Multiplexed 3D Cellular Super-Resolution Imaging with DNA-PAINT and Exchange-PAINT

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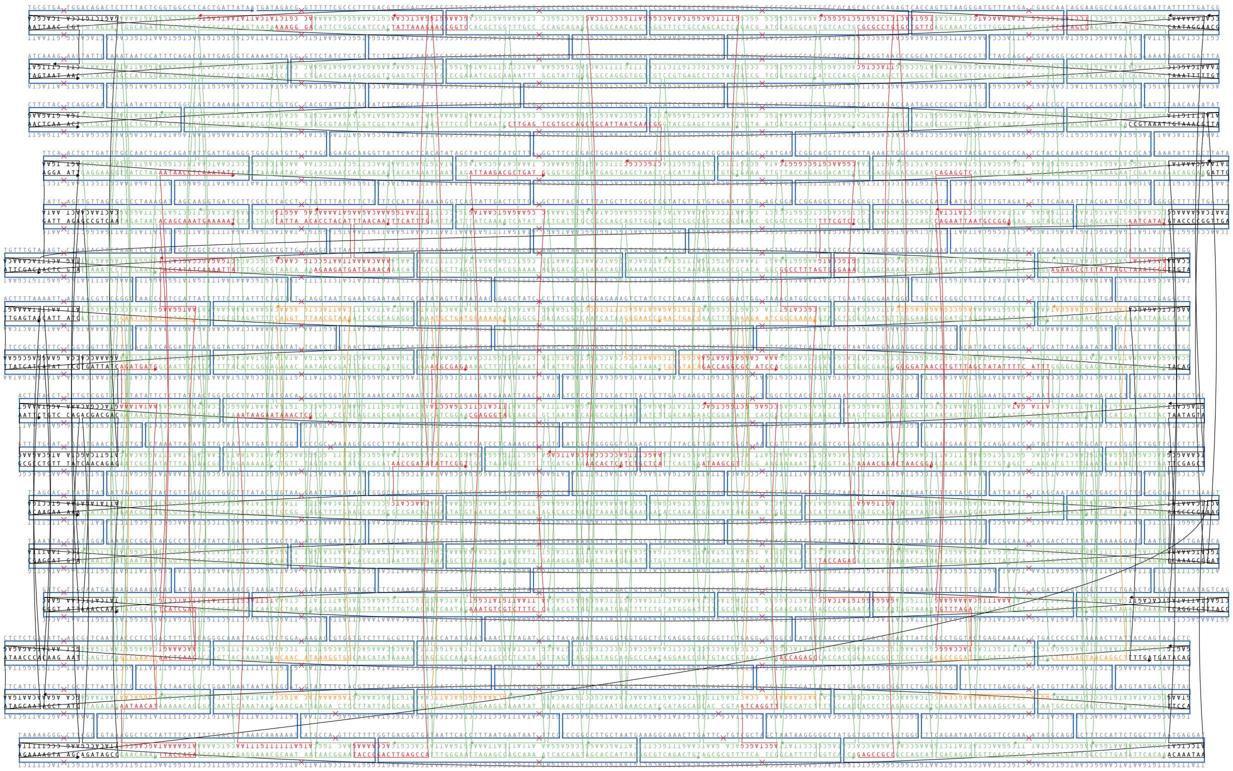
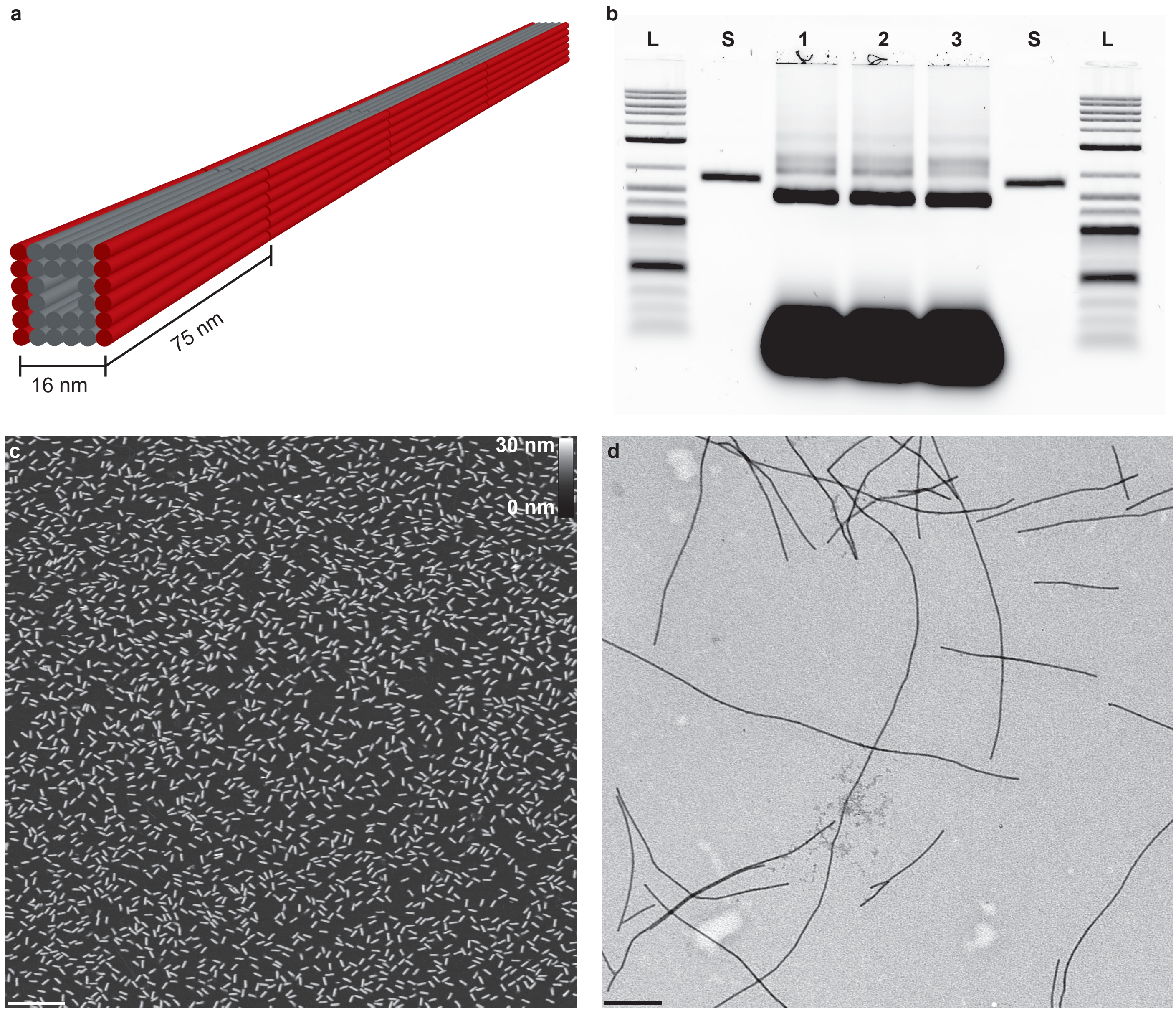
a

