive Cancer Center of University of Southern California
The Center for the Advancement of Science in Space (CASIS)
Southern California Clinical and Translational Science Institute (SC CTSI)
Health Research Council of New Zealand
National Institutes of Health (NIH)

Committee Memberships:

07/2020 – Present Faculty Advisory Committee for USC Stevens Center for Innovation
05/2020 PhD Dissertation committee for Santosh Peddi (Advisor: Dr. Andrew Mackay)
03/2020 Ad hoc Strategic Planning Sub-Committee on PhD Education
03/2020 MSc Dissertation committee for Xuejun He, (Advisor: Dr. Jean Shih)
03/2020 MSc Dissertation committee for Yanni Ma, (Advisor: Dr. Sarah Hamm-Alvarez)
03/2020 MSc Dissertation committee for Jingyi Wang, (Advisor: Dr. Clay Wang)
01/2020 PhD qualifying examination committee for Patrick Lehman (Advisor: Dr. Clay Wang)
11/2019 PhD qualifying examination committee for Christian Rabot (Advisor: Dr. Clay Wang)
11/2019 PhD qualifying examination committee for Dokyun Kim (Advisor: Dr. Jae Jung)
06/2019 PhD Dissertation committee for Michelle Grau, (Advisor: Dr. Clay Wang)
03/2019 MSc Dissertation committee for Peirou Chu, (Advisor: Dr. Jean Shih)
03/2019 MSc Dissertation committee for Jinghua Cai, (Advisor: Dr. Jean Shih)
03/2019 MSc Dissertation committee for Jiachun Li, (Advisor: Dr. Jean Shih)
03/2019 MSc Dissertation committee for Zhiyuan Yao, (Advisor: Dr. Andrew Mackay)
03/2019 MSc Dissertation committee for Yue Wang, (Advisor: Dr. Andrew Mackay)
03/2019 PhD Dissertation committee for Hsuan-Yao (Sean) Wang, (Advisor: Dr. Wei-Chiang Shen)
12/2018 Ad hoc selection committee on AFPE Fellowship Award Applications
10/2018 PhD qualifying examination committee for Connor Hurd (Advisor: Dr. Ansgar Siemer)
09/2018 PhD qualifying examination committee for Long Zheng (Advisor: Dr. Alan Epstein)
08/2018 PhD Dissertation committee for Caitlin DeAngelo, (Advisor: Dr. Nicos Petasis)
06/2018 MSc Dissertation committee for Benjamin Cooperman
(Advisor: Dr. Sarah Hamm-Alvarez)
03/2018 PhD Dissertation committee for Tzu-Shyang Lin, (Advisor: Dr. Clay Wang)
01/2018 PhD qualifying examination committee for Christina (Runzhong) Fu
(Advisor: Dr. Sarah Hamm-Alvarez)
12/2017 Ad hoc selection committee on AFPE Fellowship Award Applications
12/2017 PhD Dissertation committee for Li Zhou, (Advisor: Dr. Wei-Chiang Shen)
12/2017 PhD qualifying examination committee for Santosh Peddi
(Advisor: Dr. Andrew Mackay)
12/2017 PhD qualifying examination committee for Michelle Grau, (Advisor: Dr. Clay Wang)
11/2017 PhD qualifying examination committee for Xianhui Chen, (Advisor: Dr. Pin Wang)
08/2017 – 12/2017 Individual Development Plan (IDP) committee for Li Zhou
(Advisor: Dr. Wei-Chiang Shen)
08/2017 – Present Graduate Program Curriculum Committee, USC School of Pharmacy
08/2017 – Present Graduate Affairs Chair Committee, USC School of Pharmacy
05/2017 – Present Faculty Search Committee, Department of Pharmacology and Pharmaceutical Sciences
USC School of Pharmacy
04/2017 – Present Graduate Affairs Committee, Department of Pharmacology and Pharmaceutical

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| | Sciences, USC School of Pharmacy |
| 02/2017 | Strategic Planning Steering Committee, USC School of Pharmacy |
| 01/2017 | PhD qualifying examination committee for Changrim Lee (Advisor: Dr. Andrew Mackay) |
| 11/2016 | PhD qualifying examination committee for Jingyu Chen, (Advisor: Dr. Bangyan Stiles) |
| 11/2016 – Present | Faculty delegate of the Globalization of Pharmaceutics Education Network (GPEN) |
| 10/2016 – Present | Admissions Committee for Graduate Programs in Biomedical and Biological Sciences (PIBBS), USC Keck School of Medicine |
| 10/2016 – Present | Admissions Committee for Pharmaceutical & Translational Sciences (PHTS) Graduate Program, USC School of Pharmacy |
| 10/2016 – 05/2018 | Scholarship Oversight Committee for Dr. Erica Escobedo Hematology-Oncology Fellow of Children's Hospital Los Angeles (CHLA) (Advisor: Dr. Shahab Asgharzadeh) |
| 09/2016 – 08/2017 | Laboratory Safety Advisory Committee, USC School of Pharmacy |
| 09/2016 | PhD qualifying examination committee for Brandon Wolfe (Advisor: Dr. Alan Epstein) |
| 03/2016 | MSc thesis examination committee for Tianhan Dong, (Advisor: Dr. Jean Shih) |
| 11/2015 | PhD qualifying examination committee for Hsuan-Yao (Sean) Wang (Advisor: Dr. Wei-Chiang Shen) |
| 08/2015 | Ad hoc selection committee on Krown Fellowship Award |

