

Microbial single cell trapping using high-throughput microwells for Surface enhanced Raman spectroscopy imaging

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Metabolic engineering is a powerful technique that can replace the existing chemical synthesis process for obtaining new metabolites or improving conversion rate. This study introduces the application of single cell trapping using microwells and Surface enhanced Raman spectroscopy (SERS) imaging to metabolic engineering. The combination of microwells and SERS imaging enables the real-time detection of various metabolite concentrations in a single cell level, and it can evaluate various mutants simultaneously. We tested microbial single cell trapping on PDMS microwells. Also, SERS signals were detected for various important metabolites such as ATP. The challenge is to lower the detection limit in vivo, but if spectra references of metabolites and single cell trapping tools are established, the efficiency of metabolic engineering can be greatly developed.