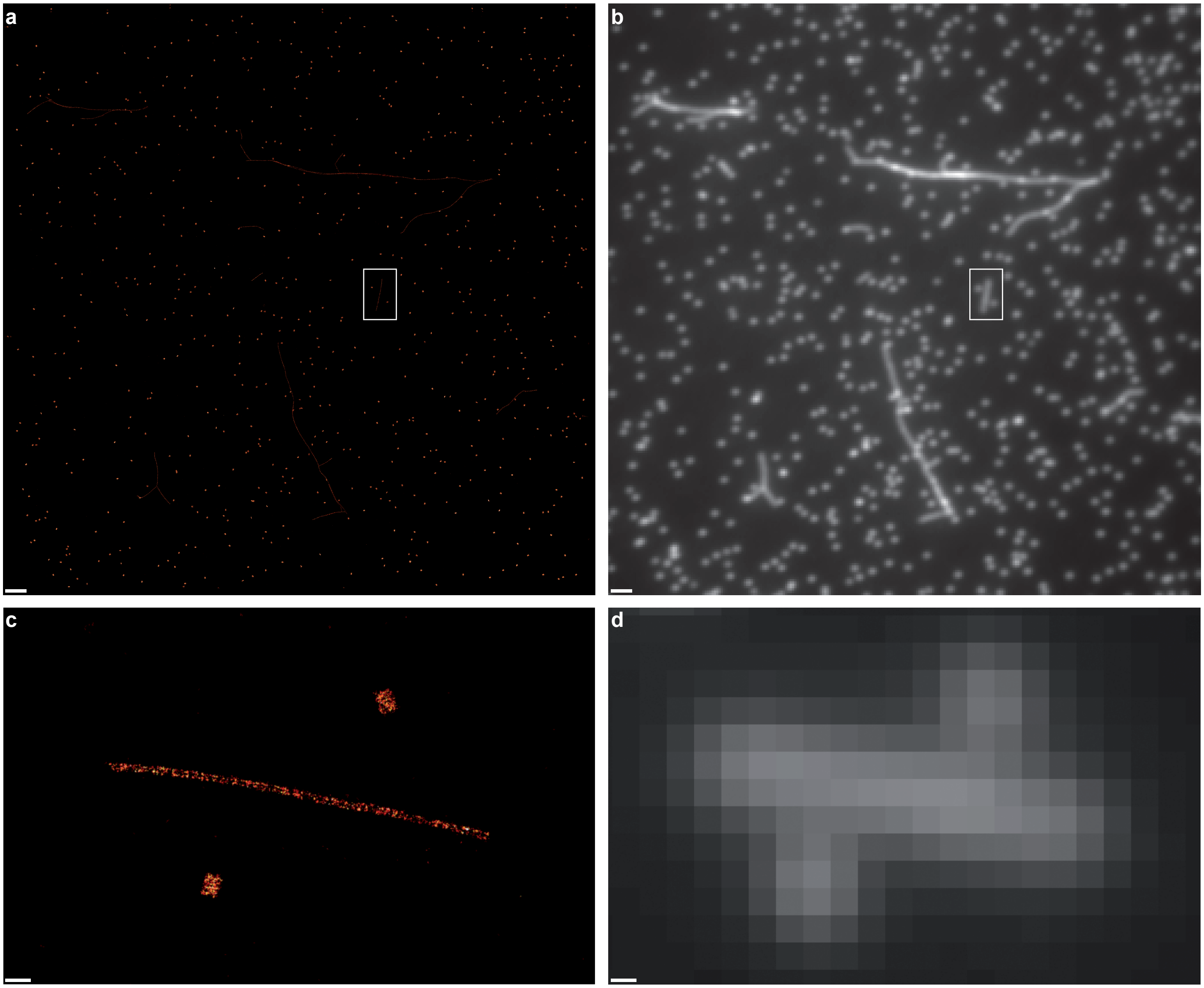


b

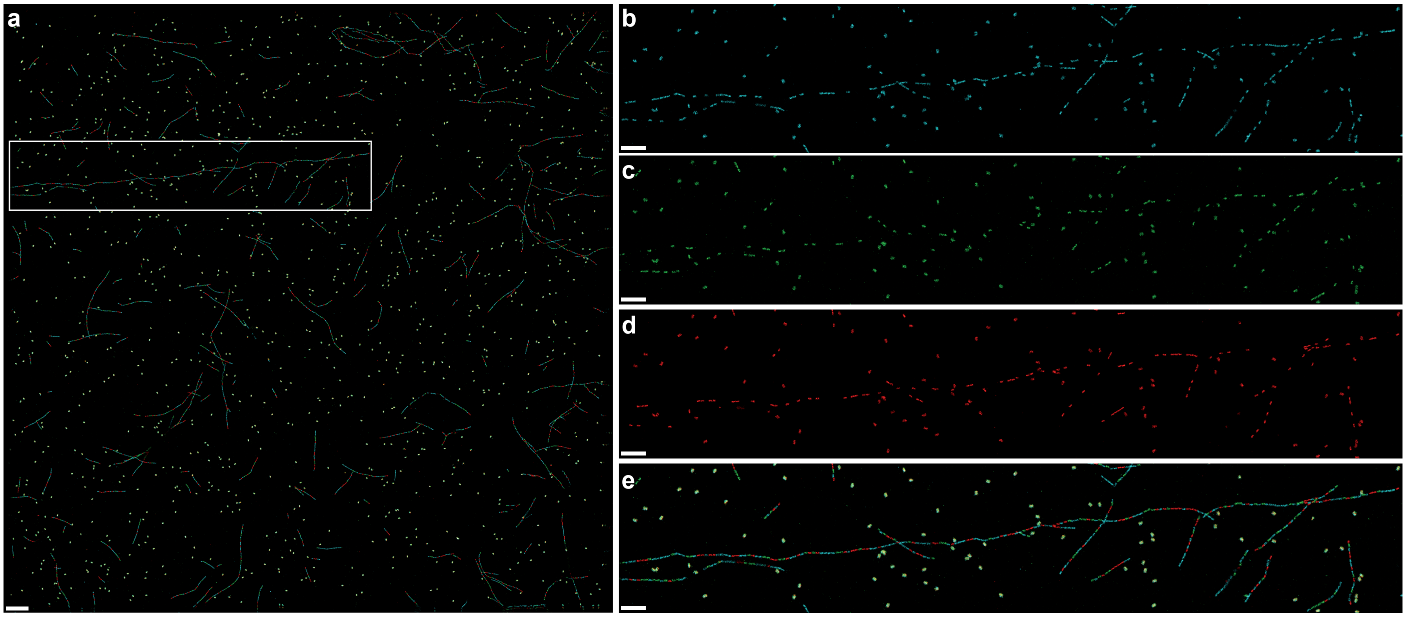
Supplementary Figure 1 | Strand diagrams for DNA origami designs. Strands are colored to denote strands extensions (see Supplementary Tables S1 and S2). Color code: Green: structure strands; Red: DNA-PAINT docking sites; Orange: Biotin docking or biotinylated strands; Black: connector strands for polymerization. (**a**) Microtubule-like DNA origami structure. (**b**) Single-layer DNA origami structure used as drift marker for super-resolution microscopy. Zoom in for details.



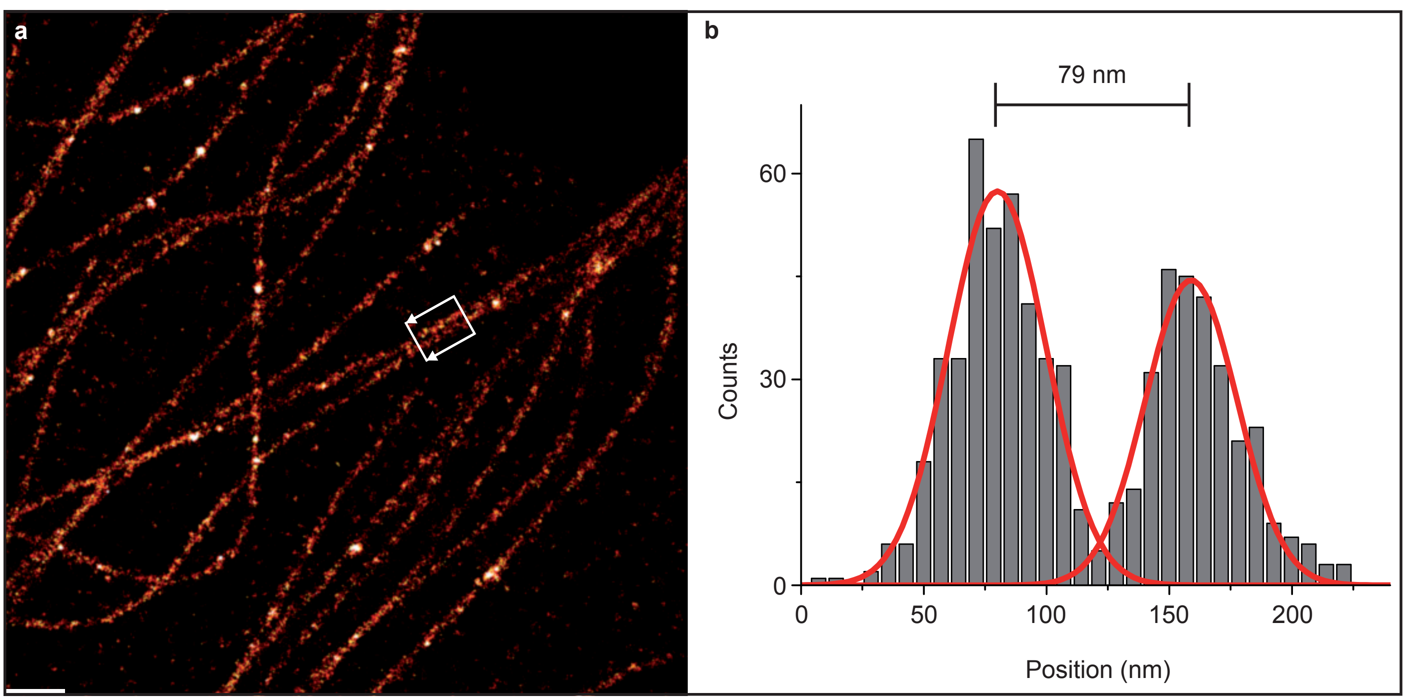
Supplementary Figure 2 | Self-assembly of the microtubule-like DNA origami. (**a**) Origami design schematic. Origami monomers are double helices arranged in a 6×6 square grid with a 2×2 void in the center (shown is an oligomer containing 4 monomer structures). (**b**) Agarose formation gel demonstrating self-assembly of origami monomers. Lanes: 2-log DNA ladder (lane L), p8064 scaffold (lane S), DNA origami monomers with docking sequences for red, green, and blue DNA-PAINT imager strands, respectively (lanes 1, 2, and 3). (**c**) AFM image of monomeric structures after purification [scale bar: 500 nm]. (**d**) TEM image of microtubule-like DNA origami structures post polymerization [scale bar: 500 nm].



