

Method and Device for Selectively Labeling RNA

Summary

The National Cancer Institute's Structure Biophysics Lab seeks partners interested in licensing or co-developing a technology to site-specifically label RNA.

NIH Reference Number

E-119-2013

Product Type

- Diagnostics

Keywords

- Crystallography
- Fluorophore labeling
- FRET
- Isotope labeling
- Labeling sensor
- NMR Spectroscopy

Collaboration Opportunity

This invention is available for licensing.

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Description of Technology

Current methods of labeling and synthesizing RNA do not allow for multiple labels or long RNA segments to be synthesized for large RNA on a milligram scale.

Investigators at the NCI [Structure Biophysics Lab](#) and UT Health Science Center have developed a method to selectively label RNA at specific residues and/or segments using a hybrid solid-liquid phase enzymatic method. Moreover, they have developed an automated robotic platform capable of performing this method. The invention overcomes the limitations of current methods of synthesizing and labeling RNA by allowing synthesis of longer RNAs (>60 nt), labeling uniformity, and labeling by multiple base types on milligram scales.

The inventors have demonstrated its utility by producing a 71-nucleotides aptamer labeled with a fluorophore attached or isotope ribonucleotides for use in smRET and NMR spectroscopy, respectively. They also demonstrated the method for synthesis of milligrams of selectively isotope-selectively labeled 103-nt RNA. In principle the method can be used for synthesis of even longer RNA because of the excellent processibility of the enzyme.

Potential Commercial Applications

- Region/position-specific isotope and fluorophore labeling of RNA greatly simplifying interpretation of NMR spectroscopy, enhanced applicability/capability of smFRET, and solving the phase problem in X-ray crystallography
- Therapeutic and molecular sensor
- Molecular marker/tracer
- RNA-aptamer-based detection of substances

Competitive Advantages

- Uniform, potentially automated production of long labeled RNAs in milligram quantities
- Specific segments or discrete residues within the RNA can be selectively labeled
- Different labels can be made in different segments

Inventor(s)

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Development Stage

- Prototype

Patent Status

- **U.S. Patent Filed:** U.S. Patent Application Number PCT/US2014/045784
- **U.S. Patent Issued:** U.S. Patent Number 10,190,143, Issued 19 Jan 2019

Therapeutic Area

- Cancer/Neoplasm

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