Reviews:

1. Shi, X., Cheng, Q. and **Zhang, Y.** Reprogramming Extracellular Vesicles with Engineered Proteins. *Methods*, 2020, 177, 95-102.
2. Cassera, M.B., **Zhang, Y. (co-first author)**, Hazleton, K.Z. and Schramm, V.L. Purine and Pyrimidine Pathways as Targets in *Plasmodium falciparum*. *Curr. Top. Med. Chem.*, 2011, 11, 2103-2115.

Original Research Publications:

1. Dai, Z., Zhang, X.N., Cheng, Q., Fei, F., Hou, T., Li, J., Abdolvahabi, A., Watanabe, J., Pei, H., Smbatyan, G., Xie, J., Lenz, H.J., Louie, S.G. and **Zhang, Y.** Site-Specific Antibody-Drug Conjugates with Variable Drug-to-Antibody-Ratios for AML Therapy. *J. Control. Release* 2021, 336, 433-442.
2. Lambeth, T.R., Dai, Z., **Zhang, Y.** and Julian, R.R. A Two-Trick Pony: Lysosomal Protease Cathepsin B Possesses Surprising Ligase Activity. *RSC Chem. Biol.* 2021, 2, 606-611.
3. Lam, A.T., Zhang, X.N., Courouble, V.V., Strutzenberg, T.S., Pei, H., Stiles, B.L., Louie, S.G., Griffin, P.R. and **Zhang, Y.** A Bifunctional NAD⁺ for Profiling Poly-ADP-Ribosylation-Dependent Interacting Proteins. *ACS Chem. Biol.* 2021, 16, 389-396.
4. Shi, X., Zhang, X.N., Chen, J., Cheng, Q., Pei, H., Louie, S.G. and **Zhang, Y.** A Poly-ADP-Ribose Polymer-Based Antibody-Drug Conjugate. *Chem. Sci.* 2020, 11, 9303-9308.
5. Shi, X. and **Zhang, Y.** A Humanized Antibody Inhibitor for Cathepsin L. *Protein Sci.* 2020, 29, 1924-1930.
6. Dai, Z., Zhang, X.N., Nasertorabi, F., Cheng, Q., Li, J., Katz, B.B., Smbatyan, G., Pei, H., Louie, S. G., Lenz, H.J., Stevens, R.C. and **Zhang, Y.** Synthesis of Site-Specific Antibody-Drug Conjugates by ADP-Ribosyl Cyclases. *Sci. Adv.* 2020, 6, eaba6752.
7. Madern, J.M., Kim, R.Q., Misra, M., Dikic, I., **Zhang, Y.**, Ovaa, H., Codee, J.D.C., Filippov, D.V. and van der Heden van Noort, G.J. Synthesis of Stable NAD⁺ Mimics as Inhibitors for the Legionella Pneumophila Phosphoribosyl Ubiquitinating Enzyme SdeC. *ChemBioChem* 2020, 21, 2903-2907.
8. Park, M., Vaikari, V.P., Lam, A.T., **Zhang, Y.**, Mackay, J.A. and Alachkar, H. Anti-FLT3 nanoparticles for acute myeloid leukemia: preclinical pharmacology and pharmacokinetics. *J. Control. Release* 2020, 324, 317-329.

