Supplementary Information:

1. Design and assembly of chip-compatible thermal cycler

Figure S1 (a) Original configuration of OpenPCR© Kit; (b) Modifications on OpenPCR© Kit and assembly of the additional parts/components
2. Transient-state thermal simulation of microfluidic setup

*Boundary Conditions:*

i. Bulk ambient temperature = 25°C

ii. Initial temperature of metal block = 30°C

iii. Total time of simulation = 1000 sec

iv. Free convection of air from all exposed surfaces = 20 W/(m².K)

v. Thermal resistance at block-chip interface = 2.5e-4 K.m²/W

vi. Materials:

   a. Aluminium metal heat block [Thermal Conductivity = 230 W/(m.K)]
   b. PMMA chip [Thermal Conductivity = 0.21 W/(m.K)]
   c. Water in reaction chambers [Thermal Conductivity = 40 W/(m.K)]

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![Transient Time Thermal Simulation for Temperature Comparison](image)

*Figure S2 Transient time thermal simulation for temperature comparison between actual measurement aluminium block temperature and simulated chamber temperature*

<table>
<thead>
<tr>
<th>PCR Phase</th>
<th>Required Chamber Temperature/°C</th>
<th>Estimated Chamber Temperature/°C</th>
<th>Temperature Offset for OpenPCR® Software/°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denaturation</td>
<td>94</td>
<td>89.7 ± 0.2</td>
<td>+4.3</td>
</tr>
<tr>
<td>Annealing</td>
<td>61</td>
<td>59.1 ± 0.1</td>
<td>+1.9</td>
</tr>
<tr>
<td>Extension</td>
<td>72</td>
<td>70.4 ± 0.2</td>
<td>+1.6</td>
</tr>
</tbody>
</table>
Comparison of Heating/Cooling Rates

Heating Rate from 25°C to 94°C
Heating Rate from 61°C to 72°C
Heating Rate from 72°C to 94°C
Cooling Rate from 94°C to 61°C

Figure S3 Comparison of heating/cooling rates of chamber temperature between actual measurements and simulated data