Universität Hamburg
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Innovative mRNA Purification Method

Chemo-Enzymatic Approach for Selective Modification of RNA Caps

Focus Sectors
- RNA Purification
- RNA Cap Modification
- Life Sciences

Project Key Words
- RNA 5'-Cap-Modification
- mRNA Preparation Purification Process
- Versatile methodology

Development Status
- Proof of Concept

Patent Procedure Status
- EP, US & JP PCT Patent applications filed

Chances for Cooperation
- Licensing
- Patent Sale
- R&D Cooperation

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Innovation and Customer Benefit

The innovative approach we are presenting offers an answer to the increasing demand for universal methods suitable to isolate mRNAs from eukaryotic cells in order to support the understanding of mRNA expression as a marker for gene and protein expression.

The most frequently used procedures for isolating mRNA are based on the specific properties of the poly(A)-tail at the 3'-end and the cap structure at the 5'-end.

We offer a new strategy for mRNA-enrichment from total cellular RNA, based on a highly specific chemo-enzymatic modification of the characteristic 5'-cap.

RNA methyltransferase is used to transfer functional groups, which allows further modification and RNA isolation using click chemistry. The method offers adaptation possibilities to particular needs.

Potential applications

The application focus is the purification process of mRNA to support gene expression profiling.

The main advantages of the presented technology are the following:

- Enrichment of mRNA from total eukaryotic RNA independent of sequence length
- Versatile application to e.g. long non-coding RNAs, or others, which lack poly(A) tail, through immobilization of the 5'-end.
- Strong matrix interaction through covalent bonds, which allows robust cleaning of the immobilized mRNA
- Improved separation of components
- Shorter purification process
- Highly flexible and adaptable technique
- Fluorescent labelling and magnetic isolation of mRNAs possible

Technical Description

Our mRNA purification approach is based on the enzymatic transformation of the 5'-cap, whereby different molecules can be selectively linked to the RNA for a further purification.

The isolation of mRNA onto azide beads (potentially magnetic for ease of separation) takes place by reaction of the 5'-cap using a newly engineered enzyme. Furthermore the isolated mRNA can be labelled using a selective dye or bioitin.

The enzyme used is stable and the enrichment of mRNA has been successfully proven by Real-Time PCR

The new chemo-enzymatic mRNA purification method based on 5'-cap enable purification of mRNA independently of their sequence length. The technology presented offers a wide range of possibilities for various downstream applications

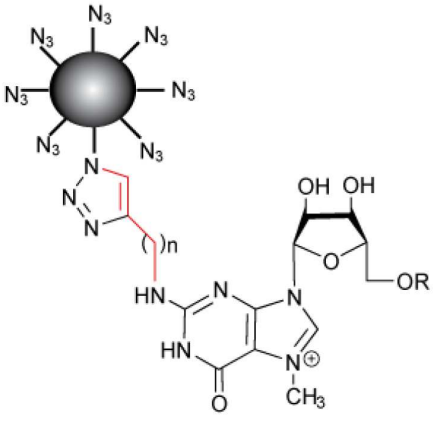

Fig: Isolation of mRNA via immobilization to azide beads.

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