# Microfluidic static droplet array for screening and enrichment of chemical producing bacteria

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Economic production of precious chemicals from micro-organisms requires development of high-producing strains, and an efficient screening method is decisive to maximize the effect of the most popular strain improvement method, combinatorial approach. However, high-throughput screening has been limited for evaluation of diverse intracellular metabolites at the single-cell level. Here we established a screening platform that combines a microfluidic static droplet array (SDA) and an artificial riboswitch to analyze intracellular metabolite concentration from single microbial cells. Using this system, we entrapped single Escherichia coli cells in SDA to measure intracellular L-tryptophan concentration. It was validated that intracellular L-tryptophan concentration can be evaluated by the fluorescence from the riboswitch. Moreover, high-producing strains were successfully screened from a mutagenized library, exhibiting up to 145% productivity compared to its parental strain. This platform will be widely applicable to strain improvement for diverse metabolite by developing new artificial riboswitches.