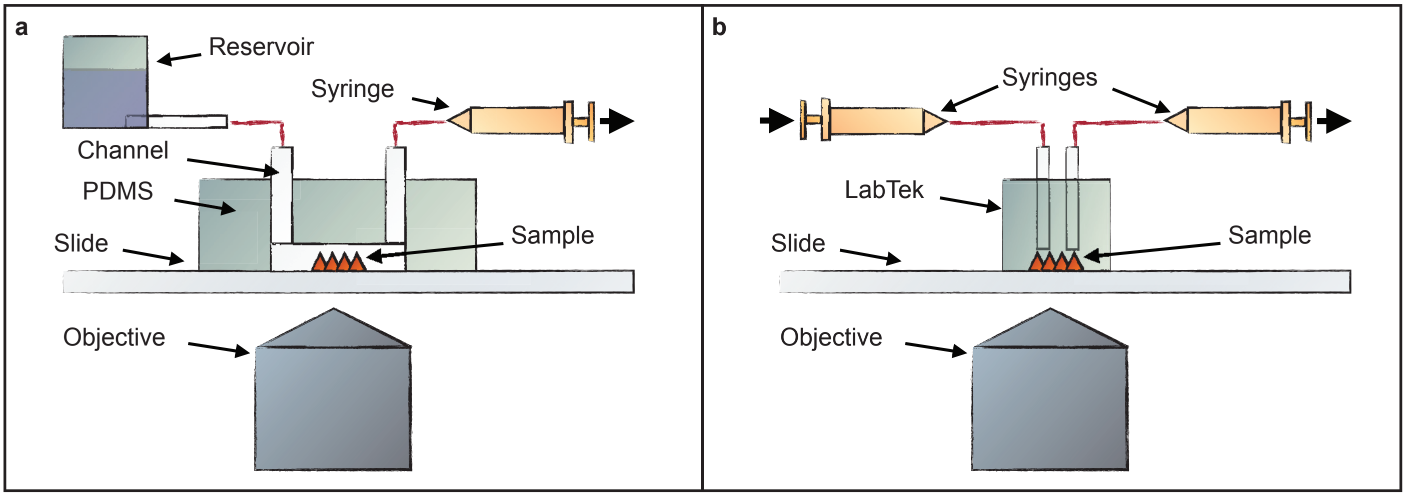
Supplementary Figure 3 | DNA-PAINT super-resolution imaging vs. diffraction-limited imaging of microtubule-like DNA origami structures. (**a**) DNA-PAINT super-resolution image of microtubule-like DNA origami polymers (filamentous structures) and DNA origami drift markers (point-like particles), both labeled with 10 nt DNA-PAINT docking sites [scale bar: 1 µm]. (**b**) Diffraction-limited representation of the same region as in **a**. Here, the diffraction-limited image is obtained by averaging all frames from the time-lapse movie [scale bar: 1 µm]. (**c**) Zoom-in of the highlighted area in **a** [scale bar: 100 nm]. (**d**) Diffraction-limited representation of the region in **c** [scale bar: 100 nm]. Imaging conditions: 1.5 nM Cy3b-labled imager strands in buffer B. 15,000 frames, 5 Hz frame rate. Excitation power density: 294 W/cm^2 at 561 nm. Zoom in for details.



Supplementary Figure 4 | Three-color DNA-PAINT super-resolution imaging of microtubule-like DNA origami structures. (**a**) Three-color DNA-PAINT super-resolution image of microtubule-like DNA origami (filamentous structures) and DNA origami drift markers (point-like objects). Microtubule-like structures are hetero-polymers containing monomers carrying 9 nt DNA-PAINT docking sites for ATTO488-, Cy3b-, and ATTO655-labeled DNA-PAINT imager strands, respectively. The incorporation of each monomer is stochastic, thus yielding a random pattern of "red", "green" or "blue" segments in the polymerized structure [scale bar: 1 µm]. (**b–e**) Zoom-in of the highlighted area in **a** [scale bars: 500 nm]. (**b–d**) For the indicated area in **a**, ATTO488, Cy3b, and ATTO655 channels are shown, respectively. These single channel images highlight the fact that there is no crosstalk in multiplexed DNA-PAINT super-resolution images, due to orthogonality of DNA-PAINT sequences. (**e**) Superimposed image from **b–d**. Imaging conditions: ATTO488-, Cy3b- and ATTO655-labeled imager strands, 1 nM each in buffer B. All imager strands were present throughout imaging, which was performed sequentially in the red, green, and blue channels. 15,000 frames each color, 2.5 Hz frame rate. Excitation power densities: 283 W/cm^2 at 647 nm, 62 W/cm^2 at 561 nm and 55 W/cm^2 at 488 nm. Zoom in for details.

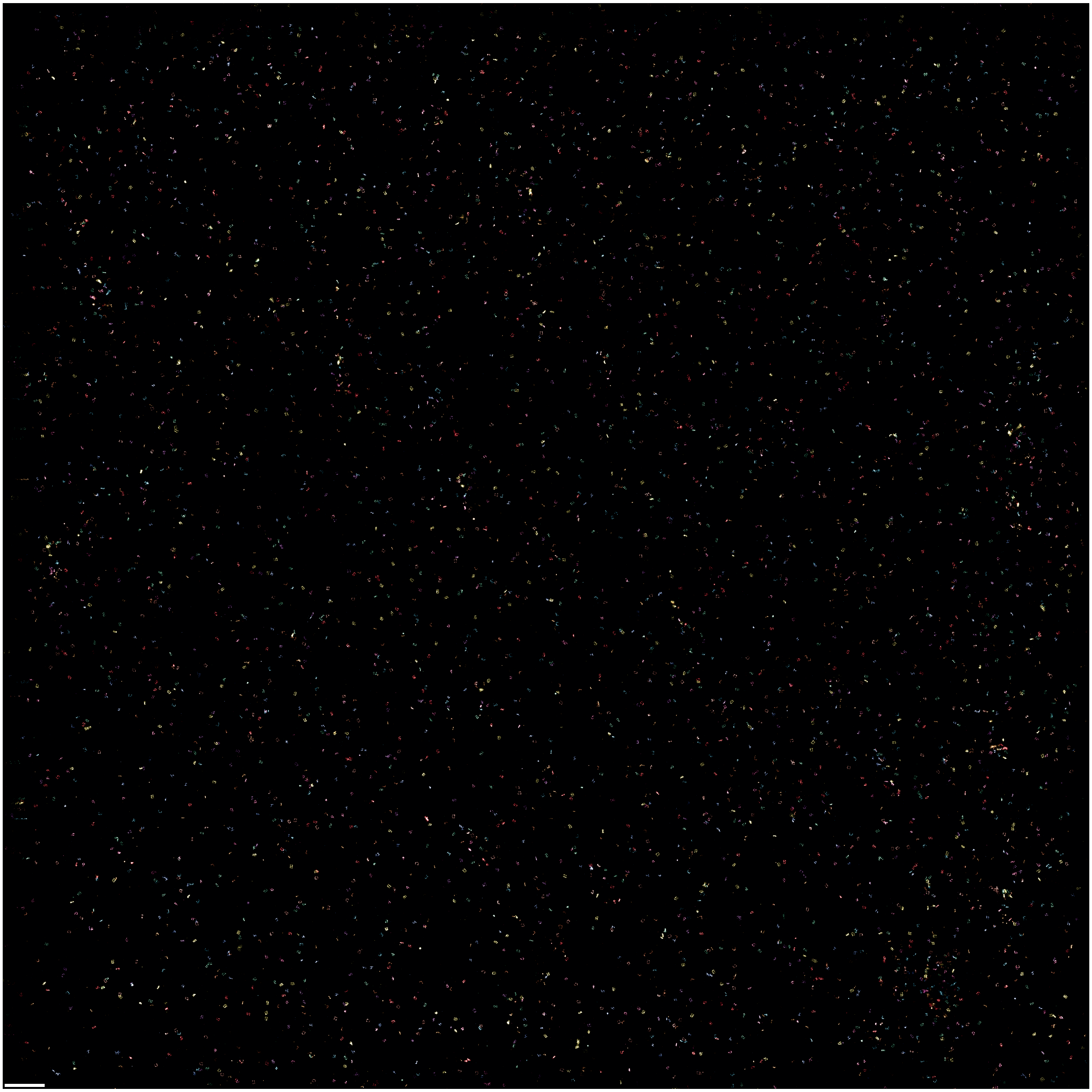


Supplementary Figure 5 | Image quantification of an intracellular microtubule network imaged with DNA-PAINT. (**a**) Zoom-in of image in **Fig. 2b**, where the region of analysis is indicated by a white box. The higher magnification image highlights the specific binding of imager strands to the Antibody-DNA conjugates on the microtubules with very little non-specific binding in the surrounding cellular environment [scale bar: 500 nm]. (**b**) Cross-sectional histogram (arrows denote histogram direction) of the highlighted area in **a** yields an apparent width of the two microtubules of ≈47 and ≈44 nm, respectively. The distance of the two microtubules is ≈79 nm, well below the diffraction limit. Imaging conditions: 700 pM ATTO655-labled imager strands in buffer C, 10,000 frames, 10 Hz frame rate. Excitation power density: 283 W/cm^2 at 647 nm.

