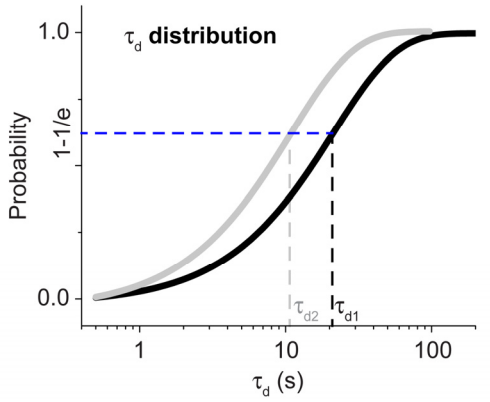
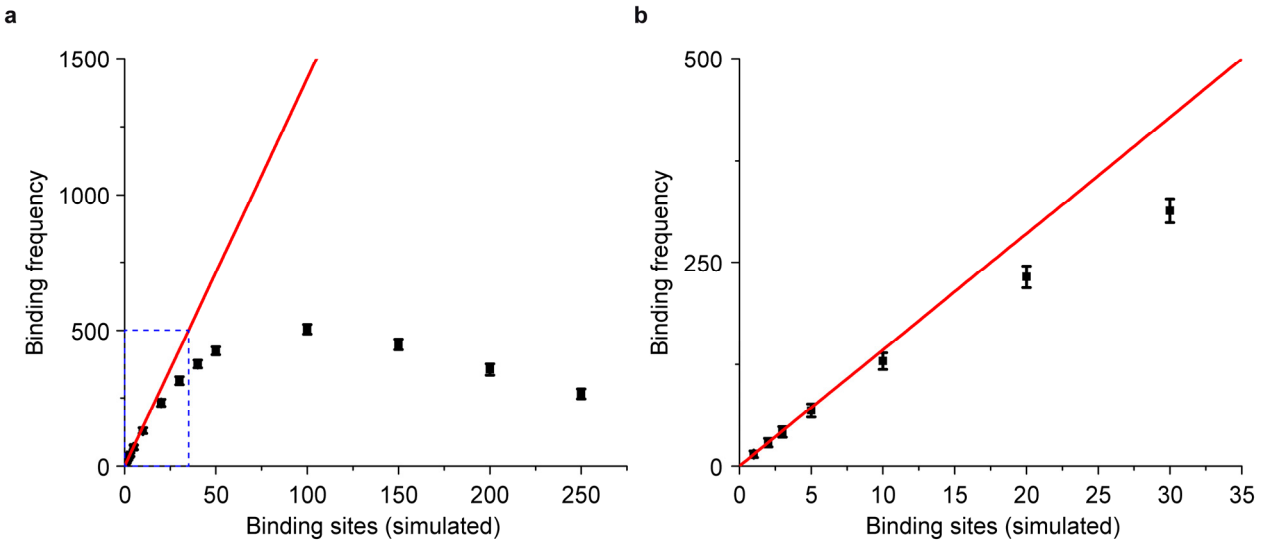


Supplementary Figure 1

Mean dark time value calculation

Mean dark time values are calculated from the cumulative distribution function (cdf)

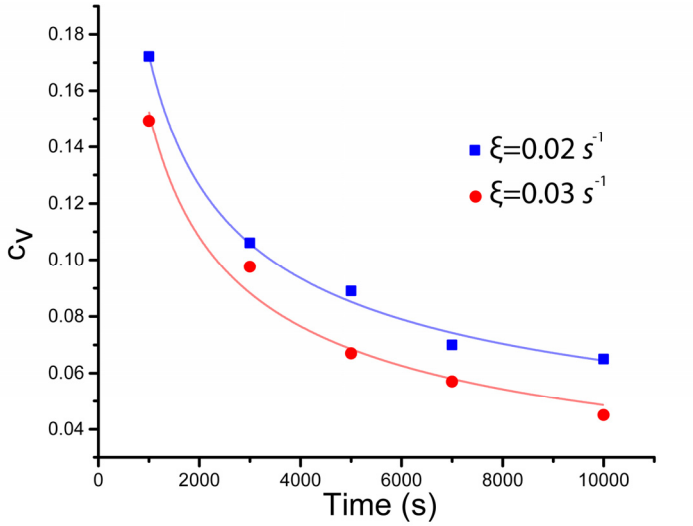


Supplementary Figure 2

Binding frequency vs. number of binding sites

(**a**) Stochastic simulations of DNA-PAINT binding events. Plotted is the binding frequency vs. number of simulated binding sites (Black, mean ± stdev; Red: Linear fit obtained from origin and first data point). (**b**) Zoom-in (blue area in **a**) shows deviations from linear behavior already for as little as ten binding sites.

Simulation conditions: 500 runs per site, 100 ms integration time, 15000 frames, ξ=0.01 s^{-1}.

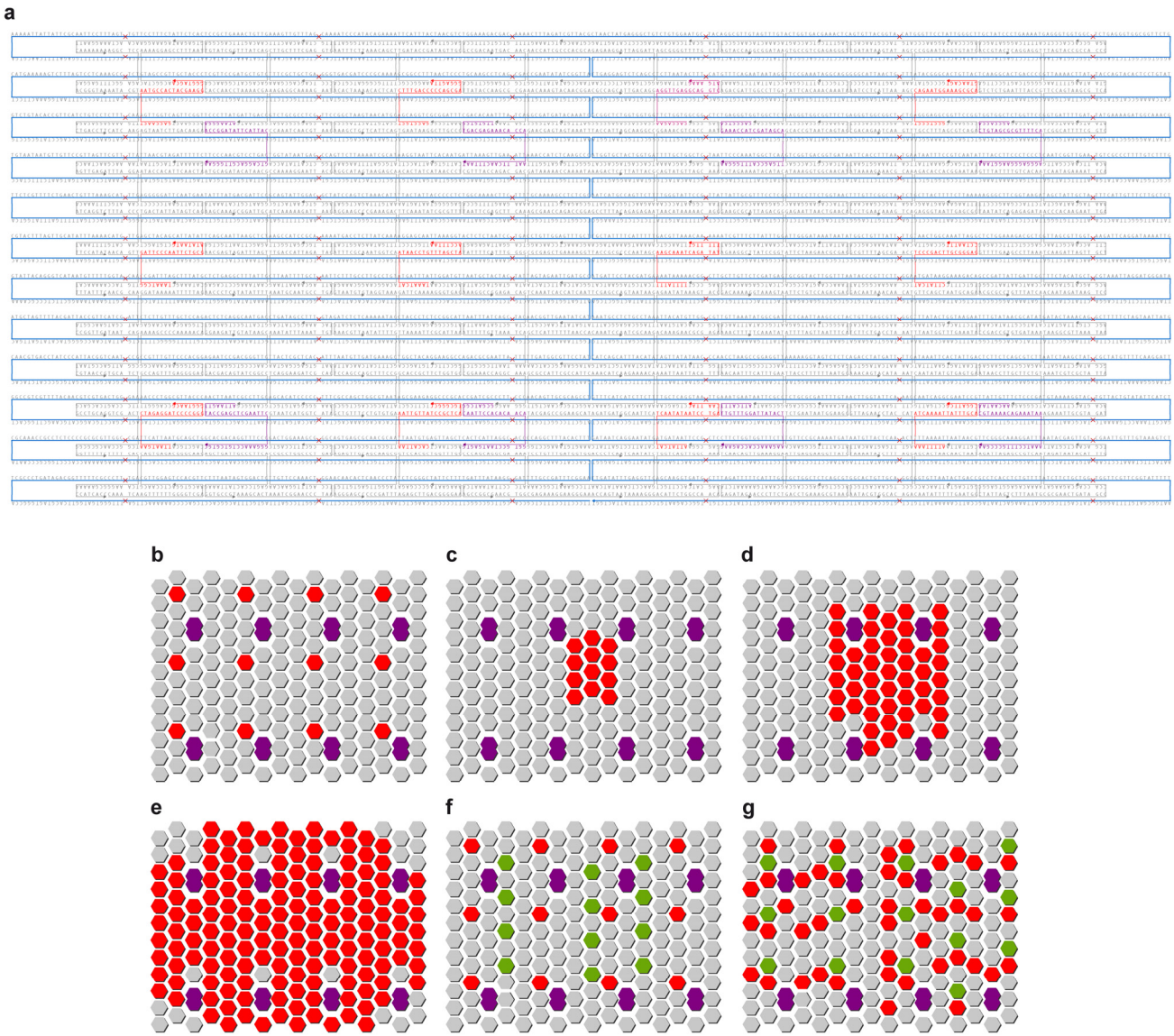


Supplementary Figure 3

Counting error time and influx rate dependency

Counting error can be reduced by increasing image acquisition time (squares and circles: experimental data; lines: data fitted with the function A(1/sqrt(x)+B). qPAINT analysis was performed on datasets of 20 nm grid DNA origami structures, by only analyzing structures showing 11 binding sites. After 166 min of imaging, for a probe influx rate of 0.02 s^{-1} the mean number of binding sites was 11.09 with a standard deviation of 0.72. For a probe influx rate of 0.03 s^{-1} the mean was 11.08 with a standard deviation of 0.49.

Imaging conditions: The imaging buffer contained 10 nM (ξ=0.02 s^{-1}) or 15 nM (ξ=0.03 s^{-1}) Cy3b-labeled imager strands in buffer B+. Imaging chambers were sealed with epoxy before imaging. Image acquisition was carried out with a CCD readout bandwidth of 3 MHz at 14 bit and 5.1 pre-amp gain. No EM gain was used. Imaging was performed using TIR illumination with an excitation intensity of ~5 mW using the 561 nm laser line. 50,000 frames at 5 Hz frame rate were acquired.

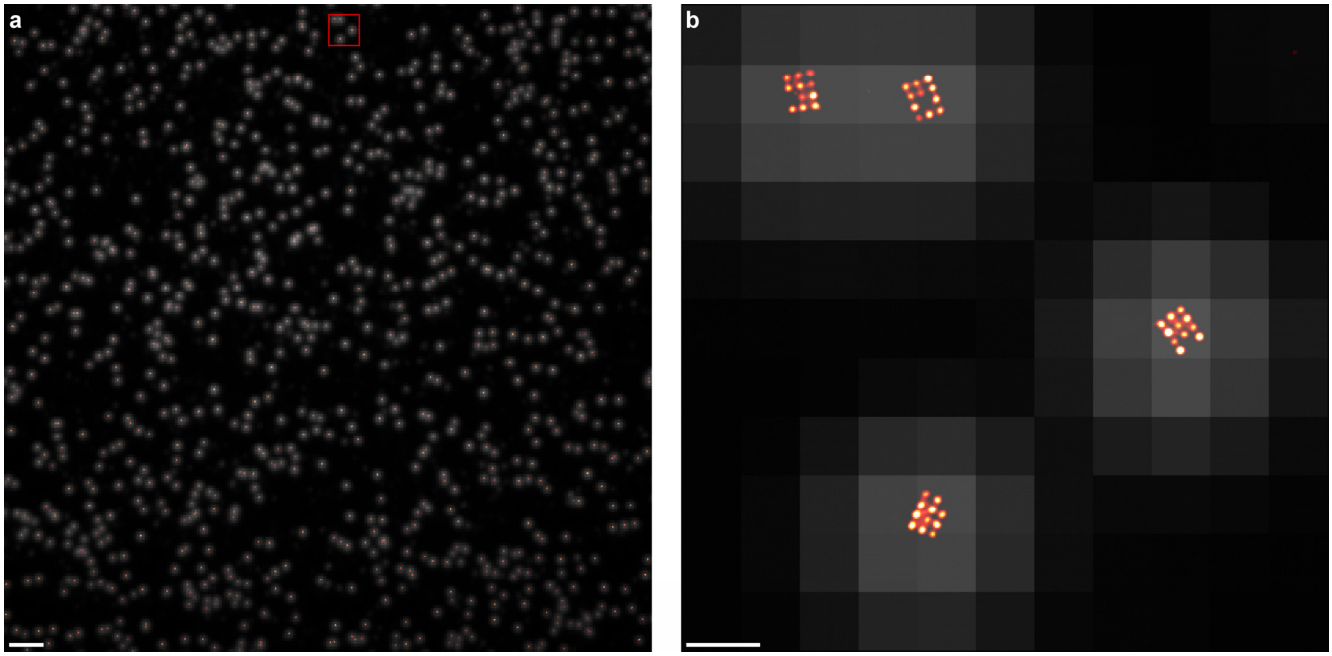


Supplementary Figure 4

Strand diagram and schematics for DNA origami structures

(**a**) Detailed DNA origami strand diagram for the 20 nm grid structure designed to carry 12 DNA-PAINT docking sites (zoom in to see details. (**b**) Schematic representation for the structure in **a.** Hexagons represent 3' ends of staples. (**c**) DNA origami with 12 DNA-PAINT docking sites. (**d**) DNA origami with 48 DNA-PAINT docking sites. (**e**) DNA origami with 150 docking sites. (**f**) 20 nm grid structure with 12 fixed Cy3 dyes (hybridized via handle/anti-handle strands). (**g**) DNA origami with 44 DNA-PAINT docking and 15 fixed Cy3 dyes (hybridized via handle/anti-handle strands).

