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研究業績

1. 原著論文 (下線、著者 ; *、corresponding author)

[39] Otaki R, Oishi Y, Abe S, Fujiwara S, Sato N* (2019) Regulatory carbon metabolism underlying seawater-base production of triacylglycerol accumulation in *Chlorella kessleri*. *Bioresour Technol* 289, 121686.

学部ホームページでの紹介記事

https://www.toyaku.ac.jp/lifescience/newsttopics/2019/0620_2755.html

- [38] Hirai K, Nojo M, Sato Y, Tsuzuki M, Sato N* (2019) Contribution of protein synthesis depression to poly- β -hydroxybutyrate accumulation in *Synechocystis* sp. PCC 6803 under nutrient-starved conditions. *Sci Rep* 9, 19944.

学部ホームページでの紹介記事

https://www.toyaku.ac.jp/lifescience/newsttopics/2019/1216_3476.html

- [37] Aoki M, Sato N* (2018) Fatty acid content and composition of triacylglycerols of *Chlorella kessleri*. *Bio-protocol* 8, 1.
- [36] Sato N*, Ebiya Y, Kobayashi R, Nishiyama Y, Tsuzuki M (2017) Disturbance of cell-size determination by forced overproduction of sulfoquinovosyl diacylglycerol in the cyanobacterium *Synechococcus elongatus* PCC 7942. *Biochem Biophys Res Commun* 487, 734-739.
- [35] Sato N*, Kamimura R, Kaneta K, Yoshikawa M, Tsuzuki M (2017) Species-specific roles of sulfolipid metabolism in acclimation of photosynthetic microbes to sulfur-starvation stress. *PLoS One* 12, e0186154.
- [34] Hayashi T, Otaki R, Hirai K, Tsuzuki M, Sato N* (2017) Optimization of seawater-based triacylglycerol accumulation in a freshwater green alga, *Chlorella kessleri*, through simultaneous imposition of lowered-temperature and enhanced-light intensity. *Algal Res* 28, 100-107.
- [33] Sato N*, Kobayashi S, Aoki M, Umemura T, Kobayashi I, Tsuzuki M (2016) Identification of genes for sulfolipid synthesis in primitive red alga *Cyanidioschyzon merolae*. *Biochem Biophys Res Commun* 470, 123-129.
- [32] Hirai K, Hayashi T, Hasegawa Y, Sato A, Tsuzuki M, Sato N* (2016) Hyperosmosis and its combination with nutrient-limitation are novel environmental stressors for induction of triacylglycerol accumulation in cells of *Chlorella kessleri*. *Sci Rep* 6, 25825.
- [31] Sato N*, Kamimura R, Tsuzuki M (2016) Dispensability of a sulfolipid for photoautotrophic cell growth and photosynthesis in a marine cyanobacterium, *Synechococcus* sp. PCC 7002. *Biochem Biophys Res Commun* 477, 854-860.

- [30] Aoki M, Tsuzuki M, Sato N* (2016) Quantitation of Cytochromes *b₅₅₉*, *b₆*, and *f*, and the Core Component of Photosystem I P₇₀₀ in Cyanobacterial Cells. *Bio-protocol* 6, 21.
- [29] Kobayashi S, Tsuzuki M, Sato N* (2015) Sulfite-stress induced functional and structural changes in the complexes of photosystems I and II in a cyanobacterium, *Synechococcus elongatus* PCC 7942. *Plant Cell Physiol* 56, 1521-1532.
- [28] Sato A, Matsumura R, Hoshino N, Tsuzuki M, Sato N* (2014) Responsibility of regulatory gene expression and repressed protein synthesis for triacylglycerol accumulation on sulfur-starvation in *Chlamydomonas reinhardtii*. *Front Plant Sci* 5, 444.
- [27] Mizuno Y, Sato A, Watanabe K, Hirata A, Takeshita T, Ota S, Sato N, Zachleder V, Tsuzuki M, Kawano S (2013) Sequential accumulation of starch and lipid induced by sulfur deficiency in *Chlorella* and *Parachlorella* species. *Bioresour Technol* 129, 150-155.
- [26] Shiratake T, Sato A, Minoda A, Tsuzuki M, Sato N* (2013) Air-drying of cells, the novel conditions for stimulated synthesis of triacylglycerol in a Green Alga, *Chlorella kessleri*. *PLoS One* 8, e79630.
- [25] Murota C, Matsumoto H, Fujiwara S, Hiruta Y, Miyashita S, Shimoya M, Kobayashi I, Hudock MO, Togasaki RK, Sato N, Tsuzuki M (2012) Arsenic tolerance in a *Chlamydomonas* photosynthetic mutant is due to reduced arsenic uptake even in light conditions. *Planta* 236, 1395-1403.
- [24] Aoki M, Tsuzuki M, Sato N* (2012) Involvement of sulfoquinovosyl diacylglycerol in DNA synthesis in *Synechocystis* sp. PCC 6803. *BMC Res Notes* 5, 98.
- [23] Sugimoto K, Tsuzuki M, Sato N* (2010) Regulation of synthesis and degradation of a sulfolipid under sulfur-starved conditions and its physiological significance in *Chlamydomonas reinhardtii*. *New Phytol* 185, 676-686.
- [22] Sugimoto K, Midorikawa T, Tsuzuki M, Sato N* (2008) Upregulation of PG synthesis on sulfur-starvation for PS I in *Chlamydomonas*. *Biochem Biophys Res Commun* 369, 660-665.
- [21] Sugimoto K, Sato N*, Tsuzuki M (2007) Utilization of a chloroplast membrane

