(SD2021-341) DNA substrate for eColi tRNA guanine transglycosylase (DNA tagging)

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ABSTRACT

Researchers from UC San Diego designed a new means to facilitate the enzymatic insertion of a variety of functionalized PreQ1 derivatives into a 17 nucleotide DNA hairpin which can then be appended to DNAs of interest for a variety of applications.

Background: While harnessing the programmable power of nucleic acids is no new revelation for science, new innovative applications that realize this power have been crucial to scientific advancements of late. These innovative strategies often rely heavily on nucleic acid modifications.

For many technical applications, precision is the key to its success, and it is necessary to have the means to carry out an efficient, site-specific, modification of the nucleic acid substrate. While a variety of site-specific enzymatic RNA modification strategies have been well established, the same is not true for DNA modifications, particularly single stranded DNA (ssDNA). Currently enzymatic modification of ssDNA is limited to 3’ insertion of modified nucleobases and the 5’ insertion of modified phosphate groups. Consequently, there is a need for higher precision methods and compositions for enzymatic modification of ssDNA.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have developed a technology that allows for the enzymatic insertion of a variety of functional small molecules into ssDNA substrates of interest for downstream applications. This system is compatible for both internal and end DNA modifications and tolerant of a variety of small molecule substrates. Additionally, this technology allows an inexpensive and straightforward method by which researchers can quickly label several DNA oligos, either simultaneously or in parallel, in a single step and with a short spin column purification. The applications demonstrated here show promise for the breadth of capabilities that this technology will unlock.

APPLICATIONS

This technology is a new means to facilitate the enzymatic insertion of a variety of functionalized PreQ1 derivatives into a 17 nucleotide DNA hairpin which can then be appended to DNAs of interest for a variety of applications.

OTHER INFORMATION

KEYWORDS

SNAP-tag, RNA modification, RNA degradation, RNA, oligonucleotide modification, RNA FISH

CATEGORIZED AS

- **Research Tools**
  - Nucleic Acids/DNA/RNA

RELATED CASES

2021-Z08-1

RNA FISH probe set labeling; near IR northern/southern blot probes; covalent delivery of ssODN for Cas9 mediated genomic modification.

ADVANTAGES

STATE OF DEVELOPMENT

INTELLECTUAL PROPERTY INFO

UC San Diego is seeking companies interesting in commercializing this patent-pending technology.

RELATED MATERIALS

- Tota EM, Devaraj NK. RNA-TAG Mediated Protein-RNA Conjugation*. Chembiochem. 2023 Jul 27:e202300454 - 07/27/2023

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