

Supplementary Data

Toehold clipping:

A mechanism for remote control of DNA strand displacement

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Name	Sequence (5' to 3')	Length
Strand L	AGGCACCATCGTAGGTTTTTCTTGCCAGGCACCATCGTAGGTTTTTCT TGCCAGGCACCATCGTAGGTTTTTCTTGCC	78
Strand M	AGCAACCTGCCTGGCAAGCCTACGATGGACACGGT AACGACT	42
Strand S	ACCGTGTGGTTGCT AGTCGTT	21
S-blunt	AGTCGTTACCGTGTGGTTGCT	21
S-DNA-TH	ACCGTGTGGTTGCT AGTCGTT <u>CCTCAAGA</u>	29
S-PCL-TH	ACCGTGTGGTTGCT AGTCGTT -PCL- <u>CCTCAAGA</u>	29
S-RNA-TH	ACCGTGTGGTTGCT AGTCGTT <u>rCrCrUrCrArArGrA</u>	29
S-complement	AACGACTAGCAACCACACGGT	21
Invading strand	TCTTGAGGAACGACTAGCAACCACACGGT	29

Table S1. Sequences for duplexes and tetrahedra. Sequences in bold are sticky ends and sequences underlined are the toehold region.

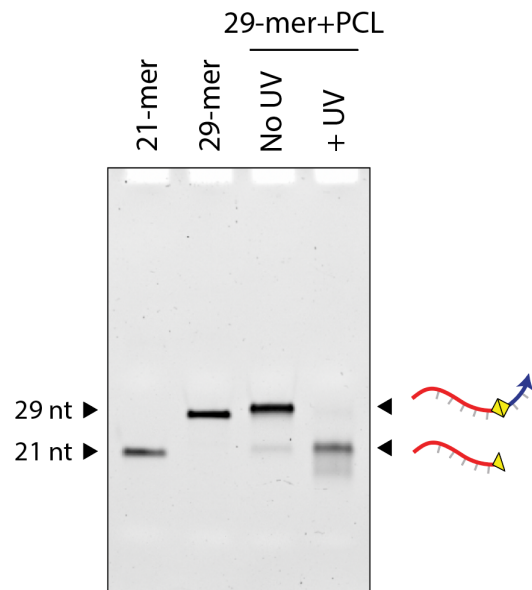


Figure S1. Cleavage of single stranded DNA containing a PCL analyzed by denaturing PAGE. Full image of gel shown in Figure 1e.

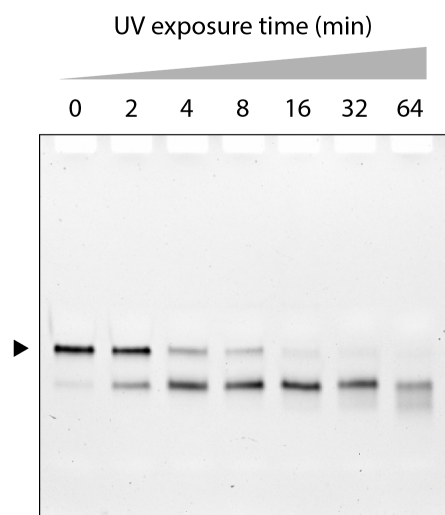


Figure S2. Time series of photocleavage in PCL-containing DNA analyzed using denaturing PAGE. Full image of gel shown in Figure 1f.

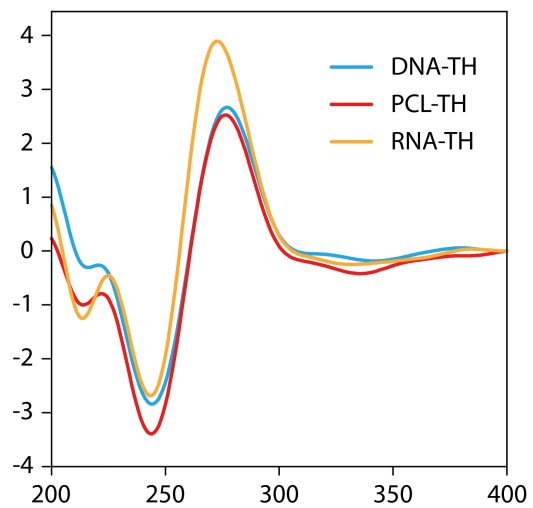


Figure S3. Circular dichroism spectra of duplexes with DNA toehold, PCL toehold and RNA toehold.

