

# DIAGNOSIS OF METHYLATED DNA FRAGMENTS OF TUMOR SUPPRESSOR GENES IN BLOOD BY UTILIZING METHYLATION-SPECIFIC APTAMERS ON A MICROFLUIDIC SYSTEM

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## ABSTRACT

Epigenetic biomarkers of cell-free circulating DNA (cfDNA) within blood of cancer patients could be considered as a promising cancer diagnostic tool in liquid biopsy. Especially, high GC methylation in promoter regions of tumor suppressor genes has been demonstrated to be significantly correlated with carcinogenesis. Thus, an anti-methyl aptamer was selected by a systematic evolution of ligands by exponential enrichment (SELEX) process in this work. An integrated microfluidic system was further developed to automate a novel assay for fast diagnosis of methyl groups in cancer cells.

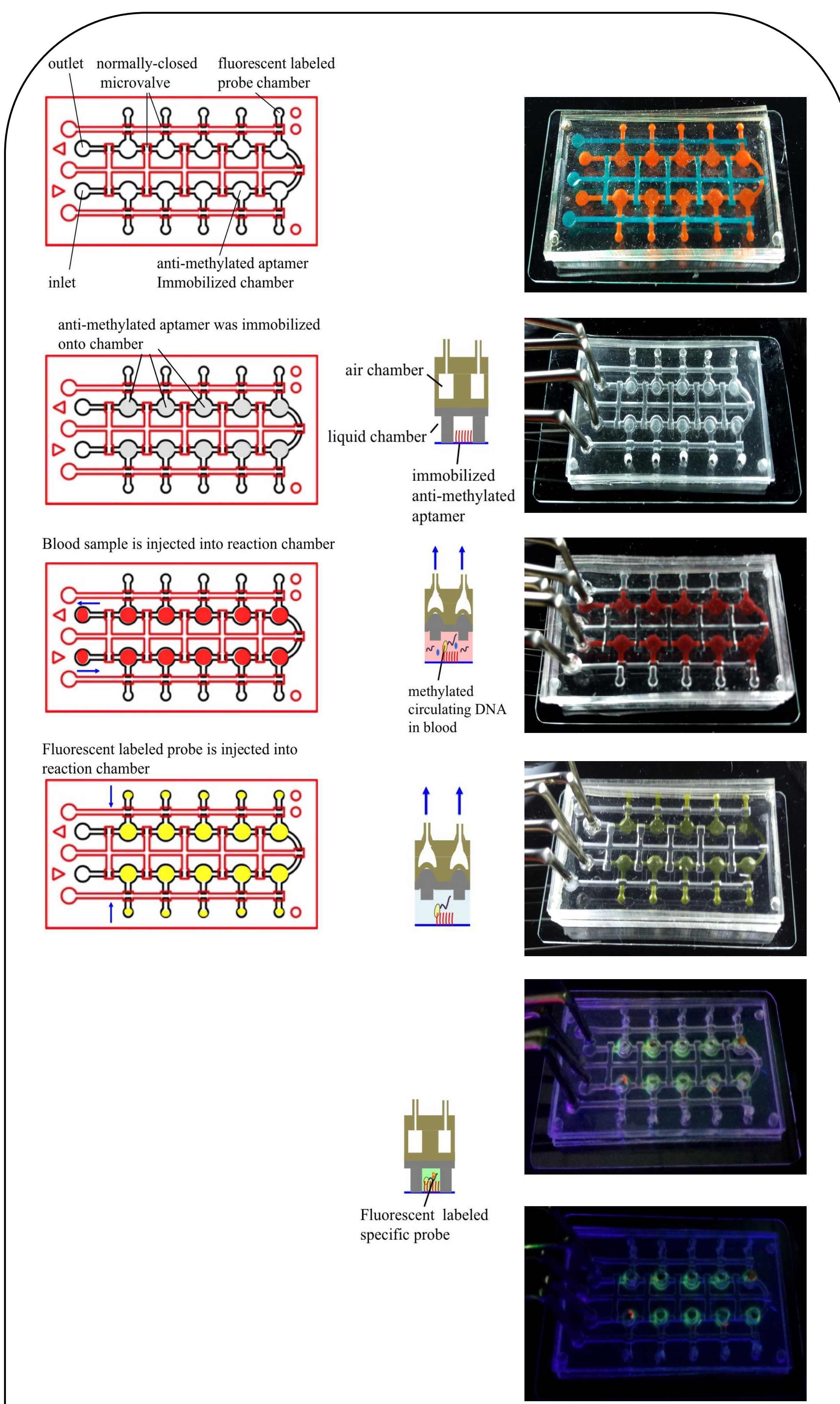
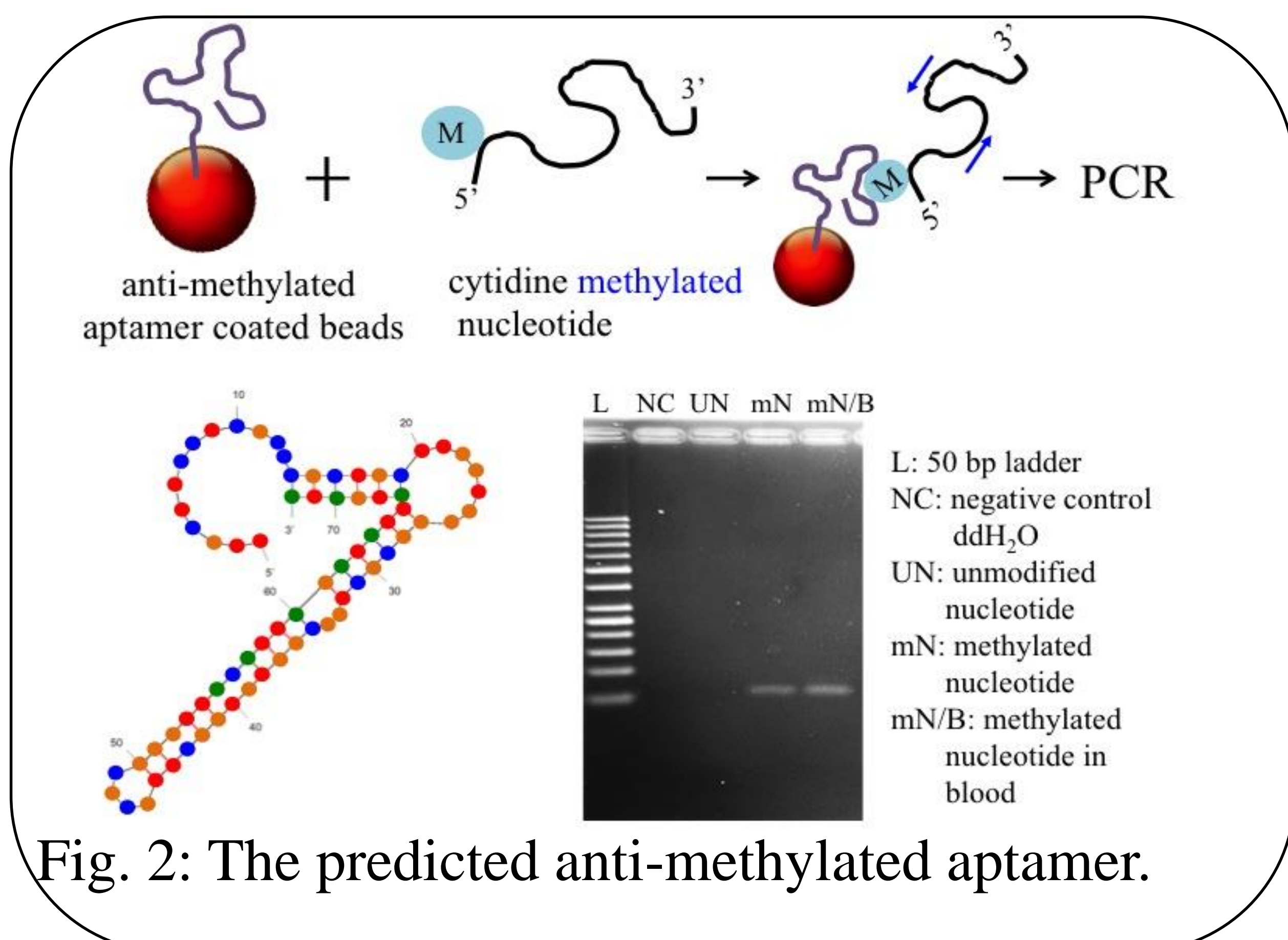
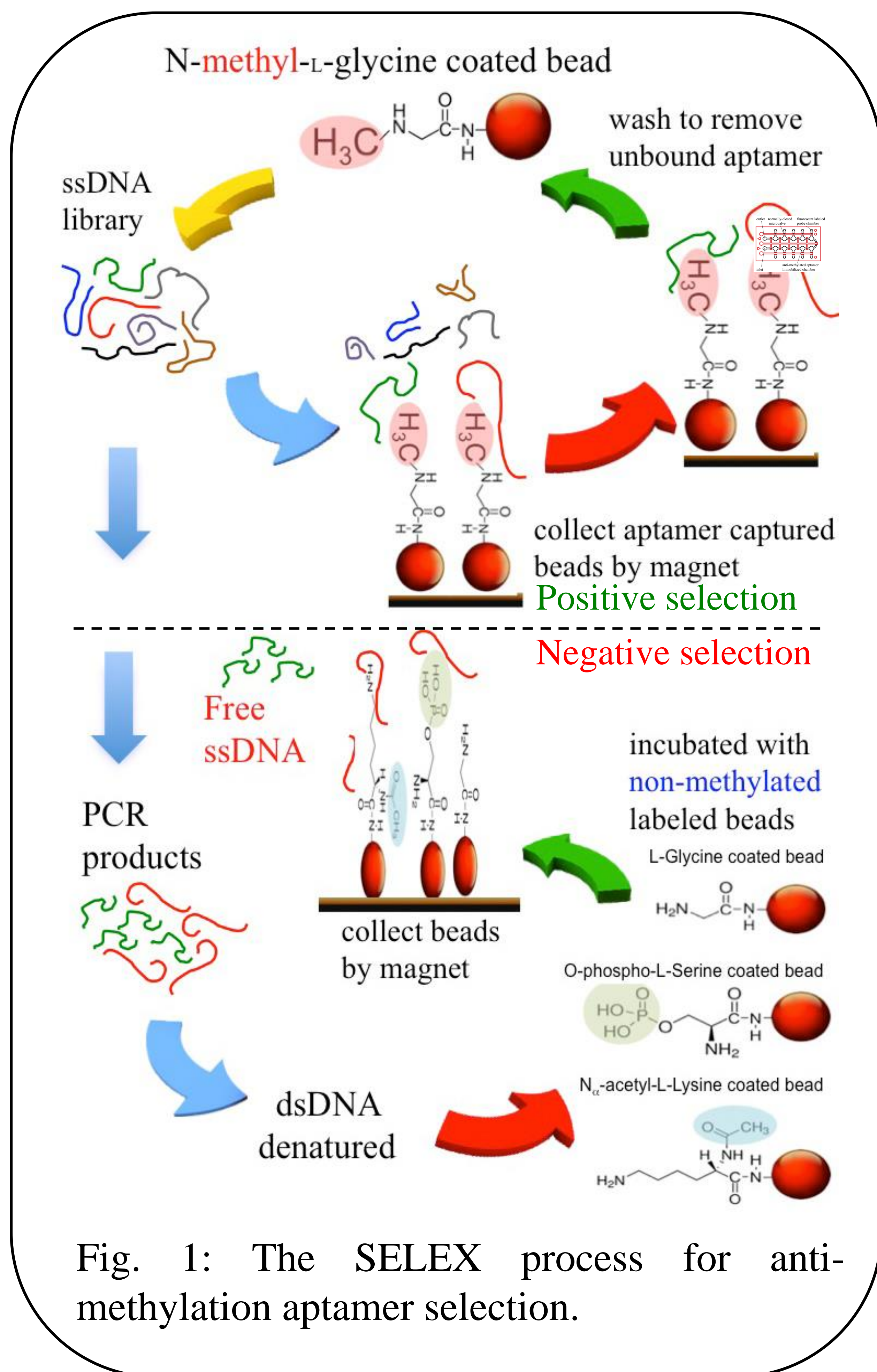


