Electronic Supplementary Material (ESI) for Lab on a Chip

Supplementary information

An innovative sample-to-answer polymer lab-on-a-chip with on-chip reservoirs for the POCT of thyroid stimulating hormone (TSH)

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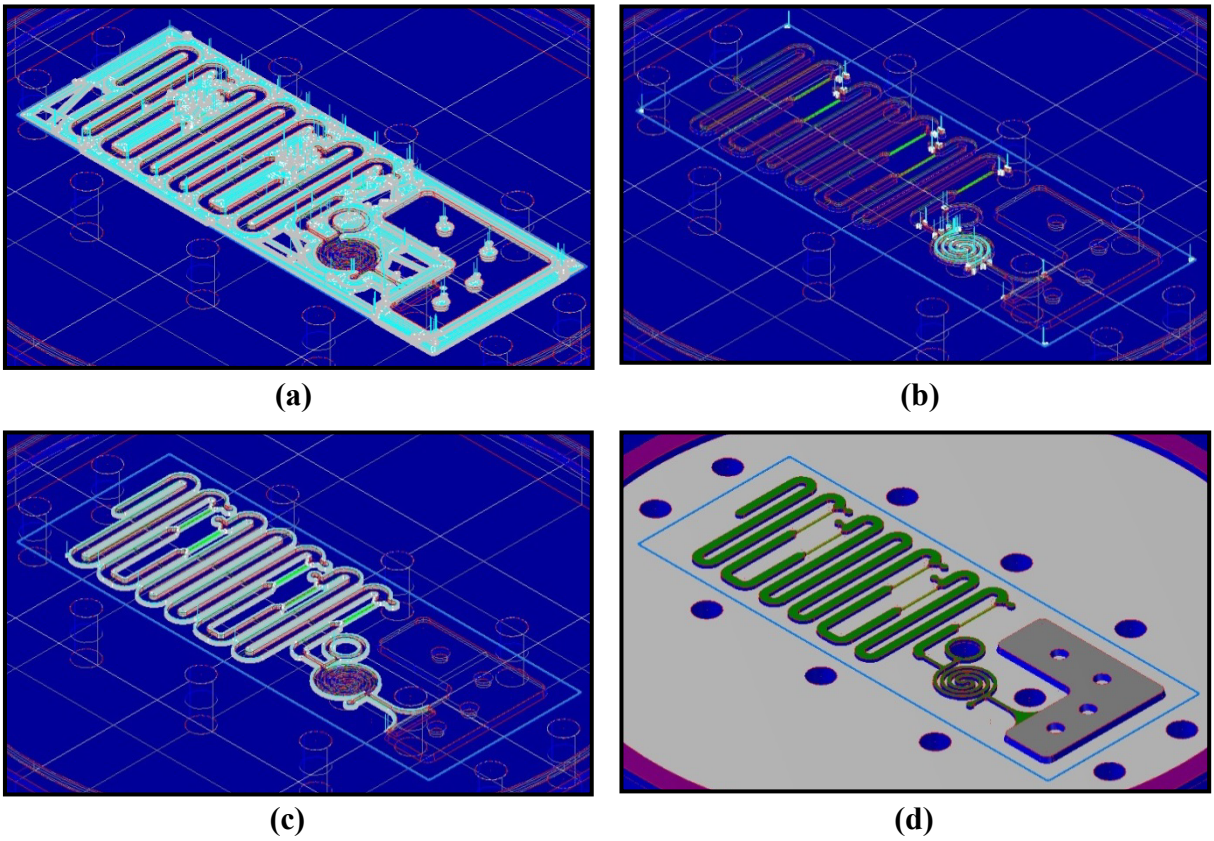

Fig. S1. Schematic diagrams of the tool-paths created for fabricating the master mold with CNC milling: (a) Tool-paths for 800 μm diameter end-mill to create the reagent chambers; (b) Tool-paths for 300 μm diameter end-mill to create the spiral reaction chamber; (c) Tool-paths for 2° draft angle on the perimeters of the microchannels; and (d) Final shape of the fabricated master mold with the above tool-paths.

