

Coumarins Suitable for Various Uses including Cell Biological Analyses

We are looking to out-license the technology for its commercialization.

Coumarin with enhanced photocleavage efficiency and improved hydrolysis resistance useful as various photoconductive molecular tools

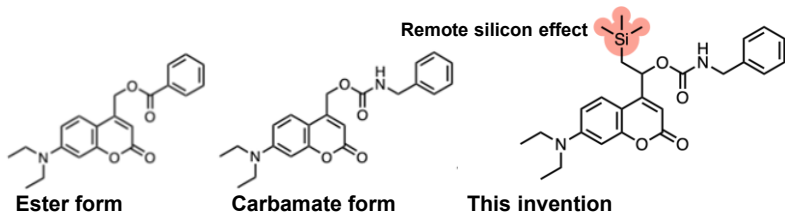
Background

Coumarin fluorescent dyes can be photolyzed by various visible light wavelengths and have been utilized as molecular tools to understand cellular biological functions and as stimuli-responsive materials. However, enhancing the efficiency of photocleavage makes them more susceptible to hydrolysis, making it difficult to develop efficient photoconductive molecular tools.

Description and Advantages

Kyoto University researchers successfully enhanced the photocleavage efficiency of coumarin by introducing a silyl group, which chemically stabilizes the photoexcited species. Additionally, the bulkiness of this substituent itself contributed to improving hydrolysis resistance.

- Useful as a new caged compounds
- Further development opportunities of biologically active substances with light-controllable properties by bioconjugation
- Various applications by using the new coumarin as a compound precursor
- Applicable to coumarins with various spectral characteristics



	Ester Form	Carbamate Form	Newly Developed Molecule
Photolysis Efficiency	++	+	+++
Hydrolysis Resistance	—	+	+++

Table 1. Chemical structures and properties of conventional coumarin dyes and the new derivative

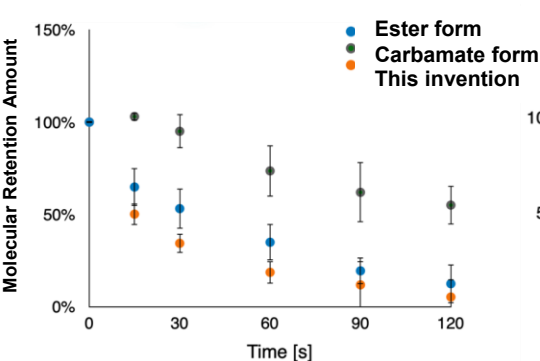


Fig.1. Photolysis efficiency analysis by thin-layer chromatography  
The new derivatives showed a lower amount of uncleaved residual molecules after light stimulation.

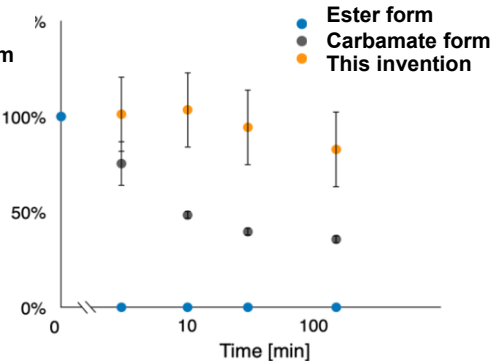


Fig.2. Comparison of hydrolysis resistance  
The new derivative exhibited improved hydrolysis resistance, showing a higher amount of residual molecules even in the presence of esterase.

Development Status

- TRL: Level 1
- Prototype development of a tool that releases proteins via light control
  - Further optimization opportunities for desired uses and properties

Applications

- Research Reagents
- Development of Photoconductive Molecular Tools

Offer

- Patent License
- Option for License
- MTA for sample testing
- Collaborative Research

References

- ChemRxiv, 06 August 2024  
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