

# **Genome editing with programmable nucleases in crop plants**

Caixia Gao

Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing 100101,  
China. Tel: (+86)-10-64807727. Email: cxgao@genetics.ac.cn.

Genome editing can accelerate plant breeding by allowing the introduction of precise and predictable modifications directly in an elite background. The most promising utilization of both the CRISPR/Cas9 system and TALENs can be used to generate targeted genome modifications including mutations, insertions, replacements and chromosome rearrangements. We developed simple and efficient genome editing approaches in which wheat plants are regenerated from callus cells transiently expressed with CRISPR/Cas9 reagents introduced as DNA, RNA or RNP. We also established a plant base editing protocol suitable for introducing targeted point mutations to wheat, rice and maize genomes. This approach will not only technologically advance plant genome engineering, but may also provide better solution for social acceptance of genome-edited crops as they do not require a donor DNA template or chromosomal cleavage. These approaches may be widely applicable for producing genome edited crop plants and has a good prospect of being commercialized.