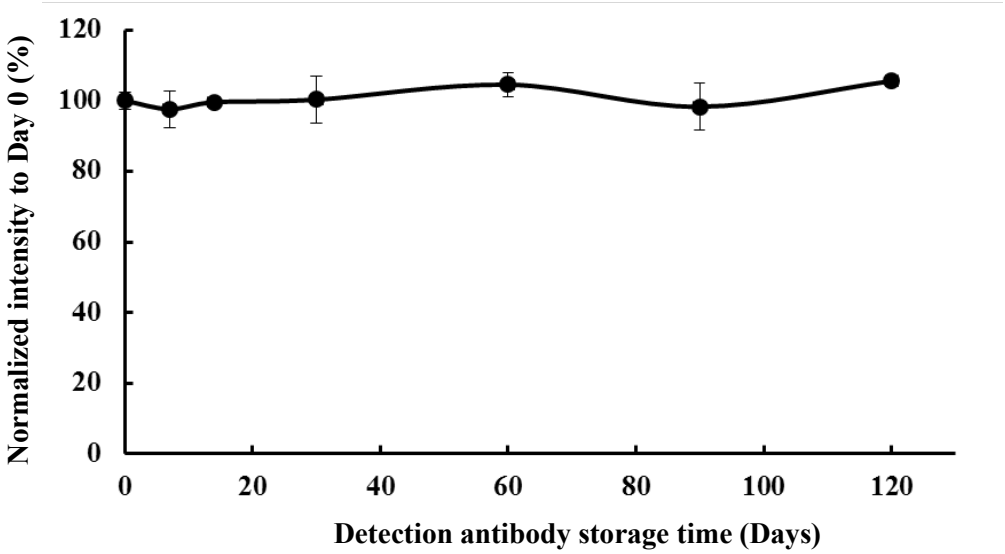

Fig. S2. Detection antibody activity maintenance test for long-term storage capability evaluation preserving its activity more than 98 % of the initial activity for 120 days. (n_{total}=14 for seven tests.)

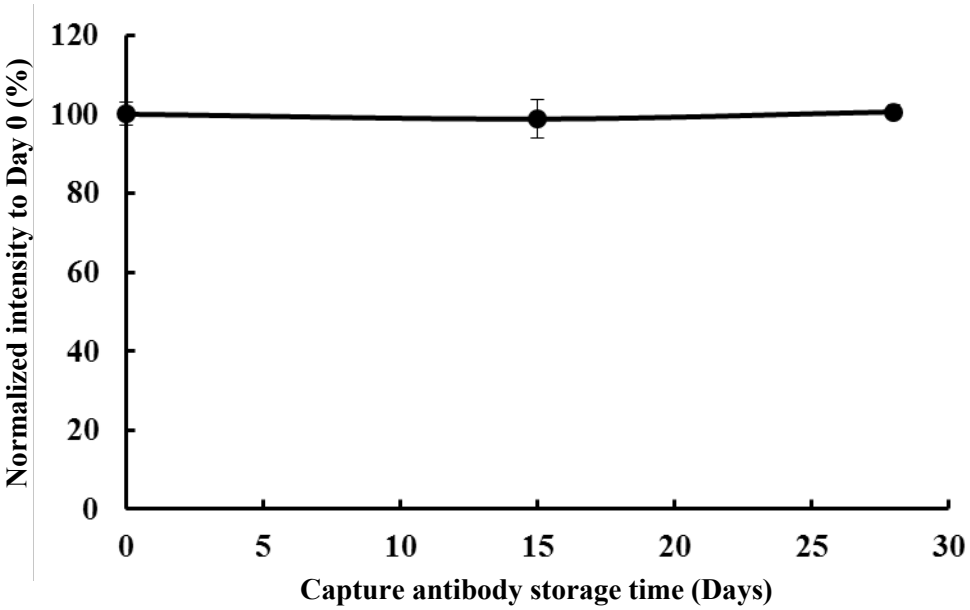

Fig. S3. Capture antibody activity maintenance test for long-term storage capability, which showed 100.6 % retention rate for 4 weeks. (n_{total}=9 for three tests.)

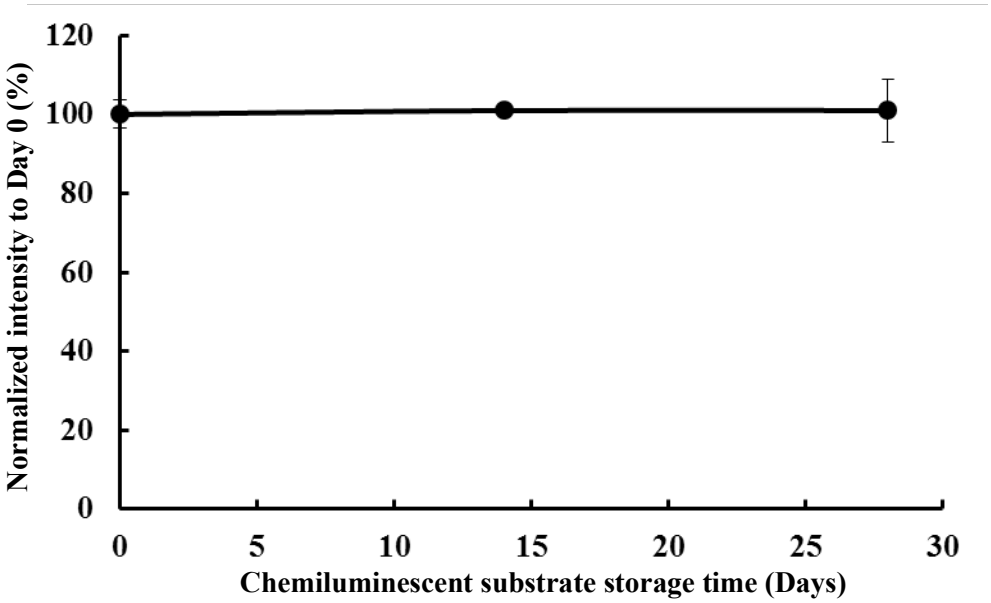

Fig. S4. Chemiluminescent substrate activity maintenance test for long-term storage capability. The on-chip stored substrate did not lose activity during 4 weeks with 101.1 % of activity retention rate. (n_{total}=9 for three tests.)

