

**SYSTEMS, METHODS, AND COMPOSITIONS FOR SITE-SPECIFIC GENETIC
ENGINEERING USING PROGRAMMABLE ADDITION VIA SITE-SPECIFIC
TARGETING ELEMENTS (PASTE)**

ABSTRACT

This disclosure provides systems, methods, and compositions for site-specific genetic engineering using Programmable Addition via Site-Specific Targeting Elements (PASTE). PASTE comprises the addition of an integration site into a target genome followed by the insertion of one or more genes of interest or one or more nucleic acid sequences of interest at the site. PASTE combines gene editing technologies and integrase technologies to achieve unidirectional incorporation of genes in a genome for the treatment of diseases and diagnosis of disease.

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