Strands are color-coded to denote strand extensions (**see Supplementary Tables S1, S2, S3, S4, S5,** and **S6**). Color code: Blue: DNA scaffold; Gray: staple strands; Red: staples with a 3'-handle extension for DNA-PAINT (docking sites); Purple: 5'-biotinylated strands; Green: 3'-Cy3-modified staples.

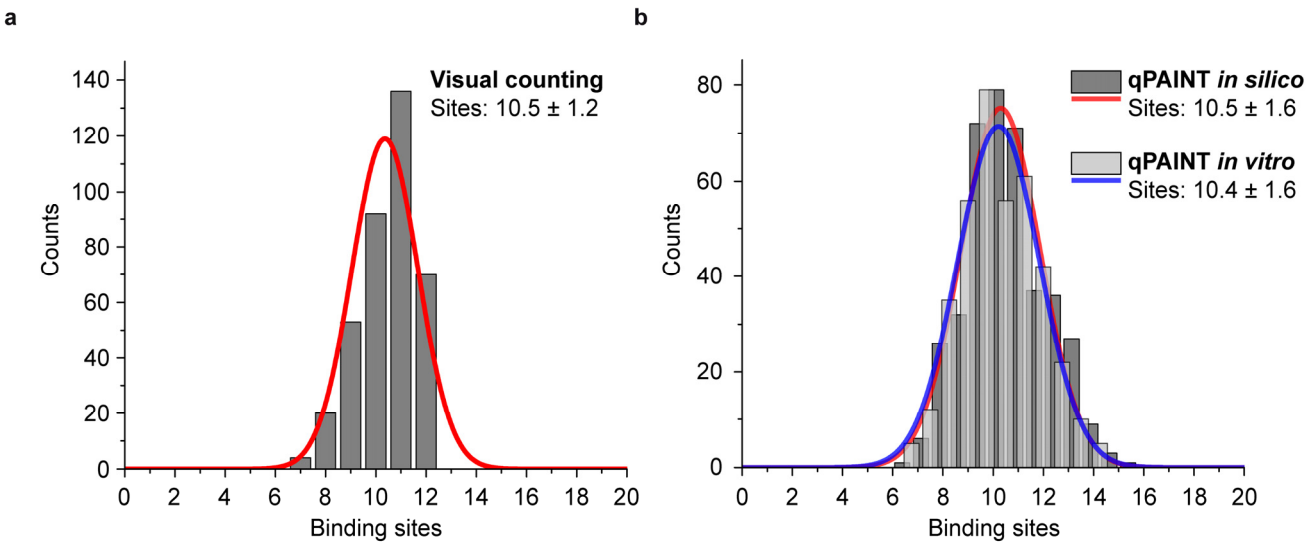


Supplementary Figure 5

Overview of 20 nm grid DNA origami

(**a**) DNA-PAINT super-resolution and diffraction-limited image of 20 nm grid DNA origami structures are superimposed. Scale bar: 2 μm.
(**b**) Zoom-in of the highlighted region in **a**. Scale bar: 500 nm.

Imaging conditions: See conditions for **Fig. 2b**.



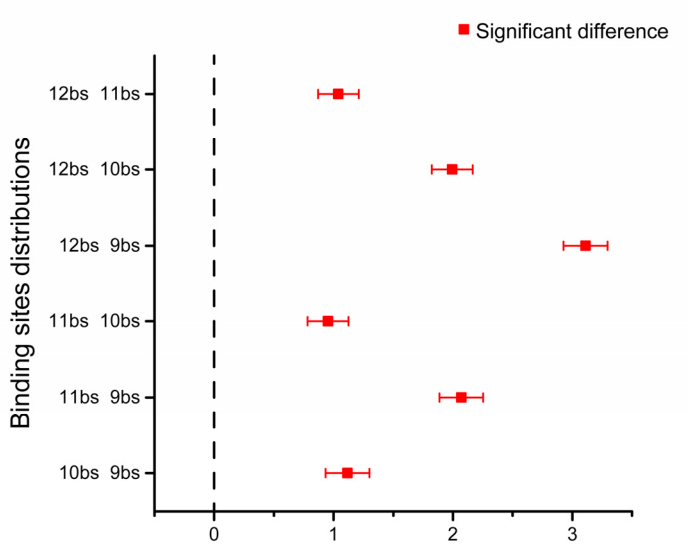
Supplementary Figure 6

Binding sites distributions for visual counting, *in silico* qPAINT, and *in vitro* qPAINT

(**a**) Distribution of the number of sites by direct counting the single spots in each DNA origami grid from **Fig. 2b**. Red line shows the Gaussian fit to the data, yielding a strand incorporation efficiency of ~87.5 % for the 12 binding sites 20 nm grid structure. (**b**) qPAINT stochastic simulations (*in silico*) and *in vitro* data from the structures analyzed visually in **a**. *In silico* simulations were performed using a normal distribution of binding sites of 10.5 ± 1.2 to represent the exact experimental conditions. qPAINT *in silico* (yielding 10.5 ± 1.6, mean ± stdv) and qPAINT experimental *in vitro* (yielding 10.4 ± 1.6, mean ± stdv) data is in good agreement.

Imaging conditions: See conditions for **Fig. 2b**.

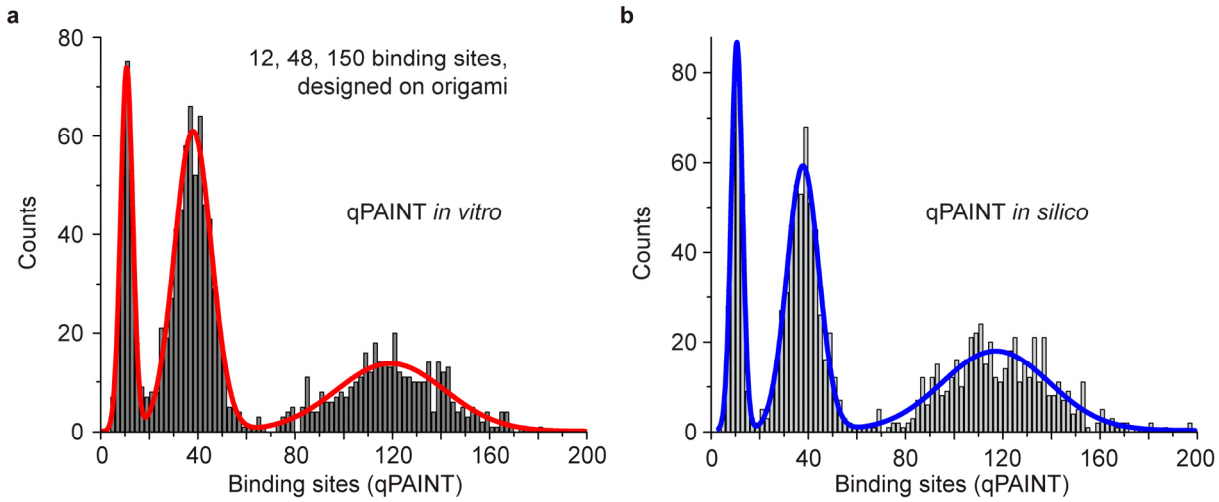
Simulation conditions: qPAINT simulations in **b** were performed using the exact binding site distribution (obtained from visual counting) from **a** as model input in combination with association and dissociation rates obtained from the experimental data. 15,000 frames at an "integration time" of 0.1 *s* were simulated.



Supplementary Figure 7

Distinguishability of binding sites based on Tukey's post hoc analysis

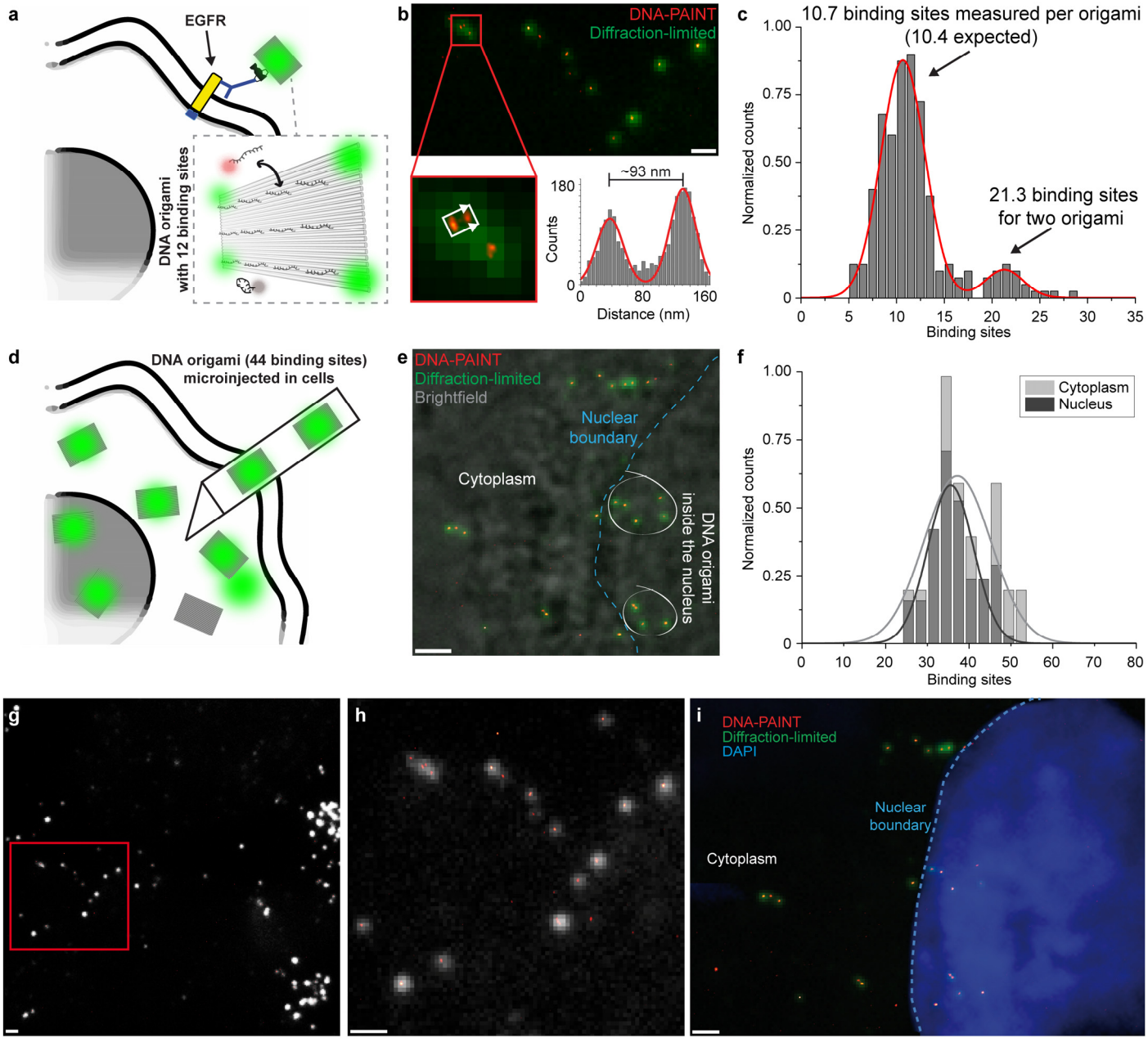
We found significant differences for the number of binding sites at 0.01 level (**Fig. 2d**). A post Tukey test showed that all distributions differed at 0.01 level of significance (if an interval does not contain 0, the corresponding mean values are significantly different).



