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Research Interests:
CRISPR-Cas, Genome Editing, Gene Therapy, Molecular Evolution

Selected Publications:

1. Su, M., Li, F., Wang, Y., Gao, Y., Lan, W., Shao, Z., Zhu, C., Tang, N., Gan, J., Wu, Z.*, **Ji, Q.***, Molecular basis and engineering of miniature Cas12f with C-rich PAM specificity, ***Nature Chemical Biology*****, 2024**, 20, 180.

2. Wu, Z., Liu, D., Pan, D., Yu, H., Shi, J., Ma, J., Fu, W., Wang, Z., Zheng, Z., Qu, Y., Li, F., Chen, W., Huang, X., Shen, H.*, **Ji, Q.***, Structure and engineering of miniature *Acidibacillus sulfuroxidans* Cas12f1, ***Nature Catalysis*****, 2023**, 6, 695.

3. Chen, W., Ma, J., Wu, Z., Wang, Z., Zhang, H., Fu, W., Pan, D., Shi, J., **Ji, Q.***, Cas12n nucleases, early evolutionary intermediates of type V CRISPR, comprise a distinct family of miniature genome editors, ***Molecular Cell*****, 2023**, 83, 2768.

4. Wu, Z., Zhang, Y., Yu, H., Pan, D., Wang, Yuj., Wang, Ya., Li, F., Liu, C., Nan, H., Chen, W., **Ji, Q.***, Programmed genome editing by a miniature CRISPR-Cas12f nuclease, ***Nature Chemical Biology*****, 2021**, 17, 1132.

5. Zhang, Y., Zhang, H., Xu, X., Wang, Yuj, Chen, W., Wang, Ya., Wu, Z., Tang, N., Wang, Yu, Zhao, S., Gan, J.*, **Ji, Q.***, Catalytic-state structure and engineering of *Streptococcus thermophilus* Cas9, ***Nature Catalysis*****, 2020**, 3, 813.

Exploration of the biological diversity of miniature CRISPR-Cas12 genome editors

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Abstract

CRISPR-Cas9/Cas12a genome editing systems have been widely harnessed for genetic engineering and gene therapeutics. However, the large sizes of these CRISPR effector nucleases restrict their flexibility in therapeutic applications that use the cargo-size-limited adeno-associated virus delivery vehicle. We recently developed miniature CRISPR-Cas12f and -Cas12n systems for efficient genome editing. We studied the detailed DNA recognition and cleavage mechanisms of the two systems. Moreover, we engineered a CRISPR-Cas12f variant with enhanced editing activity using structure-guided protein engineering. The small sizes of the nucleases offer advantages for cellular delivery, and characterizations of the nucleases will facilitate engineering more compact genome-manipulation technologies.