Macro Roundup Article

Headline: Bridge RNAs Direct Programmable Recombination Of Target And Donor DNA

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Tweet: Moving beyond CRISPR gene editing technology, “bridge recombination” allows fully programmable gene insertion and may “enable a new frontier of genome design.”

Summary: Guide RNAs [a key component of CRISPR] are underpinning a technological revolution in programmable biology. Functional diversification of these systems beyond nucleic acid binding or cleavage has generally required the recruitment or fusion of additional effector proteins, resulting in increasingly large and intricate engineered genome-editing fusions. The IS110 bridge system, in contrast, uses a single and compact RNA-guided recombinase that is necessary and sufficient for direct DNA recombination. Modular reprogramming of target and donor recognition by the bispecific bridge RNA uniquely enables the three fundamental DNA rearrangements of insertion, excision, and inversion for manipulating large-scale DNA sequences and overall genome organization. With further exploration and development, we expect that the bridge recombination mechanism will spur a third generation of programmable RNA-guided tools beyond RNA interference- and CRISPR-based mechanisms to enable a new frontier of genome design.

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