Supplementary Figure 8

qPAINT dynamic range

(**a**) Binding site distribution for DNA origami structures designed to carry 12, 48, and 150 binding sites for a probe influx rate of ξ=0.03 s^{-1} (n = 1215). qPAINT is able to operate effictively over more than an order of magnitude difference in binding sites per diffraction-limited area. Imaging was performed with Atto 655-labeled imager strands. (**b**) Corresponding *in silico* evaluation confirms the *in vitro* findings.

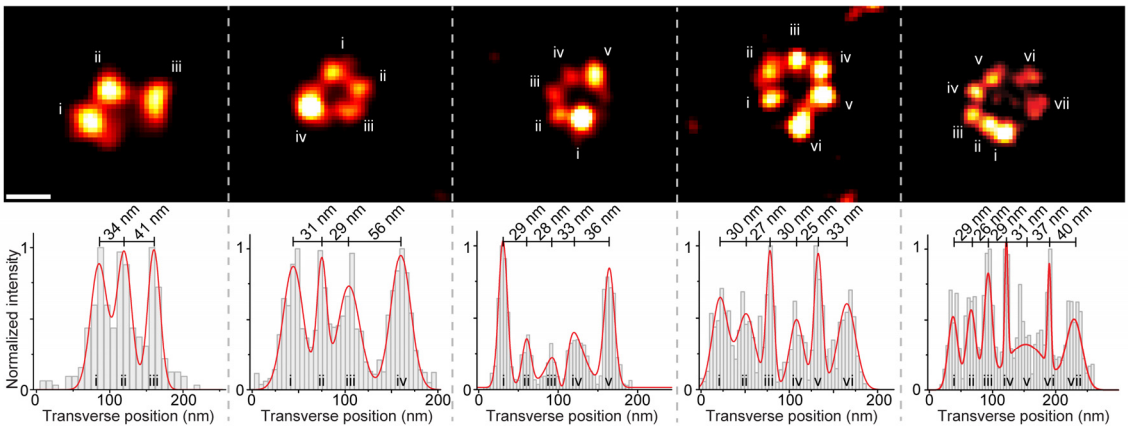


Supplementary Figure 9

qPAINT *in situ* benchmarking using DNA origami

(**a**) CHO cells were transfected to transiently express EGF receptors (EGFR). EGFR labeling is performed with pre-assembled antibody-DNA origami conjugates (44 fixed Cy3 labels, 12 DNA-PAINT docking sites for Atto 655-labeled imager strands). (**b**) Diffraction-limited (green) and super-resolved DNA-PAINT image (red) of DNA origami on a cell membrane. Transverse profile of two origami structures on a cell membrane in the boxed region are spaced ~93 nm apart. (**c**) qPAINT analysis (n = 239) yields the binding site distribution of DNA origami structures on cell membranes. The measured number of binding sites (10.7) matches well with the expected number of binding sites (10.4 for a monomer origami with 12 designed sites and 87% incorporation efficiency of the binding sites). (**d**) DNA origami (carrying 44 fixed Cy3 labels and 44 DNA-PAINT docking sites for Atto 655-labeled imager strands) were microinjected into fixed HeLa cells. Injections were targeted to nuclear and cytoplasmic regions. (**e**) Diffraction-limited image (green), super-resolved DNA-PAINT image (red), and bright field image (gray) showing origami structure inside the nucleus and in the cytoplasm. **(f)** qPAINT analysis of structures inside (n = 105) and outside (n = 24) the nuclear boundary revealed similar binding site

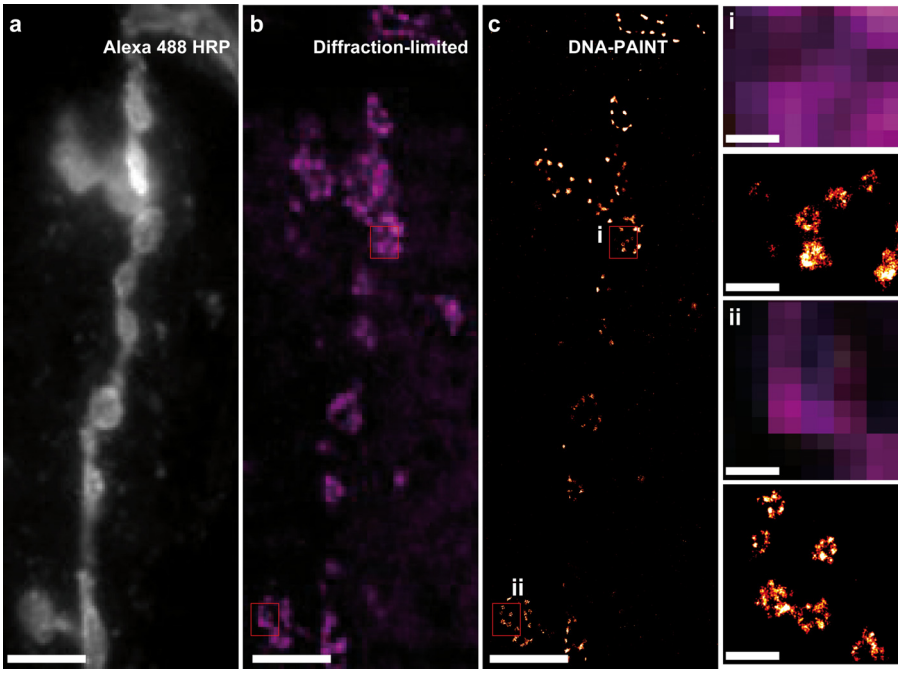
distributions, indicating that hybridization kinetics for DNA-PAINT probes are comparable in nuclear and cytoplasmic regions (mean-to-mean difference: ~1.4 binding sites). (**g**) Large view of diffraction-limited (gray) and super-resolved DNA-PAINT image (red) of DNA origami on a cell membrane (bright individual dots). (**h**) Zoom-in of the highlighted area in **g**. (**i**) For qPAINT analysis, origami structures in the cytoplasm were separated from structures in the nucleus by using DAPI signal for nuclear segmentation. DNA-PAINT super-resolution reconstruction (red), diffraction-limited image (green), and nuclear staining (blue) are superimposed. Scale bars: 1 μm (**b, g, h,** and **i**), 2 μm (**e**).



Supplementary Figure 10

Symmetric arrangement of Nup98 protein clusters in NPCs

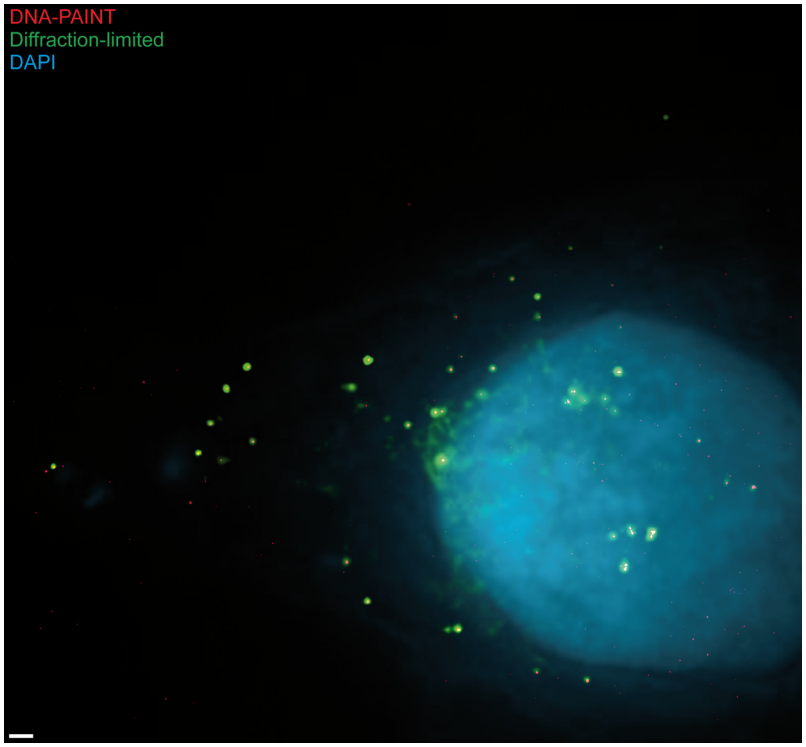
Representative images of NPC structures displaying 1–7 Nup98 protein clusters. Distance between clusters was determined by measuring the interval between means of fitted Gaussians of linearized circular intensity projection (see Online Methods for details). Scale bar: 50 nm.



Supplementary Figure 11

Overview image of Brp proteins in fixed *Drosophila* NMJs

(a) Epi-fluorescence image of anti-HRP-Alexa488 showing synaptic boutons in neuromuscular junctions (NMJ). (**b**) Diffraction-limited and (**c**) DNA-PAINT image of Brp proteins. Fillets were imaged using 10 nM Atto655-labeled imager strands (15000 frames, 10 Hz frame rate). (**i**), (**ii**) zoomed in view of the highlighted areas in **c.** Scale bars: 5 µm (**a-c**), 500 nm (**i, ii**).

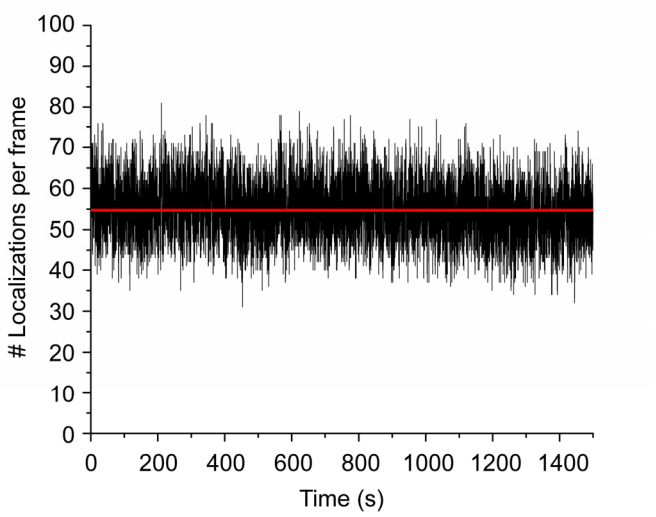


Supplementary Figure 12

Overview image of mRNA detection inside fixed HeLa cells

Diffraction-limited (green) and DNA-PAINT image (red) of SUZ12 mRNA show co-localization. Scale bar: 1 μm.

Imaging conditions: See conditions for **Fig. 3f**.

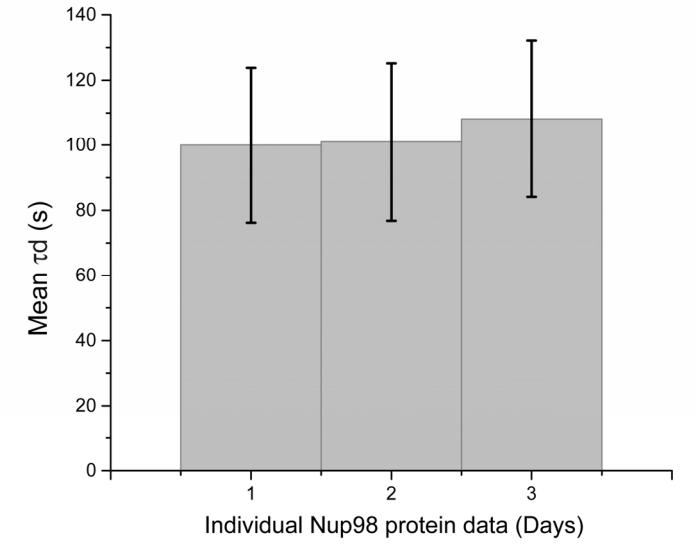


Supplementary Figure 13

Constant influx rate of imaging probes

The number of single-molecule localization events (y-axis), and thus the influx rate of imaging probes remains constant over time (x-axis) during DNA-PAINT imaging, demonstrating that qPAINT analysis is not compromised, as “photobleaching” does not occur. Black: Localizations per frame; Red: zero-slope (constant) linear curve as a guide to the eye.

Data obtained from images used for **Supplementary Fig. 9e**.