9. Dai, Z., Cheng, Q. and **Zhang, Y.** Rational Design of a Humanized Antibody Inhibitor of Cathepsin B. *Biochemistry* 2020, 59, 1420-1427.
10. Cheng, Q., Shi, X. and **Zhang, Y.** Reprogramming Exosomes for Immunotherapy. *Methods Mol. Biol.* 2020, 2097, 197–209.
11. Shi, X., Cheng, Q., Hou, T., Han, M., Smbatyan, G., Lang, J.E., Epstein, A.L., Lenz, H.J. and **Zhang, Y.** Genetically Engineered Cell-Derived Nanoparticles for Targeted Breast Cancer Immunotherapy. *Mol. Ther.* 2020, 28, 536-547.
12. Zhang, X.N., Cheng, Q., Chen, J., Lam, A.T., Lu, Y., Dai, Z., Pei, H., Evdokimov, N.M., Louie, S.G. and **Zhang, Y.** A Ribose-Functionalized NAD⁺ with Unexpected High Activity and Selectivity for Protein Poly-ADP-Ribosylation. *Nat. Commun.* 2019, 10, 4196.
13. Zhang, X.N., Dai, Z., Cheng, Q. and **Zhang, Y.** Chemoenzymatic Preparation of 4'-Thioribose NAD. *Curr. Protoc. Nucleic Acid Chem.* 2019, 77, e83.
14. Cheng, Q., Shi, X., Han, M., Smbatyan, G., Lenz, H.J. and **Zhang, Y.** Reprogramming Exosomes as Nanoscale Controllers of Cellular Immunity. *J. Am. Chem. Soc.* 2018, 140, 16413–16417
15. Dai, Z., Zhang, X.N., Nasertorabi, F., Cheng, Q., Pei, H., Louie, S.G., Stevens, R.C. and **Zhang, Y.** Facile Chemoenzymatic Synthesis of a Novel Stable Mimic of NAD⁺. *Chem. Sci.* 2018, 9, 8337-8342
Featured in Front Cover
16. Chen, J., Lam, A.T. and **Zhang, Y.** A Macrodomein-Linked Immunosorbent Assay (MLISA) for Mono-ADP-Ribosyltransferases. *Anal Biochem.*, 2017, 543, 132-139
17. Du, J., Cao Y., Liu, Y., Wang, Y., **Zhang, Y.**, Fu, G., Zhang, Y., Lu, L., Luo, X., Kim, C.H., Schultz, P.G. and Wang, F. Engineering Bifunctional Antibodies with Constant Region Fusion Architectures. *J. Am. Chem. Soc.*, 2017, 139, 18607–18615
18. Liu, Y., Wang, Y., **Zhang, Y.**, Liu, T., Jia, H., Zou, H., Fu, Q., Zhang, Y., Lu, L., Chao, E., Parker, H., Nguyen-Tran, V.T.B., Shen, W., Wang, D., Schultz, P.G. and Wang, F. Rational Design of Dual Agonist-Antibody Fusions as Long-Acting Therapeutic Hormones. *ACS Chem. Biol.*, 2016, 11, 2991-2995.
19. Luo, X., Wang, T.S.A., **Zhang, Y.**, Wang, F. and Schultz, P.G. Stabilizing Protein Motifs with a Genetically Encoded Metal-Ion Chelator. *Cell Chem. Biol.*, 2016, 23,1098-102.
20. Wang, R.E., Wang, Y., Zhang, Y., Gabrelow, C., **Zhang, Y.**, Chi, V., Fu, Q., Luo, X., Wang, D., Joseph, S., Johnson, K., Chatterjee, A.K., Wright, T.M., Nguyen-Tran, V.T.B., Teijaro, J., Theofilopoulos, A.N., Schultz, P.G. and Wang, F. Rational Design of a Kv1.3 Channel-Blocking Antibody as a Selective Immunosuppressant. *Proc. Natl. Acad. Sci. U.S.A.*, 2016, 113, 11501-11506.
21. **Zhang, Y.**, Zou, H., Wang, Y., Caballero, D., Gonzalez, J., Chao, E., Welzel, G., Shen, W., Wang, D., Schultz, P.G. and Wang, F. Rational Design of a Humanized Glucagon-Like Peptide-1 Receptor Agonist Antibody. *Angew. Chem. Int. Ed. Engl.*, 2015, 54, 2126-2130.
22. Liu, T., **Zhang, Y. (co-first author)**, Liu, Y., Wang, Y., Jia, H., Kang, M., Luo, X., Caballero, D., Gonzalez, J., Wang, D., Woods, A., Schultz, P.G. and Wang, F. Functional Human Antibody CDR Fusions as Long-Acting Therapeutic Endocrine Agonists. *Proc. Natl. Acad. Sci. U.S.A.*, 2015, 112, 1356-1361.
23. **Zhang, Y. (co-first author)**, Liu, Y., Wang, Y., Schultz, P.G. and Wang, F. Rational Design of Humanized Dual-Agonist Antibodies. *J. Am. Chem. Soc.*, 2015, 137, 38-41.
24. Lu, H., Zhou, Q., Deshmukh, V., Phull, H., Ma, J., Tardif, V., Naik, R.R., Bouvard, C., **Zhang, Y.**, Choi, S., Lawson, B.R., Zhu, S., Kim, C.H. and Schultz, P.G. Targeting Human C-Type Lectin-like Molecule-1 (CLL1) with a Bispecific Antibody for Immunotherapy of Acute Myeloid Leukemia. *Angew. Chem. Int. Ed. Engl.*, 2014, 53, 9841–9845.
25. **Zhang, Y.**, Goswami, D., Wang, D., Wang, T.S.A., Sen, S., Magliery, T.J., Griffin, P.R., Wang, F. and Schultz, P.G. An Antibody with a Variable Region Coiled-Coil “Knob” Domain. *Angew. Chem. Int. Ed. Engl.*, 2014, 53, 132-135.