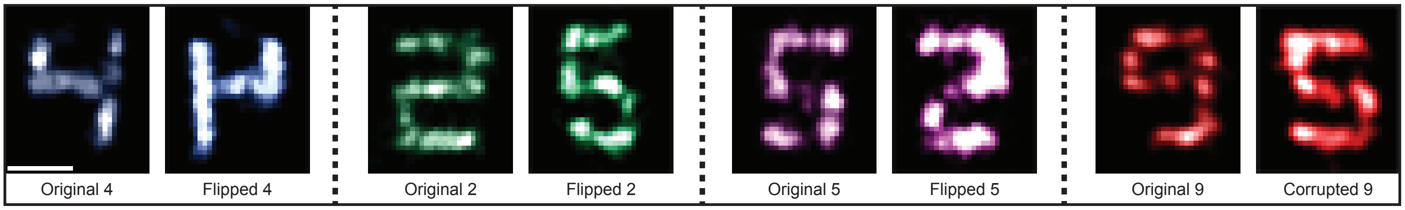


Supplementary Figure 6 | *In vitro* and *in situ* Exchange-PAINT setup. (**a**) Experimental setup used for *in vitro* DNA origami experiments. The sample is immobilized on a glass coverslip in a PDMS channel. Imaging and washing buffers are added to a reservoir and pulled through the channel by a syringe. Reservoirs and syringes are connected to the PDMS channel via flexible tubing and are thus mechanically decoupled. (**b**) Experimental setup used for *in situ* cell imaging. Cells are imaged in a Lab-Tek II chamber. One syringe supplies new buffer solution, the second one removes the previous buffer.

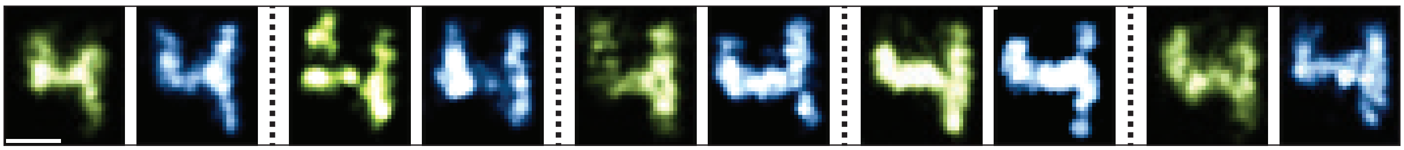
Different fluidic setups are used for *in vitro* and *in situ* imaging, as cells are grown in Lab-Tek II chambers for the *in situ* case. The PDMS chamber used in the *in vitro* experiments has the advantage of requiring less fluid volumes for buffer and imaging solution exchange.



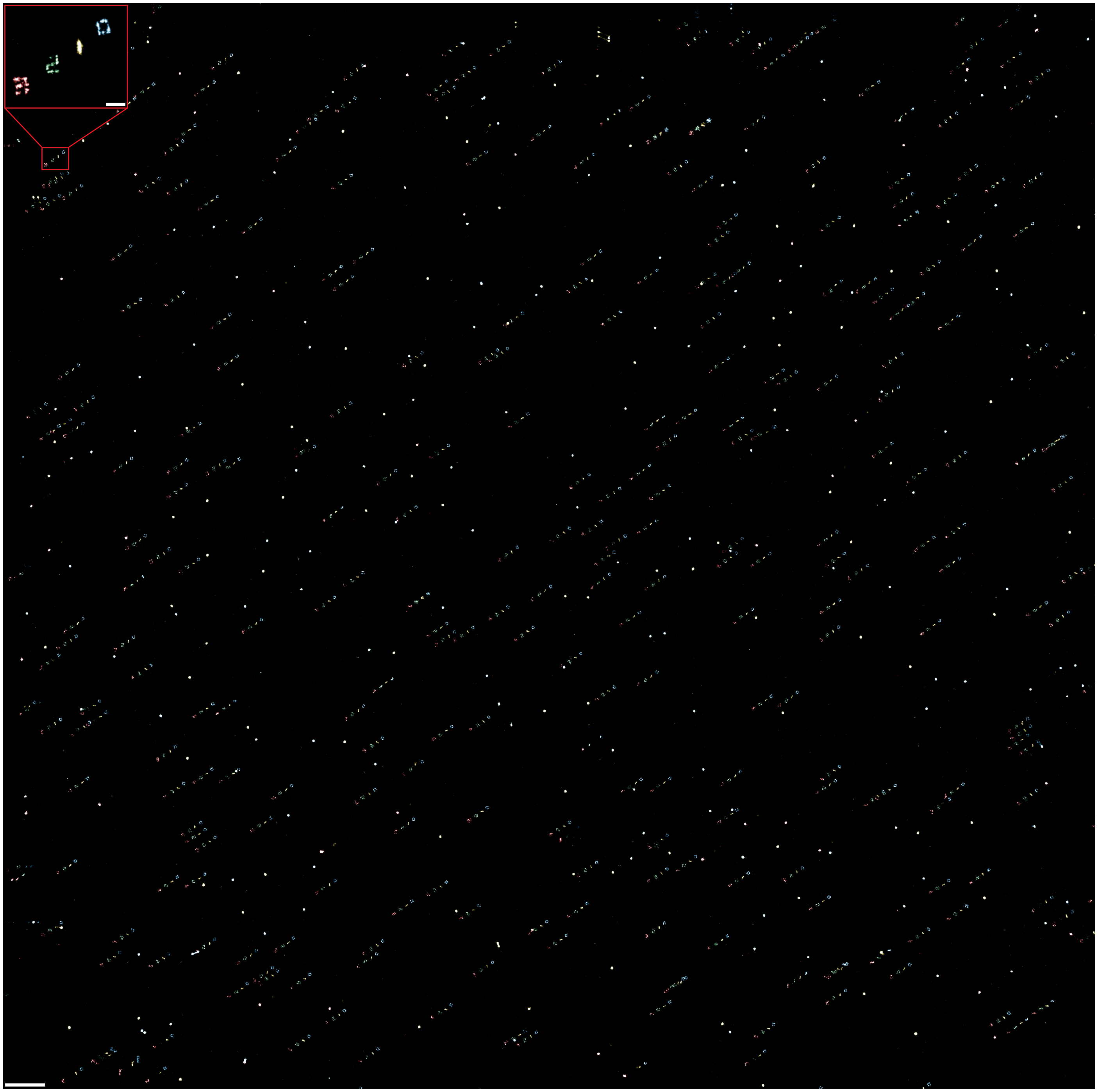
Supplementary Figure 7 | Ten-"color" *in vitro* Exchange-PAINT super-resolution overview image of DNA origami structures. Large field of view of the same image as in **Fig. 3d** [scale bar: 1 µm]. Imaging conditions for each Exchange-PAINT round: 7,500 frames, 5 Hz frame rate. Excitation power density: 166 W/cm^2 at 561 nm. Zoom in for details.