Supplementary Figure 14

Influx rate variability in Nup98 experiments

Using the same concentration of imager probes, the mean dark times (y-axis), and thus the probe influx rate remains constant for different Nup98 qPAINT datasets that were acquired at different days (x-axis). This underlines qPAINT's robustness and repeatability for different samples and different days. Furthermore, a single calibration can be used for subsequent experiments.

Data obtained from images used for **Fig. 3a**.

Supplementary Tables

Table S1 | Staple sequences for 20 nm grid. The color matches the staples in the strand diagram shown in **Supplementary Figure 4**.

Position	Sequence	Color	Description
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAA		Structure strand
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGG		Structure strand
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTT		Structure strand
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGA		Structure strand
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAA		Structure strand
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACT		Structure strand
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAA		Structure strand
1[64]4[64]	TTTATCAGGACAGCATCGGAACGACACCAACCTAAAACGAGGTCAATC		Structure strand
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAA		Structure strand
1[128]4[128]	TGACAACTCGCTGAGGCTTGCATTATACCAAGCGCGATGATAAA		Structure strand
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGAT		Structure strand
1[192]4[192]	GCGGATAACCTATTATTCTGAAACAGACGATTGGCCTTGAAGAGCCAC		Structure strand
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCA		Structure strand
1[256]4[256]	CAGGAGGTGGGGTCAGTGCCTTGAGTCTCTGAATTTACCGGGAACCAG		Structure strand
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAAT		Structure strand
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAA		Structure strand
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAG		Structure strand
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGA		Structure strand
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCAT		Structure strand
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCG		Structure strand
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAAT		Structure strand
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCA		Structure strand
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTT		Structure strand
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGC		Structure strand
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTA		Structure strand
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAA		Structure strand
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAG		Structure strand
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCA		Structure strand
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTA		Structure strand
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAA		Structure strand
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGA		Structure strand
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAG		Structure strand
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGA		Structure strand
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGA		Structure strand
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACT		Structure strand
6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAG		Structure strand
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGC		Structure strand
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTA		Structure strand
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGC		Structure strand
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCG		Structure strand
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACC		Structure strand
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCA		Structure strand

7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTC		Structure strand
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAG		Structure strand
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCC		Structure strand
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGA		Structure strand
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGG		Structure strand
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCA		Structure strand
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAAC		Structure strand
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCA		Structure strand
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATC		Structure strand
8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCA		Structure strand
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGA		Structure strand
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCC		Structure strand
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGC		Structure strand
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCG		Structure strand
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACG		Structure strand
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCA		Structure strand
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATAT		Structure strand
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTA		Structure strand
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCA		Structure strand
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCA		Structure strand
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACT		Structure strand
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCT		Structure strand
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9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAA		Structure strand
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10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTAC		Structure strand
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10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAG		Structure strand
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12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGC		Structure strand
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTT		Structure strand
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCA		Structure strand
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13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTA		Structure strand
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGT		Structure strand
13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATT		Structure strand
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14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCA		Structure strand
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16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGA		Structure strand
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17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCG		Structure strand
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18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCC		Structure strand
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCA		Structure strand
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTA		Structure strand
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACT		Structure strand
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGT		Structure strand
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19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGC		Structure strand
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19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATAT		Structure strand
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGG		Structure strand
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20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAAT		Structure strand
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACC		Structure strand
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGT		Structure strand
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCC		Structure strand
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCG		Structure strand
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAA		Structure strand
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGA		Structure strand
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTG		Structure strand
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGT		Structure strand
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCA		Structure strand
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCT		Structure strand
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACT		Structure strand
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAA		Structure strand
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGA		Structure strand
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTT		Structure strand
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTA		Structure strand
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGA		Structure strand
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTT		Structure strand
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATA		Structure strand
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAA		Structure strand
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATC		Structure strand
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAG		Structure strand
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTA		Structure strand
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAG		Structure strand
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAA		Structure strand
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAG		Structure strand
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGT		Structure strand
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAG		Structure strand
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTAC		Structure strand
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAA		Structure strand
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCA		DNA-PAINT docking site
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTA		DNA-PAINT docking site
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAG		DNA-PAINT docking site
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGT		DNA-PAINT docking site
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATG		DNA-PAINT docking site
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAA		DNA-PAINT docking site
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGT		DNA-PAINT docking site
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTT		DNA-PAINT docking site
20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACG		DNA-PAINT docking site
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCC		DNA-PAINT docking site
20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTAC		DNA-PAINT docking site
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCG		DNA-PAINT docking site
4[63]6[56]	ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5’-Biotin modification
4[127]6[120]	TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5’-Biotin modification

4[191]6[184]	CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5′-Biotin modification
4[255]6[248]	AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5′-Biotin modification
18[63]20[56]	ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5′-Biotin modification
18[127]20[120]	GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5′-Biotin modification
18[191]20[184]	ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5′-Biotin modification
18[255]20[248]	AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5′-Biotin modification

Table S2 | Staple sequences for 12 docking sites origami. The color matches the staples in the strand diagram shown in **Supplementary Figure 4**.

Position	Sequence	Color	Description
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAA		Structure strand
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGG		Structure strand
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTT		Structure strand
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAA		Structure strand
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGA		Structure strand
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAG		Structure strand
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAA		Structure strand
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACT		Structure strand
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAA		Structure strand
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAA		Structure strand
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGAT		Structure strand
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCA		Structure strand
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAAT		Structure strand
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAA		Structure strand
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAG		Structure strand
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGA		Structure strand
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCAT		Structure strand
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCG		Structure strand
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAAT		Structure strand
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCA		Structure strand
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTT		Structure strand
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGC		Structure strand
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTA		Structure strand
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAA		Structure strand
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCA		Structure strand
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAG		Structure strand
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTA		Structure strand
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCA		Structure strand
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAG		Structure strand
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTA		Structure strand
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGT		Structure strand
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAA		Structure strand
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGA		Structure strand
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAG		Structure strand
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGA		Structure strand
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGA		Structure strand

6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACT		Structure strand
6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAG		Structure strand
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGC		Structure strand
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTA		Structure strand
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGC		Structure strand
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCG		Structure strand
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACC		Structure strand
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCA		Structure strand
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTC		Structure strand
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAG		Structure strand
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCC		Structure strand
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGA		Structure strand
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCA		Structure strand
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAAC		Structure strand
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCA		Structure strand
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATC		Structure strand
8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCA		Structure strand
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGA		Structure strand
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGC		Structure strand
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCG		Structure strand
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACG		Structure strand
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCA		Structure strand
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATAT		Structure strand
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTA		Structure strand
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCA		Structure strand
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCA		Structure strand
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCT		Structure strand
9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTA		Structure strand
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAA		Structure strand
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGA		Structure strand
10[79]8[80]	GATGGCTTATCAAAAAGATTAAGAGCGTCC		Structure strand
10[111]8[112]	TTGCTCCTTTCAAATATCGCGTTTGAGGGGGT		Structure strand
10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAG		Structure strand
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAA		Structure strand
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGC		Structure strand
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTC		Structure strand
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCA		Structure strand
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTG		Structure strand
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCG		Structure strand
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAG		Structure strand
11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAA		Structure strand
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCT		Structure strand
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATG		Structure strand
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCG		Structure strand
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAA		Structure strand
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTT		Structure strand

12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTT		Structure strand
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCA		Structure strand
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGA		Structure strand
13[64]15[63]	TATATTTTGTCATTGCCTGAGAGTGGAAGATT		Structure strand
13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTA		Structure strand
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGT		Structure strand
13[192]15[191]	GTAAAGTAATCGCCATATTTAACAAAACTTTT		Structure strand
13[224]15[223]	ACAACATGCCAACGCTCAACAGTCTTCTGA		Structure strand
13[256]15[255]	GTTTATCAATATGCGTTATACAAACCGACCGT		Structure strand
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGC		Structure strand
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCA		Structure strand
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAA		Structure strand
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAA		Structure strand
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTC		Structure strand
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCA		Structure strand
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCG		Structure strand
15[96]17[95]	ATATTTTGGCTTTCATCAACATTATCCAGCCA		Structure strand
15[160]16[144]	ATCGCAAGTATGTAAATGCTGATGATAGGAAC		Structure strand
15[224]17[223]	CCTAAATCAAAATCATAGGTCTAAACAGTA		Structure strand
16[47]14[48]	ACAAACGGAAAAGCCCCAAAAACACTGGAGCA		Structure strand
16[79]14[80]	GCGAGTAAAAATATTTAAATTGTTACAAAG		Structure strand
16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGA		Structure strand
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCA		Structure strand
16[207]14[208]	ACCTTTTTATTTTAGTTAATTTCATAGGGCTT		Structure strand
16[239]14[240]	GAATTTATTTAATGGTTTGAAATATTCTTACC		Structure strand
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGT		Structure strand
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAG		Structure strand
17[96]19[95]	GCTTTCCGATTACGCCAGCTGGCGGCTGTTTC		Structure strand
17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCG		Structure strand
17[224]19[223]	CATAAATCTTTGAATACCAAGTGTTAGAAC		Structure strand
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGA		Structure strand
18[79]16[80]	GATGTGCTTCAGGAAGATCGCACAATGTGA		Structure strand
18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCC		Structure strand
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCA		Structure strand
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTA		Structure strand
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACT		Structure strand
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGT		Structure strand
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAG		Structure strand
19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTC		Structure strand
19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGC		Structure strand
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTA		Structure strand
19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATAT		Structure strand
20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACG		Structure strand
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGG		Structure strand
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCC		Structure strand
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATG		Structure strand

20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTAC		Structure strand
20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAAT		Structure strand
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCG		Structure strand
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTAC		Structure strand
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACC		Structure strand
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGT		Structure strand
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCC		Structure strand
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCG		Structure strand
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAA		Structure strand
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGA		Structure strand
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTG		Structure strand
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGT		Structure strand
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCA		Structure strand
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCT		Structure strand
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACT		Structure strand
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAA		Structure strand
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGA		Structure strand
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTT		Structure strand
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTA		Structure strand
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAA		Structure strand
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGA		Structure strand
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTT		Structure strand
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATA		Structure strand
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAA		Structure strand
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATC		Structure strand
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAG		Structure strand
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTA		Structure strand
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAG		Structure strand
1[64]4[64]	TTTATCAGGACAGCATCGGAACGACACCAACCTAAAACGAGGTCAATC		Structure strand
1[128]4[128]	TGACAACTCGCTGAGGCTTGCATTATACCAAGCGCGATGATAAA		Structure strand
1[192]4[192]	GCGGATAACCTATTATTCTGAAACAGACGATTGGCCTTGAAGAGCCAC		Structure strand
1[256]4[256]	CAGGAGGTGGGGTCAGTGCCTTGAGTCTCTGAATTTACCGGGAACCAG		Structure strand
15[64]18[64]	GTATAAGCCAACCCGTCGGATTCTGACGACAGTATCGGCCGCAAGGCG		Structure strand
15[128]18[128]	TAAATCAAAATAATTCGCGTCTCGGAAACCAGGCAAAGGGAAGG		Structure strand
15[192]18[192]	TCAAATATAACCTCCGGCTTAGGTAACAATTTCATTTGAAGGCGAATT		Structure strand
15[256]18[256]	GTGATAAAAAGACGCTGAGAAGAGATAACCTTGCTTCTGTTCGGGAGA		Structure strand
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGG		DNA-PAINT docking site
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCC		DNA-PAINT docking site
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACT		DNA-PAINT docking site
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTAC		DNA-PAINT docking site
10[175]8[176]	TTAACGTCTAACATAAAAACAGGTAACGGA		DNA-PAINT docking site
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAA		DNA-PAINT docking site
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGC		DNA-PAINT docking site
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGT		DNA-PAINT docking site
13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATT		DNA-PAINT docking site

14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCA		DNA-PAINT docking site
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGT		DNA-PAINT docking site
16[175]14[176]	TATAACTAACAAAGAACGCGAGAACGCCAA		DNA-PAINT docking site
4[63]6[56]	ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5'-Biotin modification
4[127]6[120]	TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5'-Biotin modification
4[191]6[184]	CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5'-Biotin modification
4[255]6[248]	AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5'-Biotin modification
18[63]20[56]	ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5'-Biotin modification
18[127]20[120]	GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5'-Biotin modification
18[191]20[184]	ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5'-Biotin modification
18[255]20[248]	AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5'-Biotin modification

Table S3 | Staple sequences for 48 docking sites origami. The color matches the staples in the strand diagram shown in **Supplementary Figure 4**.