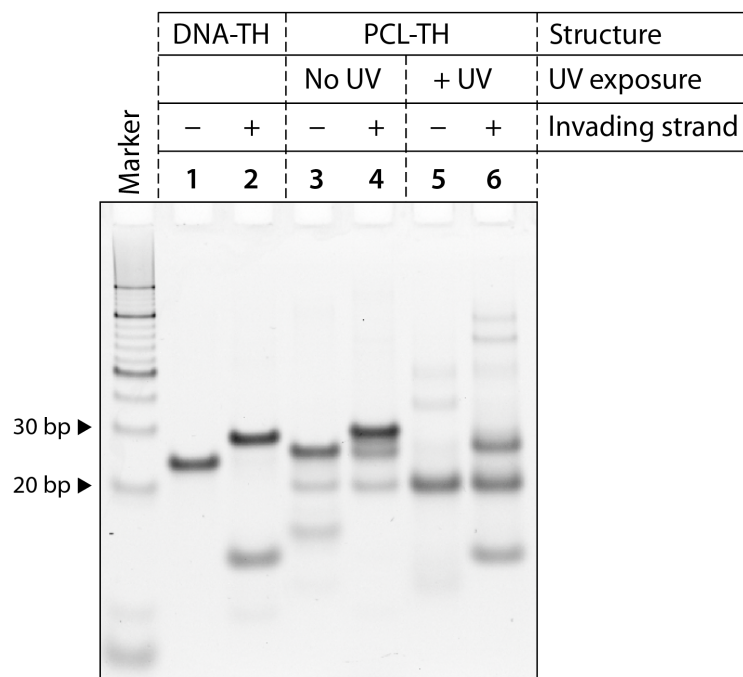


Figure S4. Strand displacement in duplexes before and after toehold clipping by UV. Full image of gel shown in Figure 1h.

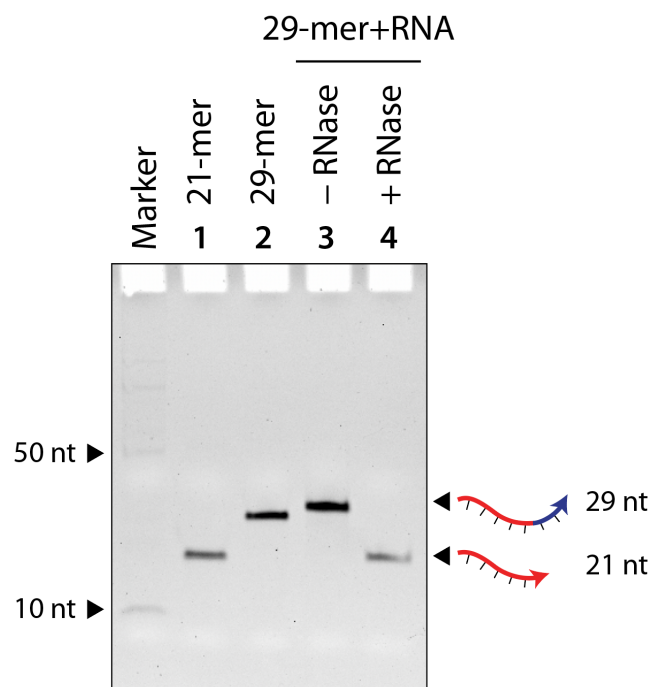


Figure S5. Degradation of RNA portion of a chimera strand containing DNA and RNA analyzed by denaturing PAGE. Full image of gel shown in Figure 3c.

