A Bioengineered Homopolymer to Deliver CRISPR Prime Editors *in vivo*

*Fengtian Fan and Rui Tian**

State Key Laboratory of Molecular Vaccinology and Molecular Diagnostics & Center for Molecular Imaging and Translational Medicine School of Public Health, Xiamen University, Xiamen, 361102, China

rtian@xmu.edu.cn

Prime editor (PE) dramatically expands the scope of genome editing, holding promising gene therapy potential. However, efficient delivery of the PE system into living lives is still challenging. Herein, we designed a PE system delivery platform with a flexible, modular, and virus assembly-mimetic structure to efficiently deliver the PE system to the nucleus. Benefiting from this flexible assembly, the essential modules, ensuring the efficient delivery to the nucleus, were also sequentially expressed in the backbone. As expected, we transported the PE to edit several cell types in cells/living mice with greatly satisfying delivery and editing efficacies. Moreover, the visualized non-virus-/virus-like-based delivery of PE was successfully implemented in living mice to repair mutated genes. This delivery system holds excellent potential for PE *in vivo* delivery for disease treatment.