

Photo-regulation of gene expression

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In this presentation, we show the photo-dependent RNAi method using photoresponsive RNA/carrier complex. The silencing of specific genes of interest, mediated by RNAi, is currently an important experimental tool for basic research into gene function. RNAi also has many potential uses in various biotechnological and therapeutic applications. To expand further the capabilities of RNAi technology for advanced biotechnological applications, it would be a great advantage if it were possible to control RNAi in a spatial and temporal manner using artificial, external factors. Light is one of the most easily manipulated external factors. Photoregulation of RNAi would be readily available for basic analysis and biotechnological and therapeutic applications. In this presentation, we show a method for photo-dependent RNAi termed **CLIP-RNAi** (CPP-linked RBP-mediated RNA internalization and photoinduced RNAi).

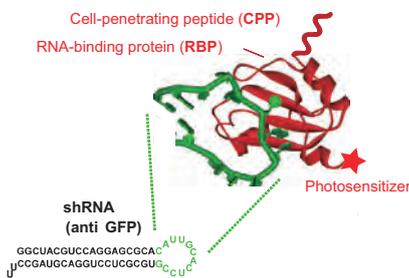


Fig. 1. Carrier protein and RNA

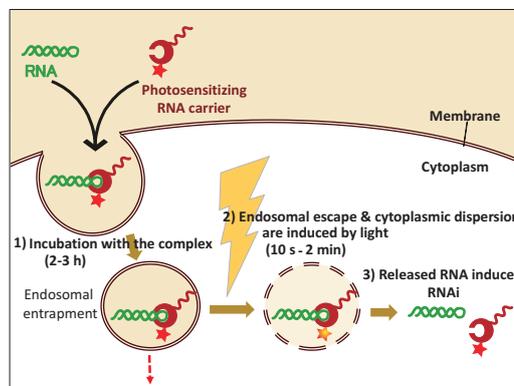


Fig. 2. The method for photoregulation of RNAi

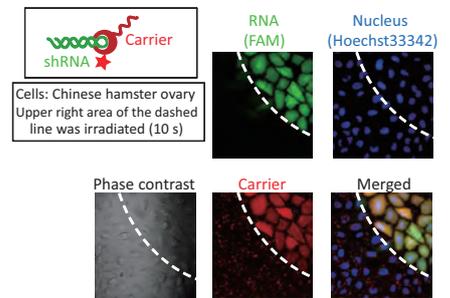


Fig. 3. The RNA and the carrier were distributed over the cytosol photo-dependently

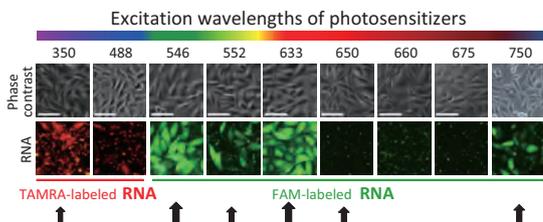


Fig. 4. Light-induced cytoplasmic RNA-dispersion various wavelengths

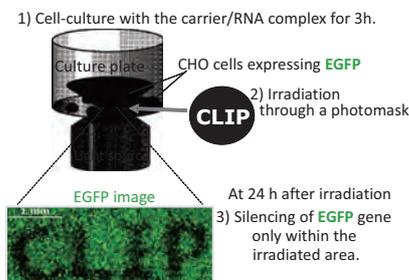


Fig. 5. CLIP-RNAi using a photomask

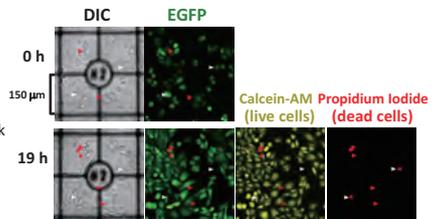


Fig. 6. Single-cell RNAi through CLIP-RNAi strategy

A single cell was irradiated strongly (▷) or moderately (▶) with laser light using a confocal microscope

Summary & Perspectives

- Photo-dependent cytoplasmic RNA delivery was demonstrated at various wavelengths.
- Photo-dependent endosomal escape of RNA was likely to be related to photoinduced ROS generation from photosensitizers.
- Region-specific gene-silencing and single-cell RNAi were demonstrated by CLIP-RNAi strategy.
- This method will be applied to genetic and medical studies, and cellular engineering.

<References>

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