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Gene Editing for Major Allergy Genes using Multiplex CRISPR-Cas9 System & Prime editing in Peanuts (*Arachis hypogaea* L.)

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[Abstract]

Recently, food-induced allergies have emerged as major global concerns. In the past ten years, it has doubled in western nations, and it has also increased in Asia and Africa. In many cases of food allergy, peanut allergy is prevalent, typically permanent, and frequently life-threatening. Therefore, we utilized gene editing techniques on the three major allergen genes in peanuts, Ara h 1, Ara h 2, and Ara h 3. Using gibson assembly and golden gate assembly, we created two vectors, the gRNA-tRNA array CRISPR-Cas9 system and Prime-editing. Using LBA4404 strain and agrobacterium-mediated transformation, the vectors were transferred to two elite Korean peanut lines. After co-cultivation and tissue culture, we extracted the tissue cultured peanut DNA amplified the hygromycin resistance gene and Cas9 gene in the T-DNA region. The integration of the T-DNA region into the host genome was demonstrated by the presence of a specific band in some samples. There have only been a few reported peanut gene editing studies. So, this study will contribute to peanut allergy and gene editing research.

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