26. **Zhang, Y.**, Evans, G.B., Clinch, K., Crump, D.R., Harris, L.D., Fröhlich, R.F.G., Tyler, P.C., Hazleton, K.Z., Cassera, M.B. and Schramm, V.L. Transition State Analogues of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases. *J. Biol. Chem.*, 2013, 288, 34746-54.
27. **Zhang, Y.**, Wang, D., Welzel, G., Wang, Y., Schultz, P.G. and Wang, F. An Antibody CDR3-Erythropoietin Fusion Protein. *ACS Chem. Biol.*, 2013, 8, 2117-2121
28. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G. and Wang, F. Functional Antibody CDR3 Fusion Proteins with Enhanced Pharmacological Properties. *Angew. Chem. Int. Ed. Engl.*, 2013, 52, 8295-8298.
29. Wang, F., Sambandan, D., Wang, J., Halder, R., Batt, S., Weinrick, B.C., Ahmad, I., Yang, P, **Zhang, Y.**, Kim, J., Hassani, M., Huszar, S., Mikusova, K., Chatterjee, A., Besra, G., Futterer, K., Jacobs, W.R. Jr. and Schultz, P.G. Identification of a Small Molecule with Activity against Drug-resistant and Persistent Tuberculosis. *Proc. Natl. Acad. Sci. U.S.A.*, 2013, 110, E2510-7.
30. Wang, F., Ekiert, D.C., Ahmad, I., Li, W., **Zhang, Y.**, Bazirgan, O., Torkamani, A., Raudsepp, T., Mwangi, W., Criscitiello, M.F., Wilson, I.A., Schultz, P.G. and Smider, V.V. Reshaping Antibody Diversity. *Cell*, 2013, 153, 1379-93.
31. **Zhang, Y.** and Schramm, V.L. Ground-State Destabilization in Orotate Phosphoribosyltransferases by Binding Isotope Effects. *Biochemistry*, 2011, 50, 4813-4818.
32. Vetting, M.W., Hegde, S.S., **Zhang, Y.** and Blanchard, J.S. Pentapeptide Repeat Proteins that Act as Topoisomerase Poison Resistance Factors Have a Common Dimer Interface. *Acta Crystallogr. Sect. F Struct. Biol. Cryst. Commun.*, 2011, 67, 296-302.
33. **Zhang, Y.**, Deng, H. and Schramm, V.L. Leaving Group Activation and Pyrophosphate Ionic State at the Catalytic Site of *Plasmodium falciparum* Orotate Phosphoribosyltransferase. *J. Am. Chem. Soc.*, 2010, 132, 17023-17031.
34. **Zhang, Y.** and Schramm, V.L. Pyrophosphate Interactions at the Transition States of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases. *J. Am. Chem. Soc.*, 2010, 132, 8787-8794.
35. Abdo, M., **Zhang, Y.**, Schramm, V.L. and Knapp, S. Electrophilic Aromatic Selenylation: New OPRT Inhibitors. *Org. Lett.*, 2010, 12, 2982-2985.
36. **Zhang, Y.**, Luo, M. and Schramm, V.L. Transition States of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases. *J. Am. Chem. Soc.*, 2009, 131, 4685-4694.
37. **Zhang, Y. (co-first author)**, Liu, S., Lajoie G. and Merrill, A.R. The Role of the Diphthamide-containing Loop within Eukaryotic Elongation Factor 2 in ADP-Ribosylation by *Pseudomonas aeruginosa* Exotoxin A. *Biochem. J.*, 2008, 413, 163-174.

Structure Publications:

1. **Zhang, Y.**, Zhan, C., Patskovsky, Y., Ramagopal, U., Shi, W., Toro, R., Wengerter, B.C., Milstein, S., Vidal, M., Burley, S.K., Almo, S.C. Structure of *Caenorhabditis elegans* UDP-Glucose Dehydrogenase. 2006, **PDB ID: 2O3J**.
2. Dai, Z., Zhang, X.N., Nasertorabi, F., Cheng, Q., Pei, H., Louie, S.G., Stevens, C.R., **Zhang, Y.**, Crystal Structure of Human CD38 in Complex with 4'-Thioribose NAD⁺. 2018, **PDB ID: 6EDR**.
3. Dai, Z., Zhang, X.N. Nasertorabi, F., Han, G.W., Stevens, C.R., **Zhang, Y.**, X-ray structure of human CD38 catalytic domain with 2'-Cl-araNAD⁺. 2020, **PDB ID: 6VUA**.