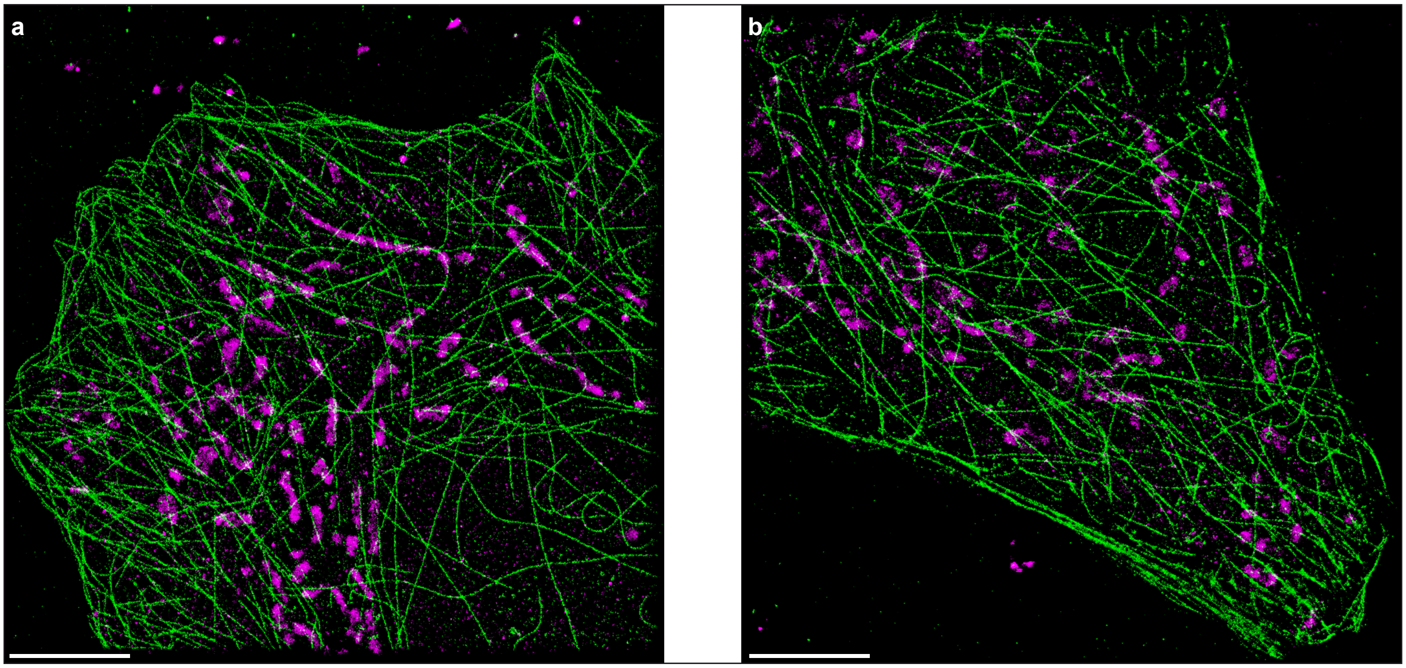
Supplementary Figure 8 | Imaging artifacts due to "flipped" or "corrupted" structures. DNA origami can be accidentally immobilized upside down. Thus, a mirrored digit can be imaged. This results e.g. in a digit 2 appearing as a digit 5 and vice versa. However, due to the specific appearance of the digit in only one imaging round, identification is nevertheless possible. Furthermore, incorporation efficiency of strands in DNA origami structures is not 100 %. DNA-PAINT docking sites can be missing stochastically in every structure. These "local defects" or missing points can alter the displayed digit, e.g. a digit 9 may appear as a digit 5. Again, specific detection in only one Exchange-PAINT cycle allows unambiguous identification. [Scale bar: 50 nm].



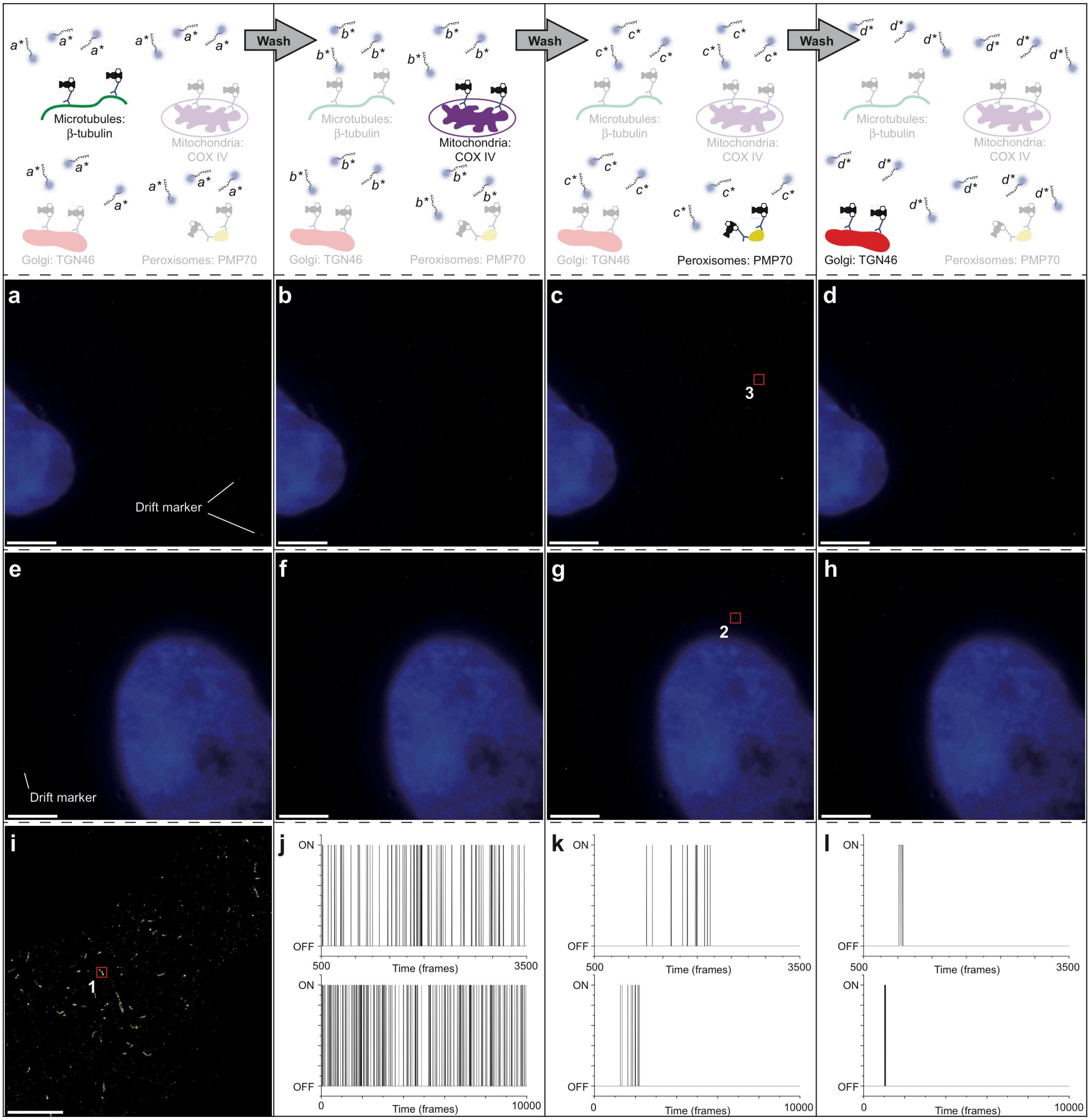
Supplementary Figure 9 | Quantitative comparison of the same targets imaged after ten rounds of Exchange-PAINT. Origami structures displaying docking strands for digit 4 were imaged in the first Exchange-PAINT round (green pseudocolor). After ten successive Exchange-PAINT cycles, the same structures were imaged again (blue pseudocolor). Digits represented in yellow pseudo-color on the left-hand side represent results from the first round of Exchange-PAINT imaging. Digits on the right in blue show the same structures after 10 successive Exchange-PAINT cycles. The average normalized cross-correlation coefficient for the 5 samples shown above is 0.92, demonstrating a high similarity of the structures after extensive imaging and washing steps [Scale bar: 50 nm].