Start	Sequence	Color	Description
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAA		Structure strand
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGG		Structure strand
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTT		Structure strand
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAA		Structure strand
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGA		Structure strand
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAG		Structure strand
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAA		Structure strand
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACT		Structure strand
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAA		Structure strand
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAA		Structure strand
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGAT		Structure strand
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCA		Structure strand
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAAT		Structure strand
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAA		Structure strand
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAG		Structure strand
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGA		Structure strand
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCAT		Structure strand
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCG		Structure strand
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAAT		Structure strand
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCA		Structure strand
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTT		Structure strand
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGC		Structure strand
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAA		Structure strand
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCA		Structure strand
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAG		Structure strand
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTA		Structure strand
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAG		Structure strand
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTA		Structure strand
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGT		Structure strand
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAA		Structure strand

5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGA		Structure strand
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAG		Structure strand
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGA		Structure strand
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACT		Structure strand
6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAG		Structure strand
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACC		Structure strand
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCA		Structure strand
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTC		Structure strand
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAG		Structure strand
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCC		Structure strand
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAAC		Structure strand
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCA		Structure strand
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATC		Structure strand
8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCA		Structure strand
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACG		Structure strand
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCA		Structure strand
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATAT		Structure strand
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTA		Structure strand
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCA		Structure strand
9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTA		Structure strand
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAA		Structure strand
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGA		Structure strand
10[79]8[80]	GATGGCTTATCAAAAAGATTAAGAGCGTCC		Structure strand
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAA		Structure strand
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGC		Structure strand
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTC		Structure strand
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCA		Structure strand
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTG		Structure strand
11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAA		Structure strand
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCT		Structure strand
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATG		Structure strand
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCG		Structure strand
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTT		Structure strand
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCA		Structure strand
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGA		Structure strand
13[64]15[63]	TATATTTTGTCATTGCCTGAGAGTGGAAGATT		Structure strand
13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTA		Structure strand
13[224]15[223]	ACAACATGCCAACGCTCAACAGTCTTCTGA		Structure strand
13[256]15[255]	GTTTATCAATATGCGTTATACAAACCGACCGT		Structure strand
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGC		Structure strand
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCA		Structure strand
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTC		Structure strand
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCA		Structure strand
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCG		Structure strand
15[96]17[95]	ATATTTTGGCTTTCATCAACATTATCCAGCCA		Structure strand
15[224]17[223]	CCTAAATCAAAATCATAGGTCTAAACAGTA		Structure strand

16[47]14[48]	ACAAACGGAAAAGCCCCAAAAACACTGGAGCA		Structure strand
16[79]14[80]	GCGAGTAAAAATATTTAAATTGTTACAAAG		Structure strand
16[239]14[240]	GAATTTATTTAATGGTTTGAAATATTCTTACC		Structure strand
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGT		Structure strand
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAG		Structure strand
17[96]19[95]	GCTTTCCGATTACGCCAGCTGGCGGCTGTTTC		Structure strand
17[224]19[223]	CATAAATCTTTGAATACCAAGTGTTAGAAC		Structure strand
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGA		Structure strand
18[79]16[80]	GATGTGCTTCAGGAAGATCGCACAATGTGA		Structure strand
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGT		Structure strand
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAG		Structure strand
19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTC		Structure strand
19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGC		Structure strand
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTA		Structure strand
19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATAT		Structure strand
20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACG		Structure strand
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGG		Structure strand
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCC		Structure strand
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCG		Structure strand
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTAC		Structure strand
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACC		Structure strand
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGT		Structure strand
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCC		Structure strand
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCG		Structure strand
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAA		Structure strand
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGA		Structure strand
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTG		Structure strand
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGT		Structure strand
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCA		Structure strand
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCT		Structure strand
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACT		Structure strand
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAA		Structure strand
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGA		Structure strand
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTT		Structure strand
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTA		Structure strand
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAA		Structure strand
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGA		Structure strand
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTT		Structure strand
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATA		Structure strand
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAA		Structure strand
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATC		Structure strand
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAG		Structure strand
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTA		Structure strand
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAG		Structure strand
1[64]4[64]	TTTATCAGGACAGCATCGGAACGACACCAACCTAAAACGAGGTCAATC		Structure strand
1[128]4[128]	TGACAACTCGCTGAGGCTTGCATTATACCAAGCGCGATGATAAA		Structure strand

1[192]4[192]	GCGGATAACCTATTATTCTGAAACAGACGATTGGCCTTGAAGAGCCAC		Structure strand
1[256]4[256]	CAGGAGGTGGGGTCAGTGCCTTGAGTCTCTGAATTTACCGGGAACCAG		Structure strand
15[64]18[64]	GTATAAGCCAACCCGTCGGATTCTGACGACAGTATCGGCCGCAAGGCG		Structure strand
15[128]18[128]	TAAATCAAAATAATTCGCGTCTCGGAAACCAGGCAAAGGGAAGG		Structure strand
15[192]18[192]	TCAAATATAACCTCCGGCTTAGGTAACAATTTCATTTGAAGGCGAATT		Structure strand
15[256]18[256]	GTGATAAAAAGACGCTGAGAAGAGATAACCTTGCTTCTGTTCGGGAGA		Structure strand
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTA		DNA-PAINT docking site
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCA		DNA-PAINT docking site
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGA		DNA-PAINT docking site
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGC		DNA-PAINT docking site
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTA		DNA-PAINT docking site
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGC		DNA-PAINT docking site
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCG		DNA-PAINT docking site
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGA		DNA-PAINT docking site
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGG		DNA-PAINT docking site
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCA		DNA-PAINT docking site
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGA		DNA-PAINT docking site
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCC		DNA-PAINT docking site
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGC		DNA-PAINT docking site
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCG		DNA-PAINT docking site
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCA		DNA-PAINT docking site
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACT		DNA-PAINT docking site
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCT		DNA-PAINT docking site
10[111]8[112]	TTGCTCCTTTCAAATATCGCGTTTGAGGGGGT		DNA-PAINT docking site
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTAC		DNA-PAINT docking site
10[175]8[176]	TTAACGTCTAACATAAAAACAGGTAACGGA		DNA-PAINT docking site
10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAG		DNA-PAINT docking site
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCG		DNA-PAINT docking site
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAA		DNA-PAINT docking site
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAG		DNA-PAINT docking site
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAA		DNA-PAINT docking site
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGC		DNA-PAINT docking site
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGT		DNA-PAINT docking site
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTT		DNA-PAINT docking site
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGT		DNA-PAINT docking site
13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATT		DNA-PAINT docking site
13[192]15[191]	GTAAAGTAATCGCCATATTTAACAAAACTTTT		DNA-PAINT docking site
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAA		DNA-PAINT docking site
14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCA		DNA-PAINT docking site
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGT		DNA-PAINT docking site
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAA		DNA-PAINT docking site
15[160]16[144]	ATCGCAAGTATGTAAATGCTGATGATAGGAAC		DNA-PAINT docking site
16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGA		DNA-PAINT docking site
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCA		DNA-PAINT docking site
16[175]14[176]	TATAACTAACAAAGAACGCGAGAACGCCAA		DNA-PAINT docking site

16[207]14[208]	ACCTTTTTATTTTAGTTAATTTCATAGGGCTT		DNA-PAINT docking site
17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCG		DNA-PAINT docking site
18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCC		DNA-PAINT docking site
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCA		DNA-PAINT docking site
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTA		DNA-PAINT docking site
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACT		DNA-PAINT docking site
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATG		DNA-PAINT docking site
20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTAC		DNA-PAINT docking site
20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAAT		DNA-PAINT docking site
4[63]6[56]	ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5'-Biotin modification
4[127]6[120]	TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5'-Biotin modification
4[191]6[184]	CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5'-Biotin modification
4[255]6[248]	AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5'-Biotin modification
18[63]20[56]	ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5'-Biotin modification
18[127]20[120]	GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5'-Biotin modification
18[191]20[184]	ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5'-Biotin modification
18[255]20[248]	AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5'-Biotin modification

Table S4 | Staple sequences for 150 docking sites origami. The color matches the staples in the strand diagram shown in **Supplementary Figure 4**.

Start	Sequence	Color	Description
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAA		Structure strand
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGG		Structure strand
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACT		Structure strand
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAA		Structure strand
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAAT		Structure strand
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAAT		Structure strand
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCA		Structure strand
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCA		Structure strand
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAA		Structure strand
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCA		Structure strand
19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTC		Structure strand
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACC		Structure strand
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGT		Structure strand
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGT		Structure strand
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAA		Structure strand
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGA		Structure strand
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTA		Structure strand
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAG		Structure strand
1[64]4[64]	TTTATCAGGACAGCATCGGAACGACACCAACCTAAAACGAGGTCAATC		Structure strand
1[128]4[128]	TGACAACTCGCTGAGGCTTGCATTATACCAAGCGCGATGATAAA		Structure strand
1[192]4[192]	GCGGATAACCTATTATTCTGAAACAGACGATTGGCCTTGAAGAGCCAC		Structure strand
1[256]4[256]	CAGGAGGTGGGGTCAGTGCCTTGAGTCTCTGAATTTACCGGGAACCAG		Structure strand
15[64]18[64]	GTATAAGCCAACCCGTCGGATTCTGACGACAGTATCGGCCGCAAGGCG		Structure strand
15[128]18[128]	TAAATCAAAATAATTCGCGTCTCGGAAACCAGGCAAAGGGAAGG		Structure strand

15[192]18[192]	TCAAATATAACCTCCGGCTTAGGTAACAATTTCATTTGAAGGCGAATT		Structure strand
15[256]18[256]	GTGATAAAAAGACGCTGAGAAGAGATAACCTTGCTTCTGTTCGGGAGA		Structure strand
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTT		DNA-PAINT docking site
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAA		DNA-PAINT docking site
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGA		DNA-PAINT docking site
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAG		DNA-PAINT docking site
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAA		DNA-PAINT docking site
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAA		DNA-PAINT docking site
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGAT		DNA-PAINT docking site
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCA		DNA-PAINT docking site
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAA		DNA-PAINT docking site
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAG		DNA-PAINT docking site
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGA		DNA-PAINT docking site
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCAT		DNA-PAINT docking site
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCG		DNA-PAINT docking site
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTT		DNA-PAINT docking site
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGC		DNA-PAINT docking site
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTA		DNA-PAINT docking site
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAA		DNA-PAINT docking site
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAG		DNA-PAINT docking site
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTA		DNA-PAINT docking site
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCA		DNA-PAINT docking site
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAG		DNA-PAINT docking site
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTA		DNA-PAINT docking site
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGT		DNA-PAINT docking site
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGA		DNA-PAINT docking site
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAG		DNA-PAINT docking site
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGA		DNA-PAINT docking site
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGA		DNA-PAINT docking site
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACT		DNA-PAINT docking site
6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAG		DNA-PAINT docking site
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGC		DNA-PAINT docking site
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTA		DNA-PAINT docking site
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGC		DNA-PAINT docking site
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCG		DNA-PAINT docking site
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACC		DNA-PAINT docking site
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTC		DNA-PAINT docking site
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAG		DNA-PAINT docking site
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCC		DNA-PAINT docking site
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGA		DNA-PAINT docking site
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGG		DNA-PAINT docking site
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCA		DNA-PAINT docking site
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAAC		DNA-PAINT docking site
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCA		DNA-PAINT docking site
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATC		DNA-PAINT docking site

