

原生生物の捕食に伴うクロロフィル *b* 誘導体の代謝とその生成物解析

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Metabolism of exogenous chlorophyll *b* and its derivatives by predation of protists and analysis of their metabolites (¹*College of Life Sciences, Ritsumeikan University*, ²*Faculty of Environmental and Information Sciences, Fukui University of Technology*) Hitoshi Tamiaki,¹ 〇Shizuka Miichi,¹ Yuichiro Kashiya,² Yusuke Kinoshita¹

Chlorophylls (Chls) are phototoxic because they produce reactive oxygen species after irradiation with visible light in an aerated solution. Protists preying on algae have been reported to metabolize native Chls to 13²,17³-cyclopheophorbide enols (CPEs), which fully suppress their phototoxicity. In this study, Chl-*b* was extracted from spinach, and its derivatives were prepared by various organic reactions. The pigments were adsorbed onto fluorescent beads, which were artificially fed to the colorless flagellate *Peranema trichophorum*. After incubation for 24 h, the metabolites in the cells were analyzed by HPLC, and some CPE analogs were identified.

Keywords: Chlorophyll; Cyclopheophorbide enol; High performance liquid chromatography; Metabolism; Protist

クロロフィル(Chl)は光を受けて一重項酸素を作り出す光毒性の側面がある。藻類を捕食するプロティストは、天然のChlを13²,17³-シクロフェオフォルバイトエノール(CPE)に代謝し、その光毒性を無毒化させることが報告されている[1]。しかし、非天然のChl誘導体の捕食に伴う代謝は報告されてない。本研究では、ハウレンソウからChl-*b*(図1 左)を抽出し、様々な誘導体を合成した。これらの色素分子を蛍光ビーズに吸着させ、人為的に無色鞭毛虫 *Peranema trichophorum* に捕食させた。捕食から24 時間経過した段階で、その細胞内での代謝生成物をHPLCで解析したところ、CPE類縁体(図1 右)[2]が得られたので報告する。

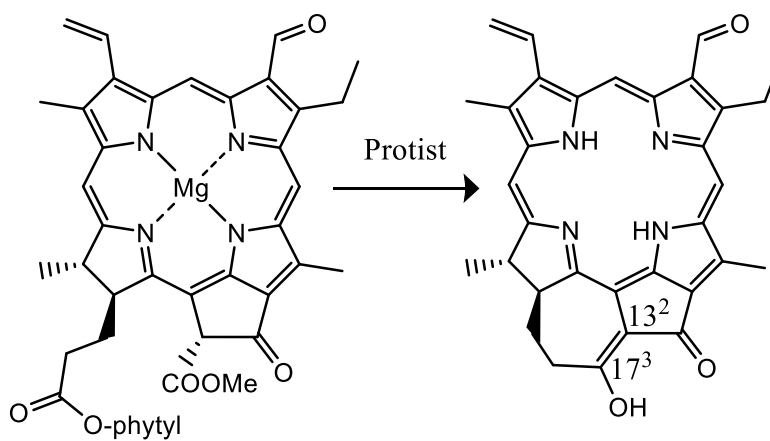


Figure 1. Metabolic modification of Chl-*b* to its corresponding CPE.

[1] Y. Kashiya, A. Yokoyama, T. Shiratori, *et al.*, *ISME J.*, **13**, 1899–1910 (2019).

[2] Y. Kashiya, A. Yokoyama, T. Shiratori, I. Inouye, Y. Kinoshita, T. Mizoguchi, H. Tamiaki, *FEBS Lett.*, **587**, 2578–2583 (2013).