- sulfolipid as a major internal sulfur source for protein synthesis in the early phase of sulfur starvation in *Chlamydomonas reinhardtii*. FEBS Lett 581, 4519-4522.
- [20] Okazaki K, Sato N, Tsuji N, Tsuzuki M, Nishida I (2006) The significance of C16 fatty acids in the sn-2 positions of glycerolipids in the photosynthetic growth of *Synechocystis* sp. PCC6803. Plant Physiol 141, 546-556.
- [19] Sato N*, Suda K, Tsuzuki M (2004) Responsibility of phosphatidylglycerol for biogenesis of the PSI complex. Biochim Biophys Acta 1658, 235-243.
- [18] Sato N* Tsuzuki M, Kawaguchi A (2003) Glycerolipid synthesis in *Chlorella kessleri* 11 h. II. Effect of the CO₂ concentration during growth. Biochim Biophys Acta 1633, 35-42.
- [17] Sato N*, Tsuzuki M, Kawaguchi A (2003) Glycerolipid synthesis in *Chlorella kessleri* 11h. I. Existence of a eukaryotic pathway. Biochim Biophys Acta 1633, 27-34.
- [16] Aoki M, Sato N, Meguro A, Tsuzuki M (2003) Differing involvement of sulfoquinovosyl diacylglycerol in photosystem II in two species of unicellular cyanobacteria. Eur J Biochem 271, 685-693.
- [15] Minoda A, Sonoike K, Okada K, Sato N, Tsuzuki M (2003) Decrease in the efficiency of the electron donation to tyrosine Z of photosystem II in an SQDG-deficient mutant of *Chlamydomonas*. FEBS Lett 553, 109-112.
- [14] Sato N, Sugimoto K, Meguro A, Tsuzuki M (2003) Identification of a gene for UDP-sulfoquinovose synthase of a green alga, *Chlamydomonas reinhardtii*, and its phylogeny. DNA Res 10, 229-237.
- [13] Sekoguchi E, Sato N, Yasui A, Fukada S, Nimura Y, Aburatani H, Ikeda K, Matsuura A (2003) A novel mitochondrial carnitine-acylcarnitine translocase induced by partial hepatectomy and fasting. J Biol Chem 278, 38796-38802.
- [12] Sato N, Aoki M, Maru Y, Sonoike K, Minoda A, Tsuzuki M (2003) Involvement of sulfoquinovosyl diacylglycerol in the structural integrity and heat-tolerance of photosystem II. Planta 217, 245-251.
- [11] Minoda A, Sato N, Nozaki H, Okada K, Takahashi H, Sonoike K, Tsuzuki M (2002) Role of sulfoquinovosyl diacylglycerol for the maintenance of photosystem II in *Chlamydomonas reinhardtii*. Eur J Biochem 269, 2353-2358.

- [10] Sato N, Hagio M, Wada H, Tsuzuki M (2000) Requirement of phosphatidylglycerol for photosynthetic function in thylakoid membranes. Proc Natl Acad Sci U S A 97,10655-10660.
- [9] Hagio M, Gombos Z, Várkonyi Z, Masamoto K, Sato N, Tsuzuki M, Wada H (2000) Direct evidence for requirement of phosphatidylglycerol in photosystem II of photosynthesis. Plant Physiol 124, 795-804.
- [8] Morita E, Abe T, Tsuzuki M, Fujiwara S, Sato N, Hirata A, Sonoike K, Nozaki H (1999) Role of pyrenoids in the CO₂-concentrating mechanism: comparative morphology, physiology and molecular phylogenetic analysis of closely related strains of *Chlamydomonas* and *Chloromonas* (Volvocales). Planta 208: 365-372.
- [7] Morita E, Abe T, Tsuzuki M, Fujiwara S, Sato N, Hirata A, Sonoike K, Nozaki H (1998) Presence of the CO₂-concentrating mechanism in some species of the pyrenoid-less free-living algal genus *Chloromonas* (Volvocales, Chlorophyta). Planta 204, 269-276.
- [6] Sato N, Fujiwara S, Kawaguchi A, Tsuzuki M (1997) Cloning of a gene for chloroplast omega6 desaturase of a green alga, *Chlamydomonas reinhardtii*. J Biochem 122, 1224-1232.
- [5] Sato N^{*}, Sonoike K, Tsuzuki M, Kawaguchi A (1996) Photosynthetic characteristics of a mutant of *Chlamydomonas reinhardtii* impaired in fatty acid desaturation in chloroplasts. Biochim Biophys Acta 1274, 112-118.
- [4] Sato N, Sonoike K, Kawaguchi A, Tsuzuki M (1996) Contribution of lowered unsaturation levels of chloroplast lipids to high temperature tolerance of photosynthesis in *Chlamydomonas reinhardtii*. J Photochem Photobiol B: Biol 36, 333-337.
- [3] Sato N^{*}, Tsuzuki M, Matsuda Y, Ehara T, Osafune T, Kawaguchi A (1995) Isolation and characterization of mutants affected in lipid metabolism of *Chlamydomonas reinhardtii*. Eur J Biochem 230, 987-993.
- [2] Sato N^{*}, Sonoike K, Tsuzuki M, Kawaguchi A (1995) Impaired photosystem II in a mutant of *Chlamydomonas reinhardtii* defective in sulfoquinovosyl diacylglycerol. Eur J Biochem 234, 16-23.
- [1] Tsuzuki M, Ohnuma E, Sato N, Takaku T, Kawaguchi A (1990) Effects of CO₂ concentration during growth on fatty acid composition in microalgae. Plant Physiol

93, 851-856.

2. 総説

- [3] Sato N^{*}, Wada H (2009) Lipid biosynthesis and its regulation in cyanobacteria, In Lipids in Photosynthesis: Essential and Regulatory Functions, edited by Wada H and Murata N, Springer, p. 157-177.
- [2] Sato N^{*} (2004) Role of the acidic lipids sulfoquinovosyl diacylglycerol in photosynthesis: their specificity and evolution. J. Plant Research 117, 445-505.
- [1] Kawaguchi A, Iwamoto-Kihara A, Sato N (1999) Biosynthesis and degradation of fatty acids. In Comprehensive Natural Products Chemistry, edited by Sankawa U, p. 23-59, Elsevier Science, Amsterdam.

3. 著書

- [3] Sato N^{*} (2018) Oil Accumulation in Microalgae for Biofuel Production—The Study in an Oleaginous Green Alga, *Chlorella kessleri*—. Radioisotopes 67, 571-572.
- [2] 佐藤典裕、都筑幹夫 (2012) 脂質—脂質膜・貯蔵脂質, 藻類ハンドブック (渡邊信 監修), エヌ・ティー・エス.
- [1] Sato N, Tsuzuki M (2004) Isolation and Identification of chloroplastic lipids. In Methods in Molecular Biology, Vol. 274: Photosynthesis Research Protocols, edited by R. Carpentier, Humana Press, p. 149-157.

4. 国際学会プロシーディング

- [7] Sugimoto K, Tsuzuki M, Sato N (2013) Regulatory systems that quantitatively alter two anionic lipids of chloroplasts in *Chlamydomonas reinhardtii* upon sulfur starvation. In Photosynthesis research for food, fuel and the future, edited by Kuang T, Lu C, Zhang L, p. 282-285, Springer.
- [6] Sato N, Sugimoto K, Meguro A, Suda K, Tsuzuki M (2005) Interaction of acidic lipids with the photosystem complexes and its evolution. In Photosynthesis: Fundamental aspects to global perspectives, edited by van der Est A and Bruce D, p. 758-760, Allen Press.
- [5] Aoki M, Sato N, Meguro A, Tsuzuki M (2005) The roles of sulfoklipid, sulfoquinovosyl diacylglycerol, within the evolution of photosynthetic organisms.

In Photosynthesis: Fundamental aspects to global perspectives, edited by van der Est A and Bruce D, p. 751-753, Allen Press.

- [4] Sato N, Aoki M, Meguro A, Suda K, Tsuzuki M (2001) Roles of acidic lipids in photosynthesis. In PS2001 Proceedings, 12th International Congress on Photosynthesis, CSIRO Publishing, S22-32.
- [3] Minoda A, Sonoike K, Nozaki H, Okada K, Sato N, Tsuzuki M (2001) Contribution of SQDG in photosystem II of *Chlamydomonas reinhardtii*. In PS2001 Proceedings, 12th International Congress on Photosynthesis, CSIRO Publishing, S5-39.
- [2] Sato N, Hagio M, Wada, H, Tsuzuki M (2000) Environmental effects on acidic lipids of thylakoid membranes. Biochem. Soc. Transac. 28: 912-914.
- [1] Sato N, Sonoike K, Tsuzuki M, Kawaguchi A (1995) Contribution of lipids to PS II. In Photosynthesis: from Light to Biosphere. Vol. III. Edited by Mathis P. p. 989-992, Kluwer Academic Publishers.