TECHNOLOGY

A Novel Vector to Assay Translational Recoding

OVERVIEW

Background
Translational recoding is a mechanism typically employed by viruses to achieve efficient production of proteins required for assembly and replication. Operationally, translational recoding employs unique 3-dimensional RNA structures that drive ribosomes to slip “out of frame” (Programmed Ribosomal Frameshifting) or to bypass stop signals (Termination Suppression). These recoding events result in the synthesis of multiple gene products (polypeptides/proteins) in ratios proportional to the frameshift efficiency, and these ratios are optimized to maximize the fitness of each virus. Altering rates of recoding have been shown to have antiviral effects by decreasing viral fitness. Thus, effective assays are needed to definitively identify the nucleic acid sequences involved in, and to screen for drugs that can effectively inhibit translational recoding.
Innovative Technology
Researchers at the University of Maryland have developed a novel reporter vector that is able to not only measure the extent of translational recoding directed by a viral nucleic acid sequence but also precludes the necessity of additional samples to serve as reference controls for the experiment. The use of fluorescence precludes requirements for expensive chemical reporter reagents. Such a vector potentially reduces the costs of experimentation and can serve as a research tool as well as effective screening mechanism to identify recoding targeting drugs in a high throughput manner. This vector also enables recoding signal measurement in bulk as well as single cells and is also conducive to lentiviral cloning that can generate stable reporter cell lines.
Advantages
- Eliminates errors caused by running experimental controls in parallel
- Reduces expenses on reagents by reducing the sample size
- Dual promoters – simultaneous induction of both control and test modules
- Key components are isolated by insulator elements to reduce variability of transgene expression
- Potential for gathering tens-of-thousands of data points in a few seconds
- Expression is inducible – system is “dark” in the absence of inducer
- Fluorescent reporter proteins are monomeric
- Design is modular – components flanked by unique restriction sites facilitate rapid modification
- Supports single cell and bulk measurements and enables generation of stable reporter cell lines
- Lentiviral-mediated delivery available
Applications
- Measurement of recoding signals embedded in a given regulatory nucleic acid element (sequence) (from viral or other prokaryotic/eukaryotic sources)

CONTACT INFO

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Additional Information

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LICENSE STATUS

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EXTERNAL RESOURCES

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