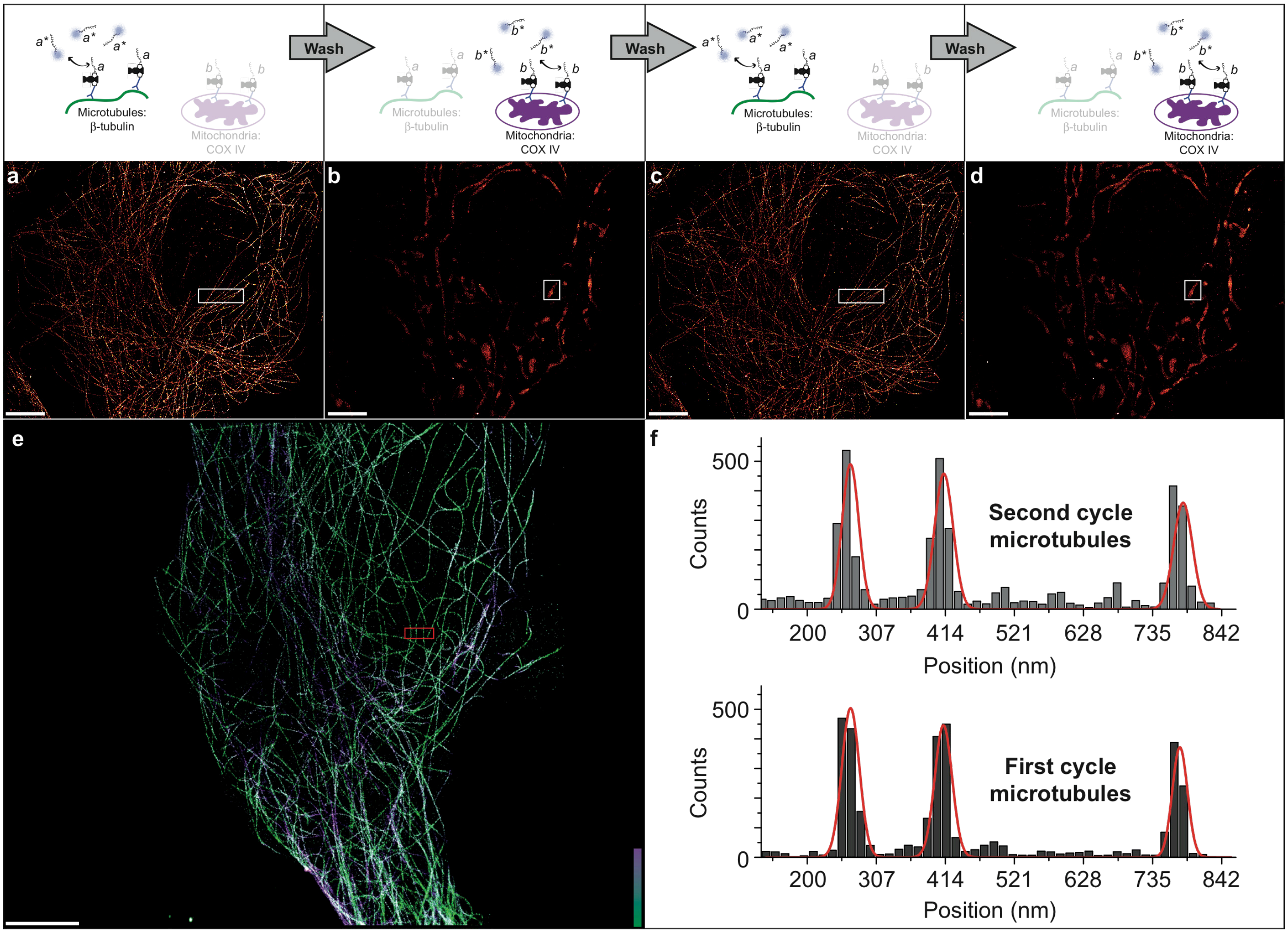
Supplementary Figure 10 | Overview image of four-"color" *in vitro* Exchange-PAINT of digits on single DNA origami structures. Large-view overlay of four consecutive pseudocolor images of **Fig. 3e**. The four images have been shifted in respect to each other for better visualization. Every origami structure displays a different digit in every imaging round. Bright spots are drift markers equipped with only one of the four docking sequences [scale bar: 1 µm]. Imaging conditions for each Exchange-PAINT round: 10,000 frames, 5 Hz frame rate. Excitation power density: 600 W/cm^2 at 647 nm. Inset: Zoom-in of highlighted region [scale bar: 100 nm]. Zoom in for details.



Supplementary Figure 11 | Additional two-color Exchange-PAINT images in fixed HeLa cells. **(a)** Two rounds of Exchange-PAINT using Cy3b-labeled imager strands were performed in fixed HeLa cells. Here, microtubules (green pseudo-color) were labeled with docking sequence *A* and mitochondria (magenta pseudo-color) with orthogonal docking sequence *B*. **(b)** Two rounds of Exchange-PAINT using ATTO655-labeled imager strands performed in fixed HeLa cells similar to **a** [scale bars: 5 µm]. Note again that all imager strands were labeled with the same fluorophore type (Cy3b in **a** and ATTO655 in **b**). Imaging conditions: 600 pM Cy3b-labeled imager strands in buffer C. 100 nm gold nanoparticles (10 nM in buffer C) were used as fiducials and channel alignment.



Supplementary Figure 12 | Interactions of imager strands in Exchange-PAINT imaging with cellular components. Results of four rounds of Exchange-PAINT imaging using the same conditions as in **Fig. 4** but **without** complementary dockings strands on the antibody-streptavidin conjugates. The images show little non-specific binding interactions with cellular components or genomic DNA (Nucleus was stained with DAPI). (**a–d**) Imaging performed with Cy3b-labeled strands**.** (**e–h**) Imaging performed with ATTO655-labeled strands. (**i**) Exchange-PAINT image of PMP70 proteins from **Fig. 4c** to demonstrate the difference between specific and non-specific imager strand interactions. (**j**) Binary intensity vs. time (I vs. t) traces for a specific interaction of imager strands with complementary docking sites obtained from the highlighted region **1** in **i** (top is a zoom-in of the time trace on the bottom). (**k**) Binary I vs. t traces for a non-specific interaction of imager strands with cellular components obtained from the highlighted region **2** in **g** (top is a zoom-in of the time trace on the bottom). (**l**) Binary I vs. t traces for a non-specific interaction of imager strands with cellular components obtained from the highlighted region **3** in **c** (top is a zoom-in of the time trace on the bottom). As can be seen in these traces, non-specific interactions show non-repeating localization events throughout the imaging process or exhibit a different blinking signature (e.g. non-exponential distribution of ON- and OFF-times) compared to specific DNA hybridization interactions and can thus be easily identified and discarded. [Scale bars: 5 µm]. As for *in situ* cell experiments in the main text, gold nanoparticles are here used for drift correction and channel alignment. The gold nanoparticles adsorb non-specifically to the glass bottom of the imaging chambers. The apparent movement of all gold nanoparticles in a field of view is tracked throughout the movie. The obtained trajectories are then averaged and used for global drift correction of the final super-resolution image. Zoom in for details.

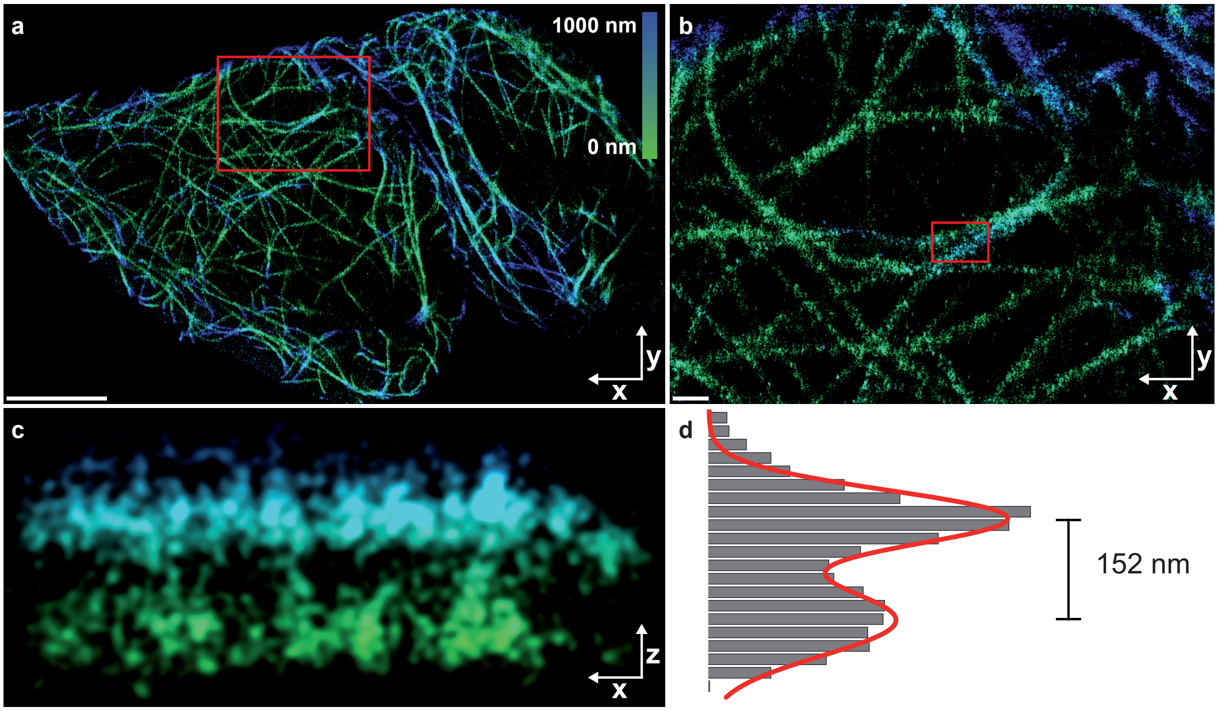


Supplementary Figure 13 | Quantification of sample distortion in Exchange-PAINT imaging. Four rounds of Exchange-PAINT imaging of two targets were performed, allowing quantification of possible sample distortion by comparing two images of the same target after several washing steps. (**a**) First, microtubule imaging was performed using imager sequence *a**. (**b**) After a washing step, mitochondria were imaged using sequence *b**. (**c**) After another washing step, microtubule imaging using sequence *a** was repeated. (**d**) After a final washing round, mitochondria imaging using sequence *b** was repeated.