8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCA		DNA-PAINT docking site
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGA		DNA-PAINT docking site
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCC		DNA-PAINT docking site
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGC		DNA-PAINT docking site
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCG		DNA-PAINT docking site
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACG		DNA-PAINT docking site
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCA		DNA-PAINT docking site
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATAT		DNA-PAINT docking site
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTA		DNA-PAINT docking site
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCA		DNA-PAINT docking site
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCA		DNA-PAINT docking site
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACT		DNA-PAINT docking site
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCT		DNA-PAINT docking site
9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTA		DNA-PAINT docking site
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAA		DNA-PAINT docking site
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGA		DNA-PAINT docking site
10[79]8[80]	GATGGCTTATCAAAAAGATTAAGAGCGTCC		DNA-PAINT docking site
10[111]8[112]	TTGCTCCTTTCAAATATCGCGTTTGAGGGGGT		DNA-PAINT docking site
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTAC		DNA-PAINT docking site
10[175]8[176]	TTAACGTCTAACATAAAAACAGGTAACGGA		DNA-PAINT docking site
10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAG		DNA-PAINT docking site
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAA		DNA-PAINT docking site
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGC		DNA-PAINT docking site
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTC		DNA-PAINT docking site
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCA		DNA-PAINT docking site
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTG		DNA-PAINT docking site
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCG		DNA-PAINT docking site
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAA		DNA-PAINT docking site
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAG		DNA-PAINT docking site
11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAA		DNA-PAINT docking site
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCT		DNA-PAINT docking site
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATG		DNA-PAINT docking site
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCG		DNA-PAINT docking site
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAA		DNA-PAINT docking site
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGC		DNA-PAINT docking site
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGT		DNA-PAINT docking site
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTT		DNA-PAINT docking site
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTT		DNA-PAINT docking site
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCA		DNA-PAINT docking site
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGA		DNA-PAINT docking site
13[64]15[63]	TATATTTTGTCATTGCCTGAGAGTGGAAGATT		DNA-PAINT docking site
13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTA		DNA-PAINT docking site
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGT		DNA-PAINT docking site
13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATT		DNA-PAINT docking site
13[192]15[191]	GTAAAGTAATCGCCATATTTAACAAAACTTTT		DNA-PAINT docking site
13[224]15[223]	ACAACATGCCAACGCTCAACAGTCTTCTGA		DNA-PAINT docking site

13[256]15[255]	GTTTATCAATATGCGTTATACAAACCGACCGT		DNA-PAINT docking site
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGC		DNA-PAINT docking site
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCA		DNA-PAINT docking site
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAA		DNA-PAINT docking site
14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCA		DNA-PAINT docking site
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGT		DNA-PAINT docking site
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAA		DNA-PAINT docking site
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTC		DNA-PAINT docking site
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCA		DNA-PAINT docking site
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCG		DNA-PAINT docking site
15[96]17[95]	ATATTTTGGCTTTCATCAACATTATCCAGCCA		DNA-PAINT docking site
15[160]16[144]	ATCGCAAGTATGTAAATGCTGATGATAGGAAC		DNA-PAINT docking site
15[224]17[223]	CCTAAATCAAAATCATAGGTCTAAACAGTA		DNA-PAINT docking site
16[47]14[48]	ACAAACGGAAAAGCCCCAAAAACACTGGAGCA		DNA-PAINT docking site
16[79]14[80]	GCGAGTAAAAATATTTAAATTGTTACAAAG		DNA-PAINT docking site
16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGA		DNA-PAINT docking site
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCA		DNA-PAINT docking site
16[175]14[176]	TATAACTAACAAAGAACGCGAGAACGCCAA		DNA-PAINT docking site
16[207]14[208]	ACCTTTTTATTTTAGTTAATTTCATAGGGCTT		DNA-PAINT docking site
16[239]14[240]	GAATTTATTTAATGGTTTGAAATATTCTTACC		DNA-PAINT docking site
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGT		DNA-PAINT docking site
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAG		DNA-PAINT docking site
17[96]19[95]	GCTTTCCGATTACGCCAGCTGGCGGCTGTTTC		DNA-PAINT docking site
17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCG		DNA-PAINT docking site
17[224]19[223]	CATAAATCTTTGAATACCAAGTGTTAGAAC		DNA-PAINT docking site
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGA		DNA-PAINT docking site
18[79]16[80]	GATGTGCTTCAGGAAGATCGCACAATGTGA		DNA-PAINT docking site
18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCC		DNA-PAINT docking site
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCA		DNA-PAINT docking site
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTA		DNA-PAINT docking site
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACT		DNA-PAINT docking site
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGT		DNA-PAINT docking site
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAG		DNA-PAINT docking site
19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGC		DNA-PAINT docking site
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTA		DNA-PAINT docking site
19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATAT		DNA-PAINT docking site
20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACG		DNA-PAINT docking site
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGG		DNA-PAINT docking site
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCC		DNA-PAINT docking site
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATG		DNA-PAINT docking site
20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTAC		DNA-PAINT docking site
20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAAT		DNA-PAINT docking site
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCG		DNA-PAINT docking site
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTAC		DNA-PAINT docking site
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCC		DNA-PAINT docking site
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCG		DNA-PAINT docking site

21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAA		DNA-PAINT docking site
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGA		DNA-PAINT docking site
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTG		DNA-PAINT docking site
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCA		DNA-PAINT docking site
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCT		DNA-PAINT docking site
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACT		DNA-PAINT docking site
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAA		DNA-PAINT docking site
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGA		DNA-PAINT docking site
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTT		DNA-PAINT docking site
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTA		DNA-PAINT docking site
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTT		DNA-PAINT docking site
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATA		DNA-PAINT docking site
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAA		DNA-PAINT docking site
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATC		DNA-PAINT docking site
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAG		DNA-PAINT docking site
4[63]6[56]	ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5’-Biotin modification
4[127]6[120]	TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5’-Biotin modification
4[191]6[184]	CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5’-Biotin modification
4[255]6[248]	AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5’-Biotin modification
18[63]20[56]	ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5’-Biotin modification
18[127]20[120]	GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5’-Biotin modification
18[191]20[184]	ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5’-Biotin modification
18[255]20[248]	AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5’-Biotin modification

Table S5 | Staple sequences for 20 nm grid with fix Cy3 dyes. The color matches the staples in the strand diagram shown in **Supplementary Figure 4**.

Position	Sequence	Color	Description
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAA		Structure strand
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGG		Structure strand
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTT		Structure strand
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGA		Structure strand
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAA		Structure strand
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACT		Structure strand
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAA		Structure strand
1[64]4[64]	TTTATCAGGACAGCATCGGAACGACACCAACCTAAAACGAGGTCAATC		Structure strand
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAA		Structure strand
1[128]4[128]	TGACAACTCGCTGAGGCTTGCATTATACCAAGCGCGATGATAAA		Structure strand
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGAT		Structure strand
1[192]4[192]	GCGGATAACCTATTATTCTGAAACAGACGATTGGCCTTGAAGAGCCAC		Structure strand
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCA		Structure strand
1[256]4[256]	CAGGAGGTGGGGTCAGTGCCTTGAGTCTCTGAATTTACCGGGAACCAG		Structure strand
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAAT		Structure strand
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAA		Structure strand
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAG		Structure strand
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGA		Structure strand

2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCAT		Structure strand
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCG		Structure strand
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAAT		Structure strand
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCA		Structure strand
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTT		Structure strand
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGC		Structure strand
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTA		Structure strand
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAA		Structure strand
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAG		Structure strand
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCA		Structure strand
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTA		Structure strand
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAA		Structure strand
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGA		Structure strand
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAG		Structure strand
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGA		Structure strand
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGA		Structure strand
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACT		Structure strand
6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAG		Structure strand
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGC		Structure strand
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTA		Structure strand
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGC		Structure strand
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCG		Structure strand
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACC		Structure strand
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCA		Structure strand
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTC		Structure strand
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAG		Structure strand
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCC		Structure strand
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGA		Structure strand
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGG		Structure strand
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCA		Structure strand
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAAC		Structure strand
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCA		Structure strand
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATC		Structure strand
8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCA		Structure strand
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGA		Structure strand
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCC		Structure strand
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGC		Structure strand
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCG		Structure strand
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACG		Structure strand
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCA		Structure strand
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATAT		Structure strand
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTA		Structure strand
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCA		Structure strand
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCA		Structure strand
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACT		Structure strand
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCT		Structure strand

9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTA		Structure strand
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAA		Structure strand
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGA		Structure strand
10[111]8[112]	TTGCTCCTTTCAAATATCGCGTTTGAGGGGGT		Structure strand
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTAC		Structure strand
10[175]8[176]	TTAACGTCTAACATAAAAACAGGTAACGGA		Structure strand
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAA		Structure strand
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGC		Structure strand
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTC		Structure strand
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCA		Structure strand
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTG		Structure strand
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCG		Structure strand
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAG		Structure strand
11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAA		Structure strand
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCT		Structure strand
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCG		Structure strand
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGC		Structure strand
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTT		Structure strand
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCA		Structure strand
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGA		Structure strand
13[64]15[63]	TATATTTTGTCATTGCCTGAGAGTGGAAGATT		Structure strand
13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTA		Structure strand
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGT		Structure strand
13[192]15[191]	GTAAAGTAATCGCCATATTTAACAAAACTTTT		Structure strand
13[224]15[223]	ACAACATGCCAACGCTCAACAGTCTTCTGA		Structure strand
13[256]15[255]	GTTTATCAATATGCGTTATACAAACCGACCGT		Structure strand
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGC		Structure strand
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAA		Structure strand
14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCA		Structure strand
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGT		Structure strand
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTC		Structure strand
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCA		Structure strand
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCG		Structure strand
15[64]18[64]	GTATAAGCCAACCCGTCGGATTCTGACGACAGTATCGGCCGCAAGGCG		Structure strand
15[96]17[95]	ATATTTTGGCTTTCATCAACATTATCCAGCCA		Structure strand
15[128]18[128]	TAAATCAAAATAATTCGCGTCTCGGAAACCAGGCAAAGGGAAGG		Structure strand
15[192]18[192]	TCAAATATAACCTCCGGCTTAGGTAACAATTTCATTTGAAGGCGAATT		Structure strand
15[224]17[223]	CCTAAATCAAAATCATAGGTCTAAACAGTA		Structure strand
15[256]18[256]	GTGATAAAAAGACGCTGAGAAGAGATAACCTTGCTTCTGTTCGGGAGA		Structure strand
16[47]14[48]	ACAAACGGAAAAGCCCCAAAAACACTGGAGCA		Structure strand
16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGA		Structure strand
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCA		Structure strand
16[175]14[176]	TATAACTAACAAAGAACGCGAGAACGCCAA		Structure strand
16[239]14[240]	GAATTTATTTAATGGTTTGAAATATTCTTACC		Structure strand
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAG		Structure strand
17[96]19[95]	GCTTTCCGATTACGCCAGCTGGCGGCTGTTTC		Structure strand

17[224]19[223]	CATAAATCTTTGAATACCAAGTGTTAGAAC		Structure strand
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGA		Structure strand
18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCC		Structure strand
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCA		Structure strand
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTA		Structure strand
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGT		Structure strand
19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTC		Structure strand
19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGC		Structure strand
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTA		Structure strand
19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATAT		Structure strand
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGG		Structure strand
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATG		Structure strand
20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAAT		Structure strand
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACC		Structure strand
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGT		Structure strand
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCC		Structure strand
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCG		Structure strand
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAA		Structure strand
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGA		Structure strand
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTG		Structure strand
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGT		Structure strand
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCA		Structure strand
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCT		Structure strand
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACT		Structure strand
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAA		Structure strand
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGA		Structure strand
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTT		Structure strand
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTA		Structure strand
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGA		Structure strand
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTT		Structure strand
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATA		Structure strand
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAA		Structure strand
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATC		Structure strand
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAG		Structure strand
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTA		Structure strand
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAG		Structure strand
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAA		Structure strand
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAG		Structure strand
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGT		Structure strand
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAG		Structure strand
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTAC		Structure strand
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAA		Structure strand
10[79]8[80]	GATGGCTTATCAAAAAGATTAAGAGCGTCC		Structure strand
10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAG		Structure strand
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAA		Structure strand

13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATT		Structure strand
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCA		Structure strand
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAA		Structure strand
15[160]16[144]	ATCGCAAGTATGTAAATGCTGATGATAGGAAC		Structure strand
16[79]14[80]	GCGAGTAAAAATATTTAAATTGTTACAAAG		Structure strand
16[207]14[208]	ACCTTTTTATTTTAGTTAATTTCATAGGGCTT		Structure strand
17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCG		Structure strand
18[79]16[80]	GATGTGCTTCAGGAAGATCGCACAATGTGA		Structure strand
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACT		Structure strand
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCA		DNA-PAINT docking site
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTA		DNA-PAINT docking site
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAG		DNA-PAINT docking site
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGT		DNA-PAINT docking site
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATG		DNA-PAINT docking site
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAA		DNA-PAINT docking site
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGT		DNA-PAINT docking site
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTT		DNA-PAINT docking site
20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACG		DNA-PAINT docking site
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCC		DNA-PAINT docking site
20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTAC		DNA-PAINT docking site
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCG		DNA-PAINT docking site
4[63]6[56]	ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5'-Biotin modification
4[127]6[120]	TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5'-Biotin modification
4[191]6[184]	CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5'-Biotin modification
4[255]6[248]	AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5'-Biotin modification
18[63]20[56]	ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5'-Biotin modification
18[127]20[120]	GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5'-Biotin modification
18[191]20[184]	ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5'-Biotin modification
18[255]20[248]	AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5'-Biotin modification

Table S6 | Staple sequences for 44 docking sites origami with fixed Cy3 dyes. The color matches the staples in the strand diagram shown in **Supplementary Figure 4**.