Fig. 3: The working principle of the microfluidic system for methylation diagnosis

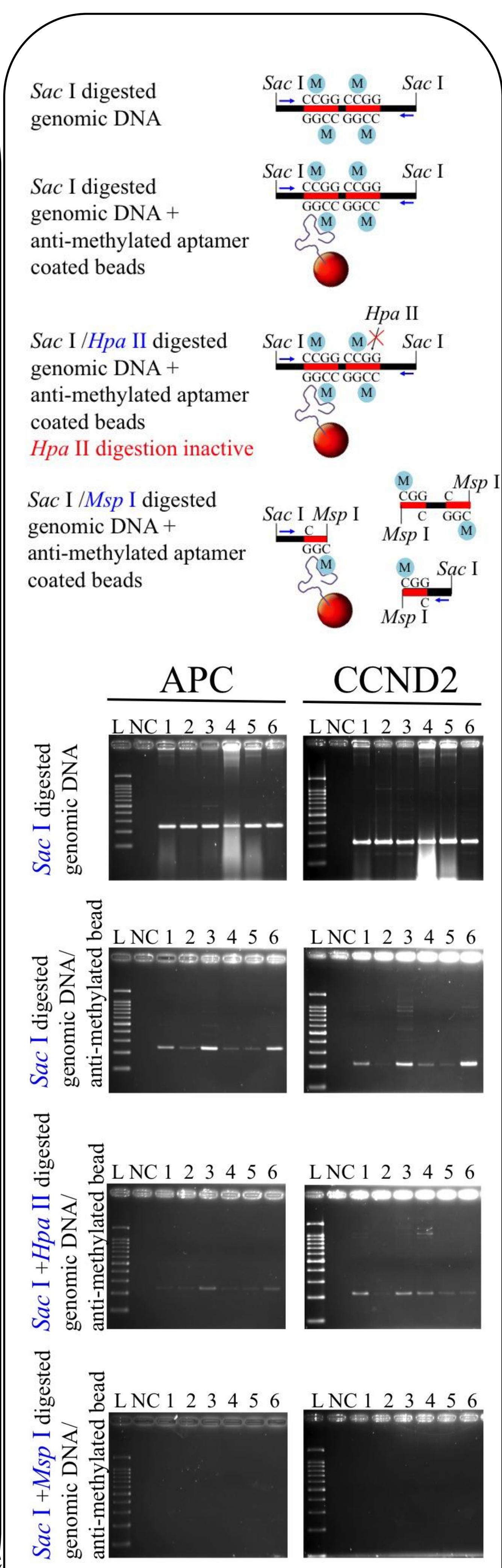


Fig. 4: The methylation assay by using methyl-sensitive restriction enzyme. The cell lines of ovarian, lung, gastric, colon, cervical and breast cancers were used in lanes 1-6, respectively.

## Conclusions

1. Methylated DNA fragments of tumor suppression genes in cancer cells could be isolated by using aptamer-coated magnetic beads.
2. An integrated microfluidic system was developing to detect DNA methylation.

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