Two analysis methods were used to assess sample distortion:

(1) A normalized cross-correlation coefficient was calculated between the image obtained in the first and second imaging round for microtubules and mitochondria, respectively. The same ROI (highlighted by a white rectangle in **a**, **b**, **c**, and **d**) was selected in each of the two image pairs. The cross-correlation coefficient was determined to be 0.80 and 0.96 for microtubules and mitochondria, respectively. To put this into perspective, we note, that even in a "classic" super-resolution image (without liquid exchange), one cannot expect 100 % correlation between two consecutive images due to the stochastic nature of the image formation. To show this effect, one can simply split a super-resolution RAW data set into two parts of equal length, perform a stochastic reconstruction and calculate the normalized cross-correlation coefficient for these supposedly equal images. (**e**) This analysis was performed for two subsets of equal length of the microtubule image (ROI is highlighted in red) from **Fig. 4** and a coefficient of 0.88 was obtained, similar to the Exchange-PAINT case of 0.80.

(2) In addition, a cross-sectional histogram analysis was used in the two Exchange-PAINT microtubule images **a** and **c** to quantitatively assess spatial shift of three fibers with respect to each other. (**f**) The cross-sectional histogram was performed on a sub-region of the white ROI in **a** and **c**. The upper and lower histograms show the localization distributions for the second and first Exchange-PAINT round, respectively. Three-component Gaussian fitting revealed a shift of fibers with respect to each other of ~ 5 nm. [Scale bars: 5 µm]. Zoom in for details.



Supplementary Figure 14 | Additional cellular 3D DNA-PAINT image. (**a**) 3D DNA-PAINT super-resolution image of a microtubule network inside a fixed DLD1 cell using Cy3b-labeled imager strands (60,000 frames, 30 Hz frame rate). Color indicates height [scale bar: 5 µm, height]. (**b**) Zoomed-in image of the highlighted area in **a** [scale bar: 500 nm]. (**c**) Perspective X-Z-profile of the highlighted area in **b**. (**d**) Cross-sectional histogram where points are summed along the long axis in **c**. A two-component Gaussian fit reveals a distance of ≈152 nm in z of two adjacent microtubules.

Supplementary Tables

Table S1 | Staple sequences for microtubule analog DNA structure. The color matches the staples in the strand diagram shown in **Supplementary Figure 1**.

Position	Sequence	Color	Description
0[39]21[39]	AGGCCACCTCACCAGTTCAACAGTGGCGTTTT		Structure strand
0[79]1[79]	CGTCAAAGGGCGAAAACATTCTGGCCATCCAC		Structure strand
0[167]22[168]	AGAATGCGCAGCGCAGTACTTATAGCTCACACATTCAACTTCATAACC		Structure strand
0[199]2[200]	CCTTACACAGCAAATCGTTTGGGTGGTAAAAC		Structure strand
0[239]21[231]	AATTCGCGTCTGGCCTAGCTTTCACAGGTCAGTACCTTTA		Structure strand
1[24]18[24]	TGGCAGATGAGTAAAAAATCGCCATATTTAACTGTAATTTAGGACAAC		Structure strand
1[96]17[95]	CACGCTGGTTAAACGGGTAAACAATTTGGGAAGGCTTGCACATCGGAA		Structure strand
1[120]1[151]	ACGGGCAACAGCTGGGTTTCTGCCAGCACTCA		Structure strand
1[152]19[167]	GACGATCGCGGGCCTGGGAAGAAAAATCT		Structure strand
2[39]23[55]	GTCTGAAAAACAGGAAGAAGGCTTCGGGTAGGAATCATTACCGCGCCC		Structure strand
2[79]23[71]	AAGAGACAGAGATAGAGACCTGAAAAATCAAGCTATTTTG		Structure strand
2[103]3[119]	GTTTGATGAATCGGCAAAATTTGCGTATTGG		Structure strand
2[127]31[143]	TTTTCACCCCTAAAACAAAGAATAAGCACCATTACAGCGTCAGACTGT		Structure strand
2[199]23[207]	GGCATCAGGGAGGTGTCGAGGCATATAGCGAGAGGCTTAT		Structure strand
2[231]5[231]	TTAAATGTCAACCCGTCGGCGCATAAATTATTCTCCGTGGCGGATTGA		Structure strand
3[16]31[31]	ATCACCCAGCCATTGCTGGATTATGAACGCGAAGGGCTTAGAACAAAG		Structure strand
3[56]19[55]	ACCTTCTACCCTACTGCGGGATCTTACCAGTATAAAGAAAAAGC		Structure strand
3[80]2[80]	GAGTGTTGTTCTCCGAGTGGTCAGTTTGGAAC		Structure strand
3[120]24[128]	GCGCCAGGGTGGTCGTGAGGCGAAGAATTATGTTCAACAG		Structure strand
3[168]5[175]	ATCCCACGGCAGCAACCGCAAGAAATGACTTGTAGAACGT		Structure strand
4[71]5[87]	AGAATACGAGCGTAAATCGTCGCTATTAATTA		Structure strand
4[135]22[120]	CCCTCGGCCAACGCGCAACTAAAGTAATAATT		Structure strand
4[207]6[184]	TATGAGCATCAGCGGGGCGCTTTCTAACCGTGCATCTGCC		Structure strand
5[16]22[16]	ATCGGCCTTGCTGGTACAATATTATCAATAATATCCGGTATTCTCCCA		Structure strand
5[32]25[31]	ATATCTATTATCTGGTCAGTTGGCTTATCTAATCTTTCCTTACCGCAC		Structure strand
5[52]3[55]	CGCGAACTGATTGGCACAGACAATATATGGAAAT		Structure strand
5[88]23[103]	ATTTTCCCTCAAAAGAAAAGGCTCCAAAAGGA		Structure strand
5[152]4[136]	CGTAATCTGCCAACGGCCACAGTTGAGGAT		Structure strand
5[176]22[184]	CAGCGTGGTGCTGCAGGTCATTGGAAACCAAAAGTAAGAG		Structure strand
6[95]4[72]	GCTATATGTGAGTGAAAATTTCTTATAGCCCGAGATAGTA		Structure strand
6[127]8[120]	TTTCCAGTAATGAGTGAGCTAACTGAGCCGGAAGCATAAA		Structure strand
6[151]22[144]	TTTCCCGTTCAACTTTAATCATTTTATGCGATTGTAAA		Structure strand
6[159]26[160]	ATAGCTGGAAATTGGAGGTTTCCCTCAGAACAGTATATATACGC		Structure strand
6[183]2[184]	AGTTTTAAGACGATAATCTGGTCACAACCAGCTTACGGCTATGCCGGG		Structure strand
6[207]4[208]	GCGCATCGGCACTCAATCCGCCGGGCAACGGGAACAGCGGTTGCGG		Structure strand
6[231]24[208]	ATAGGTCACGTTGGTGGGAGCAAAGAGCGGAATCGTCAT		Structure strand
7[16]4[16]	GAGGAAGGAAATCAACGAAACCAACCGTTGCC		Structure strand
7[48]5[51]	AAATTAAACGCCACCCTCAATCAATAGTCTTTAATG		Structure strand
7[80]25[95]	TACATAAATCAATTAGTTATCAGCATCAATAG		Structure strand

