Developing a Convenient Gene Editing System in Peanut

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The precise genome-editing technology CRISPR/Cas9 has provided novel tools not only for basic biology research in plant but also for creating new varieties in plants through applied biology. However, the CRISPR tools have not been fully applied in peanut research. We have developed several constructs for CRISPR-mediated genome-editing, such as Cas9 and Cpf1-based gene editing including indel generated for functional study, cytidine deaminase for point mutation, and promoter modification for gene regulation. Our results showed substitutions as edits in protoplast and leaf infiltration, while in hairy root, substitution, insertion and deletion were observed as edits. Furthermore, we developed a peanut flower transformation system via injection of Agrobacterium with the CRISPR component directly into calyx tube. Analysis of fatty acid content in the T0 generation seeds is still underway. These results confirmed the usefulness of the constructs and could be applied in other genes of interest in peanut; therefore, developing new peanut lines with improved traits.