

## Supplementary Information for Biomolecular Theorem Proving on a Chip: A Novel Microfluidic Solution to a Classical Logic Problem

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**Table S1. DNA representation of the literals that were used to solve the theorem proving problem through 10 nt sequences**

Variable	Sequence (5' → 3')
$\neg C$	CGTTGTATCT
$\neg B_1$	CACTATCTCA
$\neg A_1$	GTCGTTACAG
$\neg B_0$	AGTCTCATCC
$\neg A_0$	AGGCTCAATC
C	AGATAACAACG
$A_1$	CTGTAACGAC
$B_1$	TGAGATAGTG
$A_0$	GATTGAGCCT
$B_0$	GGATGAGACT

**Table S2. The oligonucleotide sequences of the clause representation.**

Clause	Sequence (5' → 3')
$\neg B_1 \vee \neg C$	CGTTGTATCTCACTATCTCA
$\neg B_0 \vee \neg A_1$	GTCGTTACAGAGTCTCATCC
$\neg A_0$	AGGCTCAATCCATGAGTGTG
C	AGATAACAACG
$A_1 \vee B_1$	CTGTAACGACTGAGATAGTG
$A_0 \vee B_0$	GATTGAGCCTGGATGAGACT

**Table S3. DNA strand R (invading DNA) and the double-stranded DNA sequence**

<b>Name</b>	<b>Sequence (5' → 3')</b>
Single-stranded DNA R (Invading DNA)	CACACTCATGGATTGAGCCTGGATGAGACTCTGTAACGACTGAGATAGTGAGATACAACG
Cy3 probe	Cy3-CGTTGTATCTCACTATCTCAGTCGTTACAGAGTCTCATCCAGGCTCAATC
BHQ2 probe	GGATGAGACTCTGTAACGACTGAGATAGTGAGATACAACG-BHQ2

**Table S4. Target DNA sequences for testing the effect of the length**

<b>Name</b>	<b>Sequence (5' → 3')</b>
Perfect match with the Cy3 probe	GATTGAGCCTGGATGAGACTCTGTAACGACTGAGATAGTGAGATAACAACG
40 nt match from 5' of the Cy3 probe	GGATGAGACTCTGTAACGACTGAGATAGTGAGATAACAACG
30 nt match from 3' of the Cy3 probe	CTGTAACGACTGAGATAGTGAGATAACAACG
40 nt match from 3' of the Cy3 probe	GATTGAGCCTGGATGAGACTCTGTAACGACTGAGATAGTG
30 nt match from 3' of the Cy3 probe	GATTGAGCCTGGATGAGACTCTGTAACGAC

The Cy3 probe is one strand of the double-stranded DNA, as shown in Table 3.