Mian Zhou

Department: School of Biotechnology

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Profile

Mian Zhou (PhD, associate professor) got her bachelor’ s degree in Biotechnology from Nanjing University in 2009, and PhD degree in Integrative Biology from UT Southwestern Medical Center (Dallas, Texas) in 2014. She joined East China University of Science and Technology in December 2014. So far she has received funding support from National Natural Science Foundation of China, National Key Research and Development Program of China, Shanghai Pujiang Program, Shanghai Chenguang Program, Shanghai Science and Technology Committee Rising-Star Program and Fundamental Research Funds for the central Universities. Her research achievements have been published in journals including Nature, Molecular Microbiology, EMBO reports, Scientific Reports, etc.

Research Field

Our group is devoted to study the molecular mechanisms of codon usage bias in regulating gene transcription and protein translation, as well as chassis cell construction and expression system modification on the basis of theoretical studies. Detailed research topics include:

1. The mechanisms of how codon bias regulates gene transcription, including its effect on epigenetic status, RNA stability and transcriptional activity change.
2. The mechanisms of how codon bias regulates protein translation, including its effect on protein synthesis speed, translational efficiency and co-translational folding.
3. Expression system modification on the basis of theoretical studies, especially codon optimization strategy development (mainly relies on genetic, molecular biological and bio-informatical methods) to assist chassis cell construction and recombinant protein expression.

Research results and selected published papers

1. Mian Zhou, Jinhu Guo, Joonseok Cha, Michael Chae, She Chen, Jose Barral, Matthew Sachs, Yi Liu*. Non-optimal codon usage affects expression, structure and function of clock protein FRQ. Nature 2013, 495(7439): 111-115.
2. Joonseok Cha, Mian Zhou, Yi Liu*. CATP is a critical component of the Neurospora circadian clock by regulating the nucleosome occupancy rhythm at the frequency locus. EMBO reports 2013, 14(10): 923-930.
3. Joonseok Cha, Mian Zhou, Yi Liu*. The mechanism of the Neurospora circadian clock, a frequency-centric view. Biochemistry 2014, 54: 150-156.
4. Joonseok Cha, Mian Zhou, Yi Liu*. Methods to study molecular mechanisms of the Neurospora circadian clock. Methods in Enzymology 2014, 551: 137-151.
5. Mian Zhou1, Tao Wang1, Jingjing Fu, Guanghua Xiao, Yi Liu*. Non-optimal codon usage influences protein structure in intrinsically disordered regions. Molecular Microbiology 2015, 97(5): 974-987.
6. Wei Shen, Ying Xue, Yiqi Liu, Chuixing Kong, Xiaolong Wang, Mengmeng Huang, Menghao Cai, Xiangshan Zhou, Yuanxing Zhang, Mian Zhou*. A novel methanol-free Pichia pastoris system for recombinant protein expression. Microbial Cell Factories 2016, 15: 178.
7. Xiaolong Wang, Qi Wang, Jinjia Wang, Peng Bai, Lei Shi, Wei Shen, Mian Zhou, Xiangshan Zhou, Yuanxing Zhang, Menghao Cai*. Mit1 transcription factor mediates methanol signaling and regulates alcohol oxidase 1 promoter in Pichia pastoris. Journal of Biological Chemistry 2016, 291 (12): 6245-6261.
8. Xiaolong Wang, Menghao Cai*,·Lei Shi, Qi Wang, Jinxiang Zhu, Jinjia Wang, Mian Zhou,·Xiangshan Zhou, Yuanxing Zhang. PpNrg1 is a transcriptional repressor for glucose and glycerol repression of AOX1 promoter in methylotrophic yeast Pichia pastoris. Biotechnology Letters 2016, 38(2): 291-298.
9. Zhipeng Zhou, Yunkun Dang, Mian Zhou, Liande Li, Chien-Hung Yu, Jingjing Fu, She Chen, Yi Liu*. Codon usage is an important determinant of gene expression levels largely through its effects on transcription. Proceedings of the National Academy of Sciences of the United States of America 2016, 113(41):E6117-E6125.
10. Jingjing Fu, Katherine Murphy, Mian Zhou, Ying Li, Vu Lam, Christine Tabuloc, Joanna Chiu*, Yi Liu*. Codon usage affects the structure and function of the Drosophila circadian clock protein PERIOD. Genes and Development 2016, 30(15):1761-75.
11. Wei Shen, Chuixing Kong, Ying Xue, Yiqi Liu, Menghao Cai, Yuanxing Zhang, Tianyi Jiang, Xiangshan Zhou* and Mian Zhou*. Kinase screening in Pichia pastoris identified promising targets involved in cell growth and Alcohol Oxidase 1 promoter (PAOX1) regulation. PLoS One 2016, 11 (12): e0167766.
12. Ning Xu, Jinxiang Zhu, Qiaoyun Zhu, Yanzi Xing, Menghao Cai, Tianyi Jiang, Mian Zhou* and Yuanxing Zhang. Identification and characterization of novel promoters for recombinant protein production in yeast Pichia pastoris. Yeast 2018, 35: 379-385.
13. Zhen Yang, Xiaohui Zhou, Yue Ma, Mian Zhou, Matthew K. Waldor, Yuanxing Zhang and Qiyao Wang*. Serine/threonine kinase PpkA coordinates the interplay between T6SS2 activation and quorum sensing in the marine pathogen Vibrio alginolyticus. Environmental Microbiology 2018, Epub ahead of print.
14. Yunpeng Guan, Kaiyu Yin, Mian Zhou, Minjun Yang, Yuanxing Zhang, Xiaohong Liu and Qiyao Wang. EsrB negatively regulates expression of the glutamine synthetase GlnA in the fish pathogen Edwardsiella piscicida. FEMS Microbiology Letters 2018, Epub ahead of print.
15. Zhipeng Zhou, Yunkun Dang, Mian Zhou, Haiyan Yuan and Yi Liu. Codon usage biases co-evolve with transcription termination machinery to suppress premature cleavage and polyadenylation. Elife 2018, 7: e33569.
16. Jinxiang Zhu, Ruiqing Gong, Qiaoyun Zhu, Qiulin He, Ning Xu, Yichun Xu, Menghao Cai, Xiangshan Zhou, Yuanxing Zhang and Mian Zhou*. Genome-wide determination of gene essentiality by transposon insertion sequencing in yeast Pichia pastoris. Scientific Reports 2018, 8(1): 10223.
17. Jinxiang Zhu, Qiaoyun Zhu, Ruiqing Gong, Qin Xu, Menghao Cai, Tianyi Jiang, Xiangshan Zhou, Mian Zhou* and Yuanxing Zhang. PiggyBac transposon-mediated mutagenesis and application in yeast Komagataella phaffii. Biotechnology Letters 2018, 40(9-10): 1365-1376.
18. Xiaoyue Sun, Wei Shen, Yanyun Gao, Menghao Cai, Mian Zhou* and Yuanxing Zhang. Heterologous expression and purification of a marine alginate lyase in Escherichia coli. Protein Expression and Purification 2019, 153: 97-104.
19. Yanzi Xing, Ruiqing Gong, Yichun Xu, Kunshan Liu and Mian Zhou*. Codon usage bias affects α-amylase mRNA level by altering RNA stability and cytosine methylation patterns in Escherichia coli. Canadian Journal of Microbiology 2020, 7:1-8.