

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

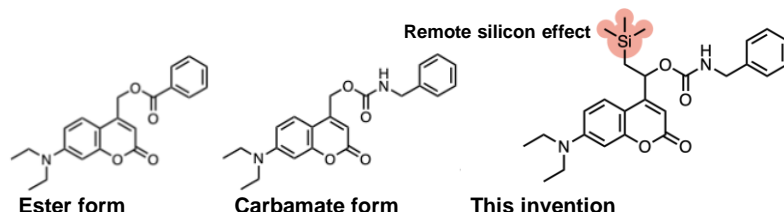
◆Background

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

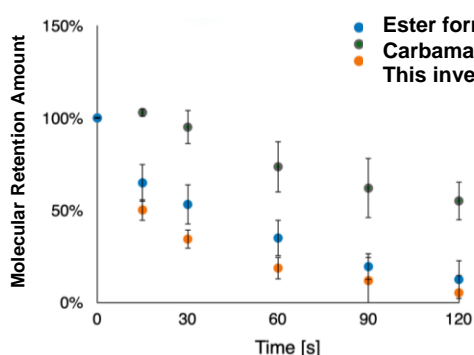


Fig. 1. Photolysis efficiency analysis by thin-layer chromatography

The new derivatives showed a lower amount of uncleaved residual molecules after light stimulation.

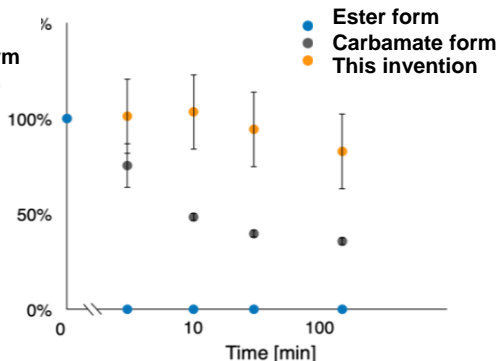


Fig. 2. Comparison of hydrolysis resistance

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
DOI: 10.26434/chemrxiv-2024-vrvwd

◆Contact

TLO-KYOTO Co., Ltd.

Mail: event@tlo-kyoto.co.jp

Phone: +81-75-753-9150

Level 3, International Science Innovation Bldg.,
Kyoto Univ.,
Yoshida-honmachi, Sakyo-ku,
Kyoto 606-8501, Japan



IAC Institutional Advancement and Communications
KYOTO UNIVERSITY