Patents:

1. **Zhang, Y.**, Humanized Cathepsin Inhibitors. Provisional Application, filed on July 10, 2020
2. **Zhang, Y.**, Dai, Z. and Zhang, X.N. Site-Specific Antibody-Drug Conjugates by ADP-Ribosyl Cyclases. PCT Application, filed on May 10, 2021
3. **Zhang, Y.** Functionalized Poly-ADP-Ribose Polymers for Drug Delivery. PCT Application, filed on March 27, 2020
4. **Zhang, Y.** Genetically Modified Exosomes for Immune Modulation. PCT Application, filed on March 27, 2020

5. **Zhang, Y.**, Dai, Z. and Zhang, X.N. 4-Thioribose NAD Analogues and Methods of Synthesizing and Using the Same, PCT Application, filed on October 4, 2019
6. **Zhang, Y.**, Shi, X., and Cheng, Q., Synthetic Extracellular Vesicles for Novel Therapies, PCT Application, filed on July 26, 2018
7. **Zhang, Y.** and Zhang, X-N., Nicotinamide Adenine Dinucleotide Analogues, PCT Application, filed on June 9, 2018
8. **Zhang, Y.** and Chen, J., An ELISA-Like Assay for Quantifying Enzymatic Activities of Mono-ADP-Ribosyltransferases, PCT Application, filed on September 27, 2017
9. **Zhang, Y.** and Dai, Z., Methods of Constructing Immunoglobulin Fusion Proteins Inhibiting Cathepsin B and Compositions Thereof, PCT Application, filed on March 31, 2017
10. Wang, F., **Zhang, Y.**, Wang, Y., Liu, Y. and Schultz, P., Coiled Coil Immunoglobulin Fusion Proteins and Compositions Thereof, PCT Application, filed on July 11, 2014.
11. Wang, F., **Zhang, Y.**, Liu, T., Wang, Y., Du, J., Liu, Y. and Schultz, P., Immunoglobulin Fusion Proteins and Compositions Thereof, PCT Application, filed on July 11, 2014.
12. Wang, F., **Zhang, Y.** and Schultz, P. Bovine Fusion Antibodies, PCT Application, filed on January 10, 2014.
13. Bazirgan, O.A., Mao, H.H., Smider, V., Ekiert, D., Schultz, P., Wang, F., Wilson, I. and **Zhang, Y.** Ultralong Complementarity Determining Regions and Uses Thereof, PCT Application, filed on January 9, 2013.

Research Support:

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|---|---------------------|-------------|
| USC Undergraduate Research Associates Program Grant "Novel Therapeutic Antibodies for Prostate Cancer" (PI: Y. Zhang) | 07/01/20 – 06/30/21 | \$6,600 |
| USC Sharon L. Cockrell Cancer Research Fund "Novel Antibody Drugs for Targeted Cancer Therapies" (PI: Y. Zhang) | 07/01/17 – 06/30/21 | \$5,000 |
| Department of Defense CDMRP Career Development Award "Developing Novel Immunotherapeutics for Acute Myeloid Leukemia" (PI: Y. Zhang) | 07/01/19 – 06/30/22 | \$593,996 |
| USC Norris Comprehensive Cancer Center Pilot Grant "Developing a Novel Therapy for Hispanic Americans with Colorectal Cancer" (PI: Y. Zhang) | 04/22/20 – 04/21/21 | \$50,000 |
| USC Stevens Technology Advancement Grant "Novel Site-Specific Antibody-Drug Conjugates for Targeted Therapy" (PI: Y. Zhang) | 07/01/20 – 06/30/21 | \$50,000 |
| NIGMS Maximizing Investigators' Research Award (MIRA) (R35) "Chemistry and Biology of ADP-Ribosylation-Dependent Signaling" (PI: Y. Zhang) | 07/01/20 – 06/30/25 | \$1,907,165 |
| USC Ming Hsieh Institute for Engineering Medicine for Cancer "Combating COVID- 19 with Novel Vaccines" (PI: Y. Zhang) | 07/01/20 – 08/31/21 | \$85,000 |

Completed Research Grant:

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| Chinese American Faculty Association Faculty Development Grant "Toward the Roles of PARP-14 in Cancer Pathogenesis" (PI: Y. Zhang) | 03/07/15 – 03/06/16 | \$2,000 |
| USC Undergraduate Research Associates Program Grant "Endogenous Targets of PARP-16 and Novel Therapeutic Tools for Breast Cancer" (PI: Y. Zhang) | 07/01/15 – 06/30/16 | \$3,200 |
| USC Ming Hsieh Institute for Engineering Medicine for Cancer "Engineering Exosome Nanoparticles for Targeted Cancer Therapies" (PI: Y. Zhang) | 07/01/15 – 08/30/16 | \$120,000 |
| USC Undergraduate Research Associates Program Grant "Profiling PARP-16-Centered Interactome in Cancer Cells" (PI: Y. Zhang) | 07/01/16 – 06/30/17 | \$6,400 |
| USC Research Center for Liver Diseases (NIH 2P30DK048522) "Role of PARP14 in Hepatocarcinogenesis" (PI: Y. Zhang) | 03/01/16/ – 02/28/18 | \$100,000 |

