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Template synthesized Microneedle Arrays for Interfacing Microalgae Cells

By

Professor Hitomi Mukaibo
Department of Chemical Engineering
University of Rochester

Genetically engineered microalgae are gaining increased interest due to their potential use in biofuel production, and in protein and drug biosynthesis. However, the cell wall that surrounds its unicellular body acts as a formidable barrier to DNA delivery. In many cases, higher transformation efficiency cannot be achieved without removing or modifying the cell wall. However, cell walls of different species have large variance in their composition, hardness and thickness, and not every cell types are compatible with such pretreatments.

This talk will discuss the first example of using microneedle-array technology to deliver genes to microalgae cells with intact cell walls. The microneedle-array was prepared by a template-synthesis method. Briefly, this entails depositing a desired material into a porous template, and then removing the template to expose the replica of the template pores. This method is highly attractive because the resulting structure can easily be controlled by manipulating the pores of the template. Details on how the microneedle array is developed using the template synthesis will be described, and results on using this needle array as a tool to interface with a model microalgae specimen, *Chlamydomonas Reinhardtii*, will be presented.

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