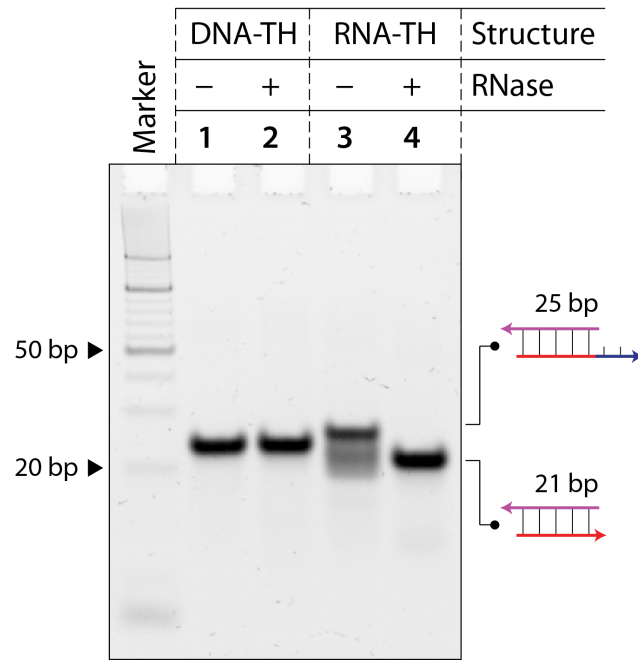


Figure S6. RNase-induced toehold clipping in DNA duplex. Full image of gel shown in Figure 3d.

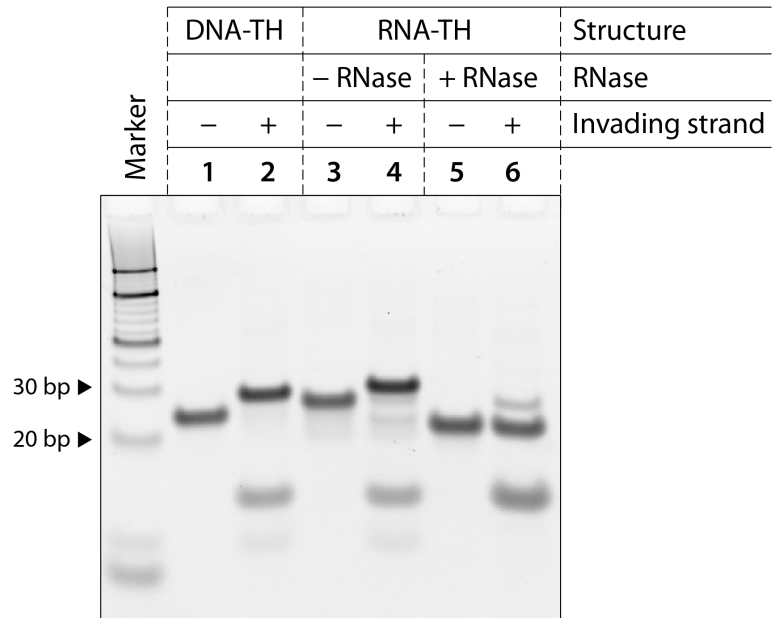


Figure S7. Strand displacement in duplexes before and after toehold clipping by RNase A. Full image of gel shown in Figure 3e.