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| USC Undergraduate Research Associates Program Grant “Delineating Cellular ADP-Ribosylation for Novel Cancer Therapies” (PI: Y. Zhang) | 07/01/17 – 06/30/18 | \$4,800 |
| USC Ming Hsieh Institute for Engineering Medicine for Cancer “Developing Novel Immuno-nanoparticles for Colorectal Cancer” (PI: Y. Zhang) | 07/01/17 – 08/30/18 | \$130,000 |
| American Cancer Society Institutional Research Grant “Novel Immunotherapeutics Targeting Human Breast Cancers” (PI: Y. Zhang) | 09/01/17 – 08/31/18 | \$30,000 |
| V Foundation Scholar Grant “Mapping PARP14-based Interactome in Cancer Cells” (PI: Y. Zhang) | 11/01/16 – 11/01/18 | \$200,000 |
| USC Ming Hsieh Institute for Engineering Medicine for Cancer “Development of Novel Immunotherapeutics for Breast Cancer” (PI: Y. Zhang) | 07/01/18 – 08/31/19 | \$140,000 |
| American Association of Pharmaceutical Scientists (AAPS) Foundation New Investigator Grant “Targeting Metastatic Colorectal Cancer with Novel Immuno-Nanoparticles” (PI: Y. Zhang) | 08/01/17 – 07/31/19 | \$40,000 |
| USC Undergraduate Research Associates Program Grant “Targeting Hepatocellular Carcinoma with Inhibitory Antibodies” (PI: Y. Zhang) | 07/01/18 – 06/30/19 | \$5,500 |
| USC Stevens Technology Advancement Grant “Pharmacology of Immunotherapeutic Exosomes” (PI: Y. Zhang) | 07/01/18 – 06/30/19 | \$50,000 |
| PhRMA Foundation Research Starter Grant in Translational Medicine and Therapeutics “Novel Immunotherapeutics for Colorectal Cancer” (PI: Y. Zhang) | 09/01/18 – 08/31/19 | \$100,000 |
| V Foundation Scholar PLUS Grant “Mapping Post-Translational Modification-Dependent Interactome in Cancer Cells” (PI: Y. Zhang) | 02/01/19 – 01/31/20 | \$100,000 |
| AACR-Bayer Innovation and Discovery Grant “Targeting Renal Cell Carcinoma with Novel Immunotherapeutics” (PI: Y. Zhang) | 07/01/19 – 06/30/20 | \$25,000 |
| USC Undergraduate Research Associates Program Grant “Targeting Hepatocellular Carcinoma with Inhibitory Antibodies” (PI: Y. Zhang) | 07/01/19 – 06/30/20 | \$4,650 |
| USC School of Pharmacy New Faculty Start-up Fund (PI: Y. Zhang) | 12/01/14 – 06/30/20 | |
| TRDRP New Investigator Award “Novel Immunotherapeutics for Cigarette-Smoking Associated Acute Myeloid Leukemia” (PI: Y. Zhang) | 09/01/19 – 08/14/20 | \$330,000 |
| USC School of Pharmacy Interdisciplinary Research Award “CD99/FLT3 Bispecific Antibodies, New Immunotherapy for Acute Myeloid Leukemia” (Co-I: Y. Zhang) | 10/01/18 – 09/30/20 | \$34,456 |
| STOP CANCER Research Career Development Award “Development of Novel Cancer Immunotherapeutics” (PI: Y. Zhang) | 02/01/18 – 01/31/21 | \$150,000 |
| CBCRP Innovative Development and Exploratory Award “Immunotherapeutic Exosomes for Triple Negative Breast Cancer” (PI: Y. Zhang) | 08/01/19 – 01/31/21 | \$247,500 |

Invited Talks:

1. Protein Engineering for Novel Targeted Therapies, UT Health Science Center San Antonio, October 2020
2. Harnessing Extracellular Vesicles as Novel Vaccines for COVID-19, USC School of Pharmacy Town Hall Talk, October 2020
3. Engineering Extracellular Vesicles for Breast Cancer Immunotherapy, USC Breast Cancer Program Meeting, November 2019

4. Devising Artificial Biomolecules at the Interface of Chemistry and Biology, the Minority Opportunities in Research (MORE) Programs at California State University, Los Angeles, CA, October 2019
5. Developing Novel Immunotherapeutics for Cancer, Fulgent Pharma, Temple City, CA, October, 2018
6. From Bench to Clinical Applications: Money Talks, USC Center for Excellence in Research, October 2018
7. CD99/FLT3 Bispecific Antibodies, New Immunotherapy for Acute Myeloid Leukemia, USC School of Pharmacy Board of Councilors Meeting, Rancho Palos Verdes, CA, October, 2018
8. Development of Novel Cancer Immunotherapeutics, Genentech-STOP CANCER Annual Research meeting, April 2018
9. Elucidating the Role of Protein ADP-Ribosylation in Hepatocellular Carcinoma, USC Research Center for Liver Diseases 22st Annual Symposium, March 2018
10. Targeting Extracellular Proteases with Novel Therapeutic Antibodies, USC Factor Meeting, November, 2017
11. Targeting Extracellular Proteases with Novel Antibody Therapeutics for Breast Cancer, USC Breast Cancer Program Meeting, August 2017
12. Systematic Deciphering of Epigenetic Landscape in Hepatocellular Carcinoma, USC Research Center for Liver Diseases 21st Annual Symposium, March 2017
13. Role of PARP14 in Hepatocarcinogenesis, USC Research Center for Liver Diseases 20th Annual Symposium, January 2016
14. Rational Design of Humanized Agonist Antibodies, 13th Annual Discovery on Target-Antibodies against Membrane Protein Targets, Boston, MA, September 2015
15. Rational Design of Novel Biomolecules for Drug Discovery, Translational and Clinical Sciences Program, USC Norris Comprehensive Cancer Center, July 2015
16. Investigating and Engineering Novel Biomolecules for Drug Discovery, Department of Chemistry, University of Southern California, CA, February 2015
17. Investigating and Engineering Novel Biomolecules for Drug Discovery, School of Life Sciences, Shandong University, China, September 2014
18. Expanding the Repertoire of Antibody CDR Fusion Proteins for Long-Lived Therapeutics, Rising Stars Symposium in Chemical Biology, University of Utah, Salt Lake City, UT, December 2013
19. Transition State Structures of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases, Gordon Research Conferences – Isotopes in Biological & Chemical Sciences, Ventura, CA, February 2008.

Conference Poster Presentations:

1. Zhang, X.N., Cheng, Q., Chen, J., Lam, A.T., Lu, Y., Dai, Z., Pei, H., Evdokimov, N.M., Louie, S.G. and **Zhang, Y.** Novel Ribose-Functionalized NAD⁺ for Studying Protein ADP-Ribosylation. Gordon Research Conferences – Nucleosides, Nucleotides and Oligonucleotides, Newport, RI, June 2019.
2. Cheng, Q., Shi, X., Han, M., Smbatyan, G., Lenz, H.J. and **Zhang, Y.** Reprogrammed Exosomes for Cancer Immunotherapy. Innovation Summit of University of Southern California, Los Angeles, CA, March 2019
3. Lam, A.T., Zhang, X.N., Chen, J., Cheng, Q., Pei, H., Louie, S.G. and **Zhang, Y.** Bifunctional NAD Analogue for Profiling ADP-ribose Interacting Proteins. 2018 Southern California Biomedical Sciences Graduate Student Symposium, Los Angeles, CA, October 2018
4. Cheng, Q., Shi, X., Han, M., Smbatyan, G., Lenz, H.J. and **Zhang, Y.** Developing Novel Immunotherapeutics for Cancer. Ming Hsieh Institute Symposium for Research on Engineering-Medicine for Cancer Moving Cancer Research into Clinical Trials, Pasadena, CA, October 2018
5. Shi, X., Cheng, Q. and **Zhang, Y.** Reprogramming Exosome as Novel Immunotherapy for Breast Cancer. (selected podium presentation) GPEN2018 Conference, National University of Singapore, Singapore, September 2018

6. Lam, A.T., Zhang, X.N., Chen, J., Cheng, Q., Pei, H., Louie, S.G. and **Zhang, Y.** Bifunctional NAD Analogue for Profiling ADP-ribose Interacting Proteins. Moving Targets Symposium, Los Angeles, CA, August 2018
7. **Zhang, Y.**, Cheng, Q., and Zhang, X-N., Novel Chemical Tools for Tracking Protein ADP-Ribosylation in Live Cells. Gordon Research Conferences – Bioorganic Chemistry, Andover, NH, June 2017.
8. Chen, J. and **Zhang, Y.** Developing Novel Antibody-Drug Conjugates for Targeted Cancer Therapy, GPEN2016 Conference, Lawrence, KA, November 2016
9. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G. and Wang, F. Engineering Antibodies with Ultralong CDR3 Loops for Enhanced Pharmacological Properties, Gordon Research Conferences – Enzymes, Coenzymes & Metabolic Pathways, Waterville Valley, NH, July 2014.
10. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G., Wang, F. Engineering Antibodies with Ultralong CDR3 Loops for Enhanced Pharmacological Properties. Gordon Research Conferences – Bioorganic Chemistry, Andover, NH, June 2013.
11. **Zhang, Y.**, Wang, D., de Lichtervelde, L., Sun, S.B., Smider, V.V., Schultz, P.G. and Wang, F. The Origin and Therapeutic Application of a Novel CDR3H Domain-containing Antibody, Gordon Research Conferences – Enzymes, Coenzymes & Metabolic Pathways, Waterville Valley, NH, July 2012.
12. **Zhang, Y.** and Schramm, V.L. Leaving Group Activation and PPi Ionic State at the Catalytic Site of *Plasmodium falciparum* Orotate Phosphoribosyltransferase, Gordon Research Conferences – Bioorganic Chemistry, Andover, NH, June 2010.
13. **Zhang, Y.** and Schramm, V.L. Pyrophosphate Nucleophilic Participation at the Transition States of *Plasmodium falciparum* and Human Orotate Phosphoribosyltransferases, Gordon Research Conferences – Isotopes in Biological & Chemical Sciences, Galveston, TX, February 2010.
14. **Zhang, Y.**, Evans, G.B., Fröhlich, R.F., Cassera, M.B., Tyler, P.C. and Schramm, V.L. Targeting Pyrimidine Synthesis in *Plasmodium falciparum* with Transition State Analogues of Orotate Phosphoribosyltransferase, Gordon Research Conferences – Malaria, Oxford, United Kingdom, September 2009.
15. Merrill, A., **Zhang, Y.**, Liu, S. and Lajoie, G. Characterization of the Diphthamide Modification on Site-Directed Mutants of Eukaryotic Elongation Factor 2 by Mass Spectrometry, VII European Symposium of the Protein Society – From Proteins to Proteome, Stockholm, Sweden, May 2007.