7[112]6[96]	GGGTGCCTCGGGAAACCTAAACATAGCGATA		Structure strand
7[176]25[191]	TCAGAGGGGACGACGATTTTGCCATAGTAAAA		Structure strand
8[39]11[31]	TGCTGATCTTTAGGAGTAGATAATCAGAGGGTTTTGAACC		Structure strand
8[95]12[80]	TGACCTTTAATTAATTCATATGGTCGGCTTAGATAACTATATGGAATT		Structure strand
8[159]10[160]	GCTCACAAAACGCGGTCCGTTTAAGGGTAA		Structure strand
8[191]8[160]	CGGCCTCAGGAAGCGCTGGCAGCCTCCGGTCC		Structure strand
9[48]25[63]	CTAGTCAGAGGCGAAGAGCCCAACGCTAACG		Structure strand
9[104]24[112]	TCATATGCTCATTTGGTGTAAAGAGACGTTAGAGTGAGA		Structure strand
9[120]10[136]	CCGCCAGCACCCTCATGAAACAGCAAAAAAATCCCGTAAAATTTGTAC		Structure strand
9[136]24[144]	GGTTGGCCGTTCCGGCATTCCACATTTCGCCAAGTACGCT		Structure strand
9[176]11[191]	CGTATCGCACTCCAGCGGATAAGTAGCTCAAA		Structure strand
9[208]25[223]	GAGGGTAAGAGATCCGTCCAATACTGAAT		Structure strand
10[31]27[23]	GAGGATTTAGAAGTATTTAAATCCAATTGAGCTGAGTTAA		Structure strand
10[55]8[40]	GTGCCACGTTTGCACGAGCCTAATTTGCCCTGAACAAGCACATCACCT		Structure strand
10[95]27[95]	ACCTTTTTAACCAAGAAACATCTCTTAAAACGAAAAGCCAGCGCCAAA		Structure strand
10[135]26[112]	ATCGACATGGATCAAACTTAAATTGAGACGCATTTGTAAC		Structure strand
10[159]27[159]	AGTTAAACGATGCTGAAAAGCCGAGAACCGCATGTACCGTAACGGA		Structure strand
10[183]27[191]	CGCTTCTGCCAGGCAAGCCGTCGAGAACCGCCTCCCTCAG		Structure strand
10[215]10[184]	TGCAACCGTTCTAGCTGATACTTTCCGGCAC		Structure strand
11[192]26[208]	TCACCATCAATATGATATTCGGGTCAGGTT		Structure strand
12[31]29[23]	GGTTAGCCCGAACGTTATTTTGCGTAATAAGATTAGAGAG		Structure strand
12[55]28[32]	AGAAATAATAGATTTTATATTATTTATCCAGCGCATTAGA		Structure strand
12[79]11[63]	ATTCATTTCAACATATCAAAGACACCACGGTCTTTCCAGTAACAAA		Structure strand
12[119]16[120]	TGGTGAAGAGACGGTCTGTAGCATGACAACGTCACCAATGGTACAACG		Structure strand
12[183]29[191]	ATTCGCCAGCAACTGTCGCCACCCCACCCTCAGAGCCCAT		Structure strand
12[215]27[215]	AAAAAAGGGTGAGAATAGGATTAGCGGGTG		Structure strand
13[40]27[55]	CTGTTGCGAGAAAAATACCAGTTACAAAATAA		Structure strand
13[72]30[80]	ATCGCGCAGAGGCTAAAACATGTTGCAGTCGATCACCGTC		Structure strand
13[104]9[103]	GAGGCGCGGATAGCCTCATAGGATCTAAAGTTTATTTATCAAAA		Structure strand
13[144]17[159]	AACTTTGATGAGTTTCCACCGTAACAGAATACCGGATATTCACGG		Structure strand
13[168]25[183]	GTAGCTGCTTCAGCAGCACCACCGGAGGGTTGAGCCCGGAATAGGTAA		Structure strand
13[216]14[224]	TTTTAGAACCCTCGCAAAATTAAGCAATAGCAAGGCAAAGAATTAATATA		Structure strand
14[55]16[40]	CAGTAACACATCGGGATAAATAAGGCGCCAGT		Structure strand
14[87]28[72]	CAATTGAATACCAAGTCTTATTACAGCAAACG		Structure strand
14[119]15[135]	TCCATGTTTATTTGTATCATCGCCTGATAAAT		Structure strand
14[223]30[208]	TTTTAAATGCAATGCCTGAGTAATAAGAGGCTGAGTAACTATTTC		Structure strand
15[32]29[55]	GCAATTCATCATTTTAGTACCATAGGACAATCCAAATAAG		Structure strand
15[80]18[80]	TTGCTAGAAATTTAATGGTTTGAACAGCAGCGAAAGACAGGGGAGTTA		Structure strand
15[96]28[104]	AAACTTTTTCAAATAACTTAGCAAATATTTCCACAG		Structure strand
15[160]28[168]	CGGGAACGGATCAGCTTACGCAACTTTGCCACTCAGACAT		Structure strand
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16[143]30[120]	CTTCATCATGACAAGACAAGTTTGCCTTTCATTAGCAAGG		Structure strand
16[191]14[160]	CAATGTGCTGCAAGGCGATTTCAGAGGTGGAGTGCCATCTCTCACCGG		Structure strand
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16[239]29[231]	AACATCCAAGGTGTTAGTCTCTGA		Structure strand
17[24]14[24]	AATAACAGAGGCATTTAATAAGAGAAAAACAGTAATCCTGATTGTCAA		Structure strand
17[40]18[56]	TCGAGTTACGTCAAAAAGGAAACCGAGGAAACGCAATAAGGAACCGG		Structure strand
17[64]14[56]	TCACCCTATACCGACAAGACTCTACCAGATGAATATA		Structure strand
17[160]31[175]	CCAGTGCCAAGCTTAACCATAGCCGGTCACCA		Structure strand
17[224]31[239]	GATGCATCAATTCTACTAAAGCCAATTCACAA		Structure strand
18[55]2[40]	AATCATAATTACAACAAACGCCTAGCCAACGCCACACGACGCTCAATC		Structure strand
18[79]21[79]	AAGGCCGCTGCCGCATGCCCAGTTATACAAATGGTTTTGAAGCGTTGC		Structure strand
18[111]0[96]	AGGCTTTGACTTTTTCATGTAACGCCTGGCCCTGAGAGAGTTGCA		Structure strand
18[183]30[160]	TTTCCCAGTCACGACGTTGTAAAAGCATTTTCCCCTTATT		Structure strand
18[239]2[232]	AACCAGACCTCTTTAACGCGTCAATCATTAACATTTTACA		Structure strand
19[56]30[64]	CTGTTTAGTATCATATTTTGCGTAACGGAAAACTGGC		Structure strand
19[96]30[96]	CGCCTAAAGAGGATGATTAGAGCCCATTAAAG		Structure strand
19[168]3[167]	ACGTTAATTTTAGGAATGTCACTGAGCCAGCGGTGCCGGTGTGGTGCC		Structure strand
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19[208]30[224]	GCTCAACATGTTTTAAATGCAAACGGAAATGGCCTTGATGAATGGAA		Structure strand
20[159]21[135]	CCAGTCAGGAGCTTGCCCTGACGAGAAGGCAGAAAGAAC		Structure strand
20[223]21[199]	GATTATTGCTGAATATAATGACAGGTAGAAAGCCAAAAG		Structure strand
21[16]1[23]	TAATATAATTACAATATGTAGCAT		Structure strand
21[40]4[32]	AGCGAACCCAGATATAAAACGCTCTTTTGAATGGCCAGAA		Structure strand
21[80]22[96]	GCCGACAATGAATACGTAATGCCACTACGAATTGAAAATCTCCAAA		Structure strand
21[136]2[128]	ACCAGAACGAGTATTAGCAGCGTGCCTGTTCTTCGTTTTC		Structure strand
21[200]1[215]	GAATGGCTTAGAGCTTGCGGCTAAAGGTT		Structure strand
21[232]6[232]	ATTAGAGGGATTAGCTCCTTTTGACAAATGCTTTAAAGAATTAATGGG		Structure strand
22[95]3[79]	AAAAACAGCTTGATACCGATACTTAGCGGGTT		Structure strand
22[119]2[104]	TTTTCACGGGCACCAAAGTGGCGAAAATCCT		Structure strand
22[143]21[159]	TTGGGCTTCCGTGAGCCTCCTAGCACCGTCGGCCCCCTAGAACTG		Structure strand
22[167]7[175]	CTCTTACCGTGAAGTTGTACTCAGTTACCAGAGCACATCC		Structure strand
22[183]18[184]	CAACACTAAATGCAGATACATAACGATTCATCGCCAGCATCCAAGGGT		Structure strand
22[207]21[223]	GCGGATTACCAGCCGGGTCACTGTTGAGTAAGAGCGCCCTAAGAGAG		Structure strand
23[56]1[55]	AATGTTGATTAAGCAAGCAAATTCCCGACTATTTTGACCAGTAATA		Structure strand
23[72]24[56]	CACCCGTGTAACCTTGCTTCTCCTAAAACATAATACCGTCCTGAA		Structure strand
23[104]5[103]	GCCTTAGAAAGGAACGGGGAGAGGCGGTCCCTTATAAATTAGAATC		Structure strand
23[208]22[208]	TCATTGAATCCCCCTTAAGAGGTCATTTTT		Structure strand
24[79]7[79]	GAGAGCTACAATTTTAAACGAACