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# Promotion of Lipid Syntheses of Microalgae by Microfluidic-Assisted Membrane Distortion

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**Abstract :** Cellular membrane distortion is known as a factor to change intracellular signaling. However, progress of relevant studies is difficult because there are no facilities that can control membrane distortion finely. In this study, we developed microfluidic device which can inflict mechanical stress on cell membrane of Chlamydomonas reinhardtii using regular height of the channels. And cellular physiological changes were analyzed from cells cultured in the device. Excessive calcium ion influx through into cytoplasm was induced from mechanical stress. The results revealed that compressed cells had up-regulated Mat3 mRNA which regulates cell size and cell cycle from a prolonged G1 phase. Additionally, TAG used for the production of biodiesel was raised rapidly from 4 h after compression. Taken together, membrane distortion can be considered as an attractive inducer for biofuel production.

**Keywords :** mechanical stress, membrane distortion, Chlamydomonas reinhardtii, deflagellation, cell cycle, lipid metabolism
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