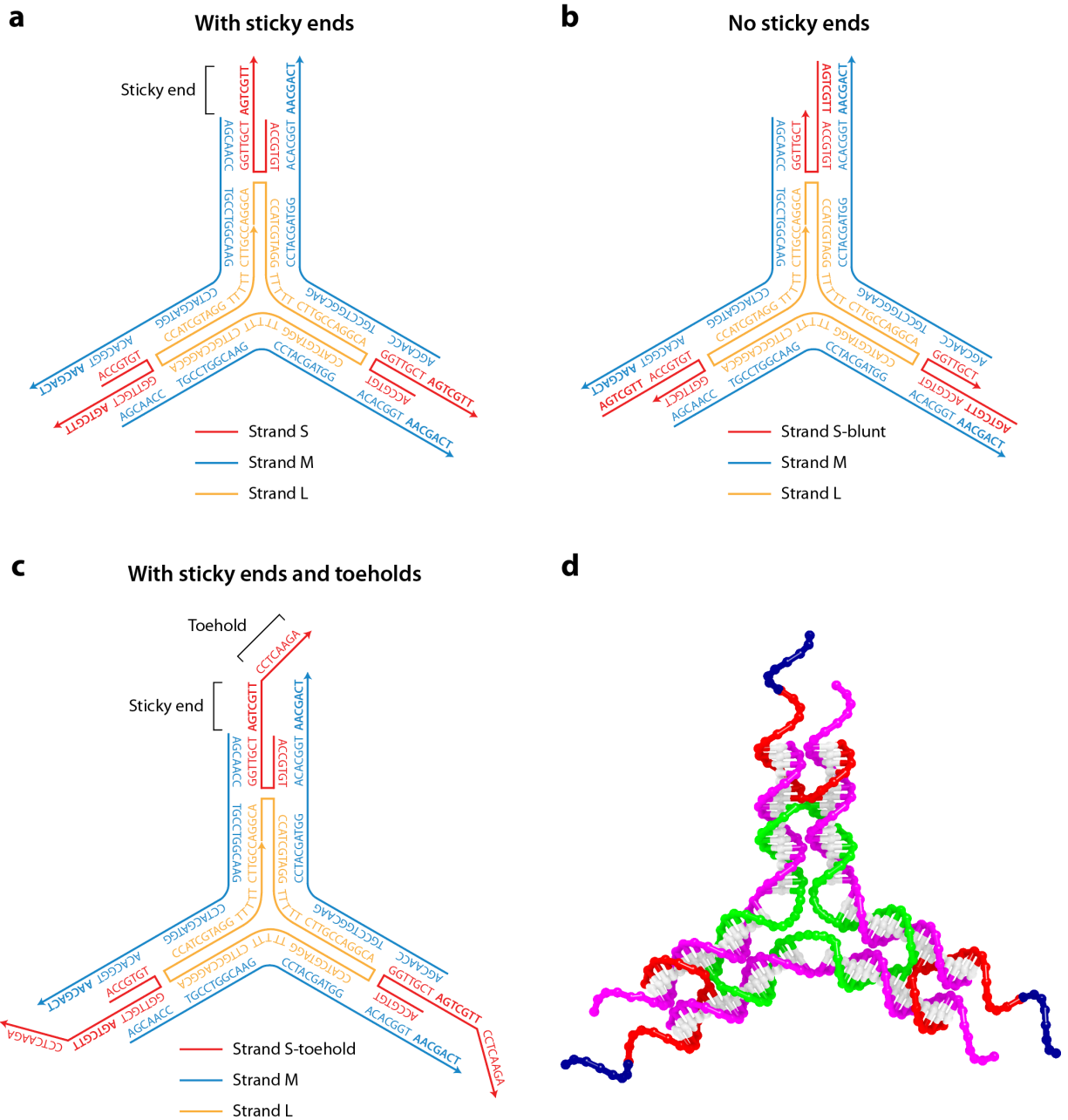


Figure S8. Design and sequence of the 3-point-star motif. (a) The 3-point-star motif is three-fold symmetric and consists of strands L, M and S in the ratio 1:3:3. Motifs connect via sticky ends to form higher order structures. Four such motifs assemble to form the DNA tetrahedron. (b) A blunt-ended motif without sticky ends. (c) Strand S in the motif has a single stranded extension that is not part of the tetrahedron; this acts as the toehold for the strand displacement process. (d) Molecular model of the 3-point-star motif.