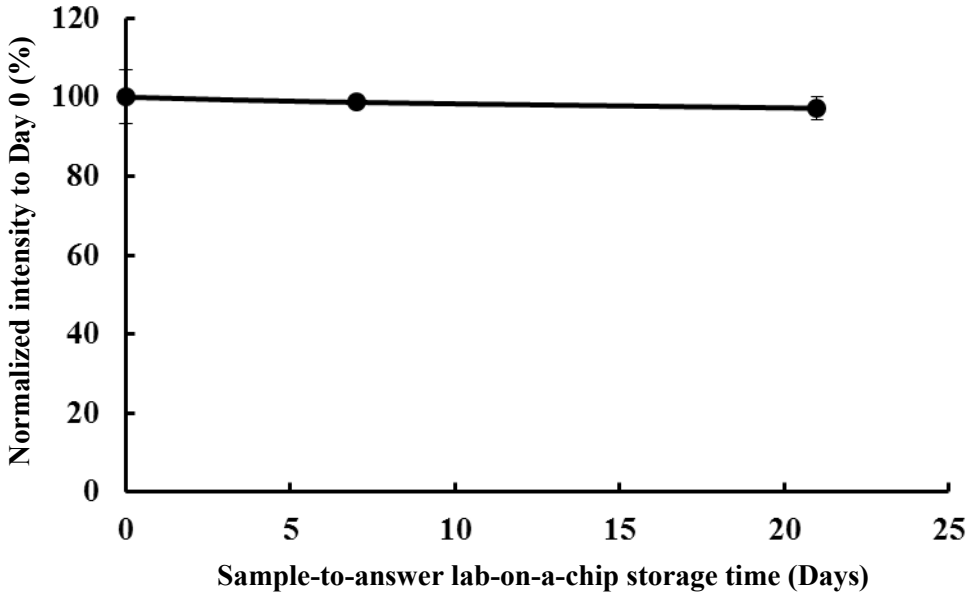

Fig. S5. Sample-to-answer lab-on-a-chip activity maintenance test for long-term storage capability. A full set of immunoassay reagents preloaded in the lab-on-a-chips maintained 97.2 % of activity during 3 weeks. 55 μIU/mL of the TSH antigen was used for the tests. (n_{total}=9 for three tests.)

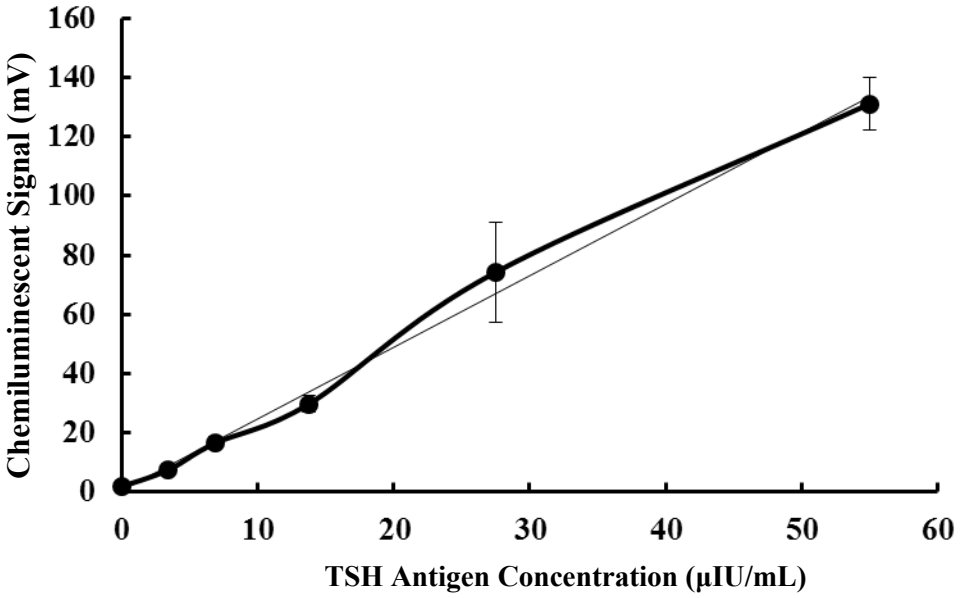

Fig. S6. The calibration plot for TSH showing the linear range up to 55 μIU/mL with the limit of detection (SNR=3) of 1.9 μIU/mL and 9.2 % of CV. (n_{total}=18 for six concentrations.)