NucleoSight

Visualize the building blocks of life

Los Alamos NATIONAL LABORATORY

TECHNOLOGY SNAPSHOT

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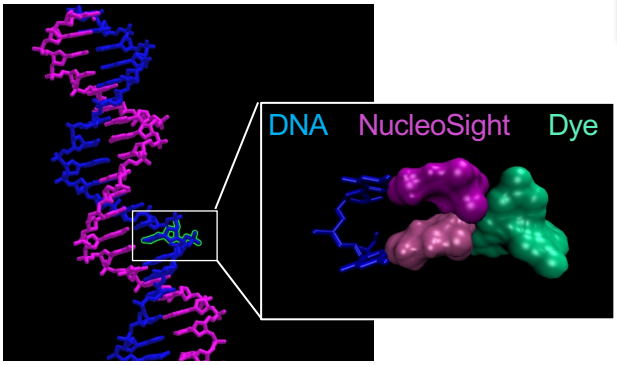

APPLICATION AREA

Sector: Biotechnology, Life Sciences, & Healthcare

Area: Biochemistry

Industry: Life Sciences

Market: DNA imaging and labeling; Fluorescent nucleotides

PARTNERSHIP OPPORTUNITIES

We are seeking a life science reagents and consumables supplier with an interest in adding NucleoSight to their DNA imaging portfolio. This technology could be packaged with an existing fluorescent kit.

This technology is available for:

- [X] Cooperative Agreement
- [X] License
- [ ] Tech Assistance
- [ ] Startup

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TECHNOLOGY READINESS LEVEL: 2

Applied research

IP information

Patent pending (S167673)

OVERVIEW

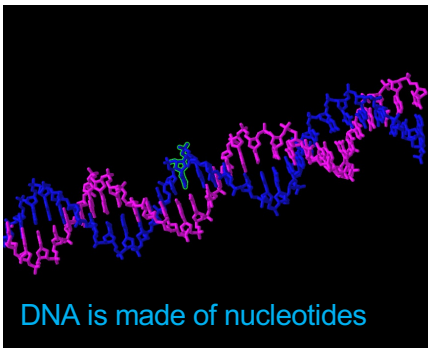
Microbiologists, synthetic biologists and nucleotide chemists are seeking new tools to enable experiments that are not currently realized with existing molecular biology products. NucleoSight is being developed for researchers who are seeking additional DNA and RNA imaging capabilities.

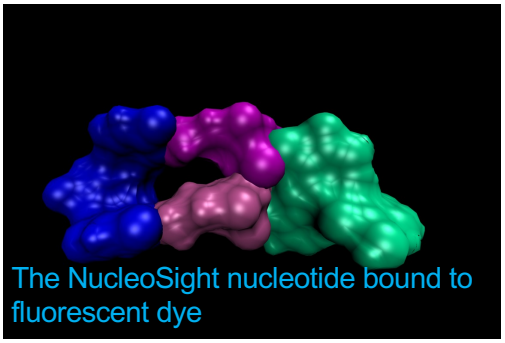
The concept of NucleoSight is a piece of DNA with a small chemical modification that binds to a commercially available fluorescent dye. Using standard laboratory equipment, this technology allows researchers to build fluorescent DNA strands either in a tube or within the cell itself. This enables new experimental avenues in which researchers can study the DNA and RNA signals their cells generate without killing the cell. NucleoSight will help researchers realize synthetic biology goals and work toward having a *conversation* with a live cell.

The growing fields of diagnostics and personalized medicine are driving the need for new tools to expand and grow the capabilities within these fields. NucleoSight is a promising addition to a researcher's toolkit to enable groundbreaking results.

ADVANTAGES

- ☑ On/off fluorescence for reduced background noise
- ☑ Binding specificity without a purification step
- ☑ Integration into living cells to keep cells of interest for future experiments and study.
- ☑ 2 nucleotide coding motif can be encoded and decoded without requiring longer sequence-specific probes


DNA is made of nucleotides


The NucleoSight nucleotide bound to fluorescent dye


NucleoSight encoded within DNA can be illuminated

TECHNOLOGY DESCRIPTION

NucleoSight is a piece of DNA with a small chemical modification that allows it to bind to a fluorescent dye that is commercially available. NucleoSight's small size allows it to penetrate the cellular membrane and fit within the cellular machinery before interacting with the dye. When NucleoSight and the dye come together, their binding activates the dye's fluorescence, a signal that can be viewed in a common fluorescence microscope or a DNA sequencer.

MARKET APPLICATIONS

The fluorescent nucleotide and DNA labeling market is $1.7B and growing due to drivers like personalized medicine and increased genetic sequencing for research and medical applications. While much of this market growth belongs to diagnostic and therapeutic applications, advancements in these areas are rooted on a foundation of basic research where NucleoSight can have impact.

Our novel fluorescent nucleotide is a tool in a growing toolbox that a researcher can incorporate into their experimental protocols. Applications of interest include:

1. Live cell growth studies for mixed populations of cells (microbiome studies, in vitro tumor growth)
2. Synthetic biology signal generation and building a semisynthetic organism

Our goal is to learn and understand the needs of researchers (i.e. microbiologists, synthetic biologists, and nucleotide chemists) in order to tailor this tool for their specific experimental use case.

NEXT STEPS

We have demonstrated proof-of-concept that NucleoSight can be incorporated into DNA and bind to the commercial dye in the laboratory. Our next step is to validate cellular penetration and demonstrate the technology for application in live cell imaging.