

A Method For Autocatalytic Genome Editing

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BACKGROUND

The CRISPR/CAS9 (clustered regularly interspaced short palindromic repeats/CRISPR-associated genes) system has been found to be adaptable to nearly every organism studied including mammalian cells, fruit flies, and plants. The broad adaptability of this system has lead in the past year to significant strides in refining the methodology and in the generation of many additional applications. The innovation we propose is based solidly on existing technologies and should work in flies, mosquitos, human cells, and plants.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have a novel method for autocatalytic genome editing based on genomic integration of a construct containing multiple elements. This is a method to generate dominant contagious mutations. For example, if a gene was introduced, which when expressed would prevent mosquitos from harboring the malaria parasite; a few individuals carrying such an expression cassette on such a contagious construct could be released to spread that cassette into that population exponentially. This explosive dispersion of the construct throughout the population derives from the novel ability of the mutant allele carrying the construct to convert the wild-type allele to the same exact condition. As a result of this self-converting property of mutant alleles, offspring inheriting such an allele would become homozygous for the allele. Sparse seeding of such mutant individuals could replace the wild-type species in less than 10 generations. The invention could also be used to allow the mutation to spread within cell of a single individual afflicted with a disease such as HIV or cancer. The invention would also be able to target insertion of the construct into DNA sequences that are specific to diseased cells and then carry a specific type of cassette that could kill, fix, or reprogram the diseased cells.

APPLICATIONS

Applications include the elimination of pathogens (e.g., malaria), targeted suppression of crop pests to those actively attacking a crop of interest, weed control, strategies to combat HIV and other diseases caused by retroviruses. The invention could also be used to combat cancer that is independent of the type of cancer or stage of cancer progression.

RELATED MATERIALS

- ▶ [Valentino M. Gantz and Ethan Bier. The mutagenic chain reaction: A method for converting heterozygous to homozygous mutations. Science, 3/19/15.](#)

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20180291382	10/11/2018	2015-095

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OTHER INFORMATION

KEYWORDS

CRISPR/CAS9, genome editing,
genetic engineering

CATEGORIZED AS

- ▶ [Biotechnology](#)
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