Position	Sequence	Color	Description
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTT		Structure strand
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAA		Structure strand
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGA		Structure strand
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAG		Structure strand
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAA		Structure strand
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACT		Structure strand
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAA		Structure strand
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGG		Structure strand
1[128]4[128]	TGACAACTCGCTGAGGCTTGCATTATACCAAGCGCGATGATAAA		Structure strand
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGAT		Structure strand
1[192]4[192]	GCGGATAACCTATTATTCTGAAACAGACGATTGGCCTTGAAGAGCCAC		Structure strand

1[256]4[256]	CAGGAGGTGGGGTCAGTGCCTTGAGTCTCTGAATTTACCGGGAACCAG		Structure strand
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAA		Structure strand
1[64]4[64]	TTTATCAGGACAGCATCGGAACGACACCAACCTAAAACGAGGTCAATC		Structure strand
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAA		Structure strand
10[111]8[112]	TTGCTCCTTTCAAATATCGCGTTTGAGGGGGT		Structure strand
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTAC		Structure strand
10[175]8[176]	TTAACGTCTAACATAAAAACAGGTAACGGA		Structure strand
10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAG		Structure strand
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAA		Structure strand
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGA		Structure strand
10[79]8[80]	GATGGCTTATCAAAAAGATTAAGAGCGTCC		Structure strand
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCG		Structure strand
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAG		Structure strand
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCT		Structure strand
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTC		Structure strand
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCA		Structure strand
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTG		Structure strand
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGC		Structure strand
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCG		Structure strand
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGT		Structure strand
13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATT		Structure strand
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGA		Structure strand
13[64]15[63]	TATATTTTGTCATTGCCTGAGAGTGGAAGATT		Structure strand
13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTA		Structure strand
14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCA		Structure strand
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAA		Structure strand
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTC		Structure strand
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCA		Structure strand
15[128]18[128]	TAAATCAAAATAATTCGCGTCTCGGAAACCAGGCAAAGGGAAGG		Structure strand
15[192]18[192]	TCAAATATAACCTCCGGCTTAGGTAACAATTTCATTTGAAGGCGAATT		Structure strand
15[224]17[223]	CCTAAATCAAAATCATAGGTCTAAACAGTA		Structure strand
15[256]18[256]	GTGATAAAAAGACGCTGAGAAGAGATAACCTTGCTTCTGTTCGGGAGA		Structure strand
15[64]18[64]	GTATAAGCCAACCCGTCGGATTCTGACGACAGTATCGGCCGCAAGGCG		Structure strand
16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGA		Structure strand
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCA		Structure strand
16[175]14[176]	TATAACTAACAAAGAACGCGAGAACGCCAA		Structure strand
16[207]14[208]	ACCTTTTTATTTTAGTTAATTTCATAGGGCTT		Structure strand
16[239]14[240]	GAATTTATTTAATGGTTTGAAATATTCTTACC		Structure strand
16[47]14[48]	ACAAACGGAAAAGCCCCAAAAACACTGGAGCA		Structure strand
16[79]14[80]	GCGAGTAAAAATATTTAAATTGTTACAAAG		Structure strand
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAG		Structure strand
17[96]19[95]	GCTTTCCGATTACGCCAGCTGGCGGCTGTTTC		Structure strand
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCA		Structure strand
18[79]16[80]	GATGTGCTTCAGGAAGATCGCACAATGTGA		Structure strand
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTA		Structure strand
19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTC		Structure strand

19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGC		Structure strand
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAG		Structure strand
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGA		Structure strand
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCAT		Structure strand
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCG		Structure strand
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAAT		Structure strand
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCA		Structure strand
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAAT		Structure strand
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAA		Structure strand
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATG		Structure strand
20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAAT		Structure strand
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCG		Structure strand
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTAC		Structure strand
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCG		Structure strand
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGA		Structure strand
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTG		Structure strand
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGT		Structure strand
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACC		Structure strand
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGT		Structure strand
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCC		Structure strand
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACT		Structure strand
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAA		Structure strand
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGA		Structure strand
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTT		Structure strand
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTA		Structure strand
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAA		Structure strand
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCA		Structure strand
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCT		Structure strand
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAA		Structure strand
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATC		Structure strand
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAG		Structure strand
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTA		Structure strand
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAG		Structure strand
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGA		Structure strand
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTT		Structure strand
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATA		Structure strand
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAA		Structure strand
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTT		Structure strand
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTA		Structure strand
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCA		Structure strand
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAG		Structure strand
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTA		Structure strand
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGT		Structure strand
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAG		Structure strand
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAG		Structure strand
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTA		Structure strand

6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAG		Structure strand
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGA		Structure strand
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGG		Structure strand
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCA		Structure strand
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCA		Structure strand
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTC		Structure strand
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAG		Structure strand
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCC		Structure strand
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCC		Structure strand
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCG		Structure strand
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACG		Structure strand
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCA		Structure strand
9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTA		Structure strand
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAA		Structure strand
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGCTAACATTCCTAACTTCTCATA		3’-Cy3 modification
11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAATAACATTCCTAACTTCTCATA		3’-Cy3 modification
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAATAACATTCCTAACTTCTCATA		3’-Cy3 modification
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGTTAACATTCCTAACTTCTCATA		3’-Cy3 modification
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATGTAACATTCCTAACTTCTCATA		3’-Cy3 modification
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGTTAACATTCCTAACTTCTCATA		3’-Cy3 modification
17[224]19[223]	CATAAATCTTTGAATACCAAGTGTTAGAACTAACATTCCTAACTTCTCATA		3’-Cy3 modification
18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCCTAACATTCCTAACTTCTCATA		3’-Cy3 modification
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTATAACATTCCTAACTTCTCATA		3’-Cy3 modification
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGATAACATTCCTAACTTCTCATA		3’-Cy3 modification
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAATAACATTCCTAACTTCTCATA		3’-Cy3 modification
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGATAACATTCCTAACTTCTCATA		3’-Cy3 modification
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGCTAACATTCCTAACTTCTCATA		3’-Cy3 modification
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGCTAACATTCCTAACTTCTCATA		3’-Cy3 modification
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACTTAACATTCCTAACTTCTCATA		3’-Cy3 modification
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCATTATACATCTA		DNA-PAINT docking site
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAATTATACATCTA		DNA-PAINT docking site
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTTTTATACATCTA		DNA-PAINT docking site
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTTTTATACATCTA		DNA-PAINT docking site
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCATTATACATCTA		DNA-PAINT docking site
13[192]15[191]	GTAAAGTAATCGCCATATTTAACAAAACTTTTTTATACATCTA		DNA-PAINT docking site
13[224]15[223]	ACAACATGCCAACGCTCAACAGTCTTCTGATTATACATCTA		DNA-PAINT docking site
13[256]15[255]	GTTTATCAATATGCGTTATACAAACCGACCGTTTATACATCTA		DNA-PAINT docking site
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAATTATACATCTA		DNA-PAINT docking site
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGTTTATACATCTA		DNA-PAINT docking site
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGCTTATACATCTA		DNA-PAINT docking site
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCATTATACATCTA		DNA-PAINT docking site
15[160]16[144]	ATCGCAAGTATGTAAATGCTGATGATAGGAACTTATACATCTA		DNA-PAINT docking site
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCGTTATACATCTA		DNA-PAINT docking site
15[96]17[95]	ATATTTTGGCTTTCATCAACATTATCCAGCCATTATACATCTA		DNA-PAINT docking site

17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCGTTATACATCTA		DNA-PAINT docking site
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACTTTATACATCTA		DNA-PAINT docking site
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGTTTATACATCTA		DNA-PAINT docking site
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAGTTATACATCTA		DNA-PAINT docking site
19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATATTTATACATCTA		DNA-PAINT docking site
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCCTTATACATCTA		DNA-PAINT docking site
20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTACTTATACATCTA		DNA-PAINT docking site
20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACGTTATACATCTA		DNA-PAINT docking site
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGGTTATACATCTA		DNA-PAINT docking site
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAATTATACATCTA		DNA-PAINT docking site
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTATTATACATCTA		DNA-PAINT docking site
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGCTTATACATCTA		DNA-PAINT docking site
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCATTATACATCTA		DNA-PAINT docking site
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGATTATACATCTA		DNA-PAINT docking site
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGATTATACATCTA		DNA-PAINT docking site
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCGTTATACATCTA		DNA-PAINT docking site
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACCTTATACATCTA		DNA-PAINT docking site
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCATTATACATCTA		DNA-PAINT docking site
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAACTTATACATCTA		DNA-PAINT docking site
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGATTATACATCTA		DNA-PAINT docking site
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGCTTATACATCTA		DNA-PAINT docking site
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATCTTATACATCTA		DNA-PAINT docking site
8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCATTATACATCTA		DNA-PAINT docking site
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCATTATACATCTA		DNA-PAINT docking site
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACTTTATACATCTA		DNA-PAINT docking site
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCTTTATACATCTA		DNA-PAINT docking site
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATATTTATACATCTA		DNA-PAINT docking site
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTATTATACATCTA		DNA-PAINT docking site
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCATTATACATCTA		DNA-PAINT docking site
4[63]6[56]	ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5’-Biotin modification
4[255]6[248]	AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5’-Biotin modification
4[191]6[184]	CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5’-Biotin modification
4[127]6[120]	TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5’-Biotin modification
18[63]20[56]	ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5’-Biotin modification
18[255]20[248]	AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5’-Biotin modification
18[191]20[184]	ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5’-Biotin modification
18[127]20[120]	GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5’-Biotin modification

Table S7 | M13mp18 scaffold sequence for DNA origami structures

TTCCCTTCCTTTCTCGCCACGTTCGCCGGCTTTCCCCGTCAAGCTCTAAATCGGGGGCTCCCTTTAGGGTTCCGATTTAGTGCTTTACGGCACCTCGACCCCAAAAAAC
TTGATTTGGGTGATGGTTCACGTAGTGGGCCATCGCCCTGATAGACGGTTTTTCGCCCTTTGACGTTGGAGTCCACGTTCTTTAATAGTGGACTCTTGTTCCAAACTGG
AACAACACTCAACCCTATCTCGGGCTATTCTTTTGATTTATAAGGGATTTTGCCGATTTCGGAACCACCATCAAACAGGATTTTCGCCTGCTGGGGCAAACCAGCGTGG
ACCGCTTGCTGCAACTCTCTCAGGGCCAGGCGGTGAAGGGCAATCAGCTGTTGCCCGTCTCACTGGTGAAAAGAAAAACCACCCTGGCGCCCAATACGCAAACCGCCTC
TCCCCGCGCGTTGGCCGATTCATTAATGCAGCTGGCACGACAGGTTTCCCGACTGGAAAGCGGGCAGTGAGCGCAACGCAATTAATGTGAGTTAGCTCACTCATTAGGC
ACCCCAGGCTTTACACTTTATGCTTCCGGCTCGTATGTTGTGTGGAATTGTGAGCGGATAACAATTTCACACAGGAAACAGCTATGACCATGATTACGAATTCGAGCTC
GGTACCCGGGGATCCTCTAGAGTCGACCTGCAGGCATGCAAGCTTGGCACTGGCCGTCGTTTTACAACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACTTAATCGC
CTTGCAGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTTGCCTGGT
TTCCGGCACCAGAAGCGGTGCCGGAAAGCTGGCTGGAGTGCGATCTTCCTGAGGCCGATACTGTCGTCGTCCCCTCAAACTGGCAGATGCACGGTTACGATGCGCCCAT
CTACACCAACGTGACCTATCCCATTACGGTCAATCCGCCGTTTGTTCCCACGGAGAATCCGACGGGTTGTTACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAG
GAAGGCCAGACGCGAATTATTTTTGATGGCGTTCCTATTGGTTAAAAAATGAGCTGATTTAACAAAAATTTAATGCGAATTTTAACAAAATATTAACGTTTACAATTTA