Lab Personnel:

Current lab members:

Dr. Xiao-Nan Zhang (Postdoctoral researcher)
 Dr. Qinqin Cheng (Postdoctoral researcher)
 Dr. Liang-Chieh Chen (Postdoctoral researcher)
 Jiawei Li (PhD student)
 Elisa Stephens (PhD student)
 Guoyun Kao (PhD student)
 Hyo Sun (Sunny) Kim (Master student)
 Kimia Hariri (Master student)
 Zekun Li (Master student)
 Po-Wen Yu (Master student)
 Sean Lee (Undergraduate student)

Former lab members:

Larry Rodriguez (PhD rotation student), 06/2015 – 12/2015
 Xianhui Chen (PhD rotation student), 09/2015 – 12/2015
 Xueyuan Jing (PhD rotation student), 01/2018 – 03/2018
 Christian Rabot (PhD rotation student), 01/2018 – 03/2018
 Connor Hurd (PhD rotation student), 03/2018 – 04/2018

Eunjin Hong (PhD rotation student), 03/2018 – 04/2018
Wilson Lee (PhD rotation student), 01/2019 – 04/2019
Ryan Van Damme (PhD rotation student), 03/2019 – 04/2019
Brandon Ebright (PhD rotation student), 09/2019 – 12/2019
Benazir Oluoch (PhD rotation student), 09/2020 – 12/2020
Jingwen (Julianna) Chen (PhD student), 01/2015 – 05/2019
Xiaojing Shi (PhD student), 03/2015 – 05/2020
Albert Lam (PhD student), 03/2015 – 10/2020
Zhefu Dai (PhD student), 01/2015 – 05/2021
Chun (Michael) Chen (PharmD student), 09/2019 – 12/2019
Menglu Han (Master student), 03/2015 – 06/2016
Aliya Anvery (Master student), 06/2015 – 08/2015
Rui Wu (Master student), 09/2015 – 12/2015
Yanran Lu (Master student), 09/2015 – 05/2017
Tianling Hou (Master student), 09/2017 – 05/2019
Xinping Duan (Master student), 09/2018 – 05/2020
Yiling Wang (Master student), 09/2018 – 05/2020
Tianxiao Zhang (Master student), 09/2019 – 06/2021
Connie Kim (Undergraduate student), 01/2015 – 05/2015
Sungwon Byun (Undergraduate student), 01/2016 – 05/2016
Jaynelle Gao (Undergraduate student), 06/2016 – 08/2016
Devin Zhao (Undergraduate student), 06/2016 – 08/2016
Joseph Tuan (Undergraduate student), 09/2016 – 12/2017
Jason Tsoi (Undergraduate student), 06/2017 – 08/2017
Qiuyang (Annie) Chen (Undergraduate student), 01/2017 – 12/2017
Alice Lee (Undergraduate student), 08/2017 – 11/2017
Itzel Ortega (Undergraduate student), 05/2018 – 08/2018
Amanda Shen (Undergraduate student), 10/2018 – 04/2019
Cindy Yang (Undergraduate student), 01/2019 – 04/2019
Brandon Irie (Undergraduate student), 09/2019 – 11/2019
Shivani Daftary (Undergraduate student), 04/2019 – 05/2020
Won Sek Lee (Undergraduate student), 01/2020 – 05/2021
Chen Niu (Visiting undergraduate student from China Pharmaceutical University), 01/2017 – 05/2017
Kevin Duong (SURF Undergraduate student from University of Illinois Urbana-Champaign), 05/2018 – 08/2018
Stephanie George (Francisco Bravo Medical Magnet High School), 06/2017 – 05/2018