



## Photolinker to Cage Biological Molecules Turn Genes “On” or “Off” with Light

Docket #15-7214

### STATE OF DEVELOPMENT

proof of concept, in vivo data

### INTELLECTUAL PROPERTY

Provisional application, file date  
8/2014

### REFERENCE MEDIA

Gripenburg, J.C., et al. Chem.  
Sci. 2015, 6, 2342-2346

### DESIRED PARTNERSHIPS

- License
- Sponsored research

### INVENTOR

Ivan Dmochowski, PhD

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Department of Chemistry

### APPLICATIONS

- Coatings, Surfactant, Emulsifier
- Vesicle/Nanoparticle
- Microbubble for Ultrasound Usage
- MRI Imaging/Theranostic Agent

### LEARN MORE

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### Problem

The ability to regulate the structure, function, and/or localization of a biological molecule in an organism could be used to treat many diseases or facilitate basic research. One such example is to turn on or off gene expression in a specific cell or region in an human/organism. Current methods to accomplish this feat are limited and do not allow for specific activation at a given time and locality.

### Solution

The Dmochowski Lab has developed a new method to “cage” and “uncage” molecules, using a photo-activated linker. This linker is attached to the molecule, such as antisense RNA.

The molecule is then caged, silencing it or altering its activity. Exposure to specific wavelengths of light will activate the photolinker to release the molecule.

### Technology Overview

Dmochowski lab has designed a Ruthenium-based compound, RuBEP, that is a synthetically versatile photolinker. The photolinker can be tuned to be activated at a large range of visible and near-IR wavelengths, allowing for better tissue penetration and reducing toxicity issues.

The photoactivation is incredibly rapid and efficient, occurring on the order of 20 nanoseconds. The photolinker is easily attached using click chemistry and can be used with a variety of biologics, including peptides, oligonucleotides, oligosaccharides, and lipids.

### Advantages

- Controlled, efficient, and specific activation
- Highly efficient, simple synthesis
- Variable wavelength activation for RuBEP -> Combination of treatments