AATATTTGCTTATACAATCTTCCTGTTTTTGGGGCTTTTCTGATTATCAACCGGGGTACATATGATTGACATGCTAGTTTTACGATTACCGTTCATCGATTCTCTTGTT
TGCTCCAGACTCTCAGGCAATGACCTGATAGCCTTTGTAGATCTCTCAAAAATAGCTACCCTCTCCGGCATTAATTTATCAGCTAGAACGGTTGAATATCATATTGATG
GTGATTTGACTGTCTCCGGCCTTTCTCACCCTTTTGAATCTTTACCTACACATTACTCAGGCATTGCATTTAAAATATATGAGGGTTCTAAAAATTTTTATCCTTGCGT
TGAAATAAAGGCTTCTCCCGCAAAAGTATTACAGGGTCATAATGTTTTTGGTACAACCGATTTAGCTTTATGCTCTGAGGCTTTATTGCTTAATTTTGCTAATTCTTTG
CCTTGCCTGTATGATTTATTGGATGTTAATGCTACTACTATTAGTAGAATTGATGCCACCTTTTCAGCTCGCGCCCCAAATGAAAATATAGCTAAACAGGTTATTGACC
ATTTGCGAAATGTATCTAATGGTCAAACTAAATCTACTCGTTCGCAGAATTGGGAATCAACTGTTATATGGAATGAAACTTCCAGACACCGTACTTTAGTTGCATATTT
AAAACATGTTGAGCTACAGCATTATATTCAGCAATTAAGCTCTAAGCCATCCGCAAAAATGACCTCTTATCAAAAGGAGCAATTAAAGGTACTCTCTAATCCTGACCTG
TTGGAGTTTGCTTCCGGTCTGGTTCGCTTTGAAGCTCGAATTAAAACGCGATATTTGAAGTCTTTCGGGCTTCCTCTTAATCTTTTTGATGCAATCCGCTTTGCTTCTG
ACTATAATAGTCAGGGTAAAGACCTGATTTTTGATTTATGGTCATTCTCGTTTTCTGAACTGTTTAAAGCATTTGAGGGGGATTCAATGAATATTTATGACGATTCCGC
AGTATTGGACGCTATCCAGTCTAAACATTTTACTATTACCCCCTCTGGCAAAACTTCTTTTGCAAAAGCCTCTCGCTATTTTGGTTTTTATCGTCGTCTGGTAAACGAG
GGTTATGATAGTGTTGCTCTTACTATGCCTCGTAATTCCTTTTGGCGTTATGTATCTGCATTAGTTGAATGTGGTATTCCTAAATCTCAACTGATGAATCTTTCTACCT
GTAATAATGTTGTTCCGTTAGTTCGTTTTATTAACGTAGATTTTTCTTCCCAACGTCCTGACTGGTATAATGAGCCAGTTCTTAAAATCGCATAAGGTAATTCACAATG
ATTAAAGTTGAAATTAAACCATCTCAAGCCCAATTTACTACTCGTTCTGGTGTTTCTCGTCAGGGCAAGCCTTATTCACTGAATGAGCAGCTTTGTTACGTTGATTTGG
GTAATGAATATCCGGTTCTTGTCAAGATTACTCTTGATGAAGGTCAGCCAGCCTATGCGCCTGGTCTGTACACCGTTCATCTGTCCTCTTTCAAAGTTGGTCAGTTCGG
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CAGTTCGCGCATTAAAGACTAATAGCCATTCAAAAATATTGTCTGTGCCACGTATTCTTACGCTTTCAGGTCAGAAGGGTTCTATCTCTGTTGGCCAGAATGTCCCTTT
TATTACTGGTCGTGTGACTGGTGAATCTGCCAATGTAAATAATCCATTTCAGACGATTGAGCGTCAAAATGTAGGTATTTCCATGAGCGTTTTTCCTGTTGCAATGGCT
GGCGGTAATATTGTTCTGGATATTACCAGCAAGGCCGATAGTTTG

Table S8 | Sequences for FISH-PAINT probes

SUZ12 mRNA, NCBI Reference Sequence: NM_015355.2

(64 probes 5'-labeled with Cy3b, 3'-extended with P1 docking handle)

Sequence name	Sequence
SUZ12_mrna_1	GAGGAAAAGCTCGTGGTCAGTTATACATCTA
SUZ12_mrna_2	GATCTGTGTTGGCTTCTCAATTATACATCTA
SUZ12_mrna_3	GAGATTCCGAGTTCGAAGAATTATACATCTA
SUZ12_mrna_4	TGTGCAAAAATATTGGTGCTTTATACATCTA
SUZ12_mrna_5	TCTGGAGTTTCGATGAGACATTATACATCTA
SUZ12_mrna_6	TGAGATTCTTGCTCTCCTTTTTATACATCTA
SUZ12_mrna_7	CTGCAAATGAGCTGACAAGCTTATACATCTA
SUZ12_mrna_8	TGGAAGAAACCAGTAAACGTTTATACATCTA
SUZ12_mrna_9	AAGAGTGAACTGCAACGTAGTTATACATCTA
SUZ12_mrna_10	GCAATAGGAGCCGTAGATTTTTATACATCTA
SUZ12_mrna_11	ATTTCTAGTGGCAAGAGGTTTTATACATCTA
SUZ12_mrna_12	TAACTGAACCAGGCTTGTTTTTATACATCTA
SUZ12_mrna_13	ACAGCAATAGTTTGAGTAGGTTATACATCTA
SUZ12_mrna_14	TGTTGCCTTGTATTGTTGTTTTATACATCTA

SUZ12_mrna_15	CAGGTCATCTCTTGCTTCAGTTATACATCTA
SUZ12_mrna_16	TCAGAGTACACCAAGGGCAATTATACATCTA
SUZ12_mrna_17	AAACTATAAAGTTTGCGGCATTATACATCTA
SUZ12_mrna_18	TGGCAGAGTTTAAGATGCTTTTATACATCTA
SUZ12_mrna_19	CCTAGCACCTTTTGGATGATTTATACATCTA
SUZ12_mrna_20	GGAGCCATCATAACACTCATTTATACATCTA
SUZ12_mrna_21	TATCCTGAGGATTTCCTGCATTATACATCTA
SUZ12_mrna_22	TGCGACTAAAAGCAAATCCATTATACATCTA
SUZ12_mrna_23	GGTGTTCTCTTAACTGGTCCTTATACATCTA
SUZ12_mrna_24	GCCTGCACACAAGAATATGTTTATACATCTA
SUZ12_mrna_25	CATGCTTGCTTTTGTTCGTTTTATACATCTA
SUZ12_mrna_26	CTTTGCTGTTCTACTTCCCCTTATACATCTA
SUZ12_mrna_27	AAATACAGACGATTGTGGCCTTATACATCTA
SUZ12_mrna_28	AGAGGTAAGCAGGTATCACTTTATACATCTA
SUZ12_mrna_29	GACATGGAGATTCCAGAGTTTTATACATCTA
SUZ12_mrna_30	CAGCAATAAACCCATGCTTCTTATACATCTA
SUZ12_mrna_31	CAGGCATGATTCATTTGATTTTATACATCTA
SUZ12_mrna_32	TGAAGCATGAAGTTTCGACATTATACATCTA
SUZ12_mrna_33	AAAGTCATGCATGCTGACTATTATACATCTA
SUZ12_mrna_34	CATTTCACGGAGCTTGGTAATTATACATCTA
SUZ12_mrna_35	TATTTCTTCGTTTGCAGGGGTTATACATCTA
SUZ12_mrna_36	CCATTTGCTGTCCCATTTTGTTATACATCTA
SUZ12_mrna_37	CTGTTTTGAAACCCCTGAGATTATACATCTA
SUZ12_mrna_38	ACATGGGGTTAGAGCTTTTCTTATACATCTA
SUZ12_mrna_39	AGAGGATGAATTCCCTAAAATTATACATCTA
SUZ12_mrna_40	TGAAGTAGAACCCTGATACATTATACATCTA
SUZ12_mrna_41	CCTCCCCAAGAAAATGTCTCTTATACATCTA
SUZ12_mrna_42	AGGATCAAAGTTTGACTGCATTATACATCTA
SUZ12_mrna_43	GGGTGAGCAATGCACTAAAATTATACATCTA
SUZ12_mrna_44	ACAGCTTAATTTTCCGTGTGTTATACATCTA
SUZ12_mrna_45	CAAATGCGTTCTTTCCTTGGTTATACATCTA
SUZ12_mrna_46	TTCTCCCCTTATAAGTGACATTATACATCTA
SUZ12_mrna_47	AGTCAGCTTATCTCTATTGGTTATACATCTA
SUZ12_mrna_48	ACACATATAACACAGGGCAATTATACATCTA
SUZ12_mrna_49	CAACTGCAAATATGTGCGTGTTATACATCTA
SUZ12_mrna_50	TGCTTGTTAATGTGCCAGTATTATACATCTA
SUZ12_mrna_51	CGGAGTTGGAATAAAAACCTTTATACATCTA
SUZ12_mrna_52	GATGTTACTCAACCACAGTGTTATACATCTA
SUZ12_mrna_53	ACACATCTTAAAGACCAGTCTTATACATCTA
SUZ12_mrna_54	TCGTTAAATAGCCTCACAGTTTATACATCTA
SUZ12_mrna_55	TGACAAATCACATCCACACTTTATACATCTA
SUZ12_mrna_56	AATGAAAGCTGCAGTTTCCCTTATACATCTA
SUZ12_mrna_57	GCTTACCAATCAAGGAATCTTTATACATCTA
SUZ12_mrna_58	CCAGAGGCAAAAATCAGAGTTTATACATCTA
SUZ12_mrna_59	CGAGATAAACGCTCGAGATCTTATACATCTA
SUZ12_mrna_60	TATGTGCACAGCTTTAGCAATTATACATCTA
SUZ12_mrna_61	TTCTACACCTACATCTCCCCTTATACATCTA
SUZ12_mrna_62	AGCATTAAGAGCATAACTGCTTATACATCTA
SUZ12_mrna_63	GCAAACAATGCTAGCCTTCTTTATACATCTA
SUZ12_mrna_64	GGTGGGAATCACCAACTTTTTTATACATCTA

Table S9 | DNA-PAINT docking and imager sequences and biotin docking sequence

Description	Sequence
Imager P1*	CTAGATGTAT-dye
Imager P3*	GTAATGAAGA-dye
Imager P5*	CATACATTGA-dye
9 nt P1 docking site	Strand-TTATACATCTA
9 nt P3 docking site	Strand-TTTCTTCATTA
9 nt P5 docking site	Strand-TTTCAATGTAT
Biotinylated 9 nt P1 docking site for antibody coupling	Biotin-TTATACATCTA
Handle strand for binding of "fixed" Cy3-labeled strand	TAACATTCCTAACTTCTCATA
Cy3-labeled anti-handle strand	TATGAGAAGTTAGGAATGTTA-Cy3

Supplementary Video 1 | Confocal imaging of DNA origami microinjected in fixed cells

Confocal image of HeLa cells (blue) after microinjection with Cy3-labeled DNA origami structures (green spots). Cell membrane delimitation was possible by using whole cell blue staining for 10 min.

Supplementary Video 2 | De-convoluted wide-field image stack of DNA origami microinjected in fixed cells

A 3D representation of HeLa cells after microinjection of Cy3-labeled origami structures was obtained by de-convolution of a wide-field image stack using Huygens Professional image processing software. The Cy3 signal (yellow) is overlaid with the spots detected through the software (green). The 3D image shows the homogeneous distribution of structures inside the nucleus and cytoplasm in the whole cell. Different viewing perspectives of the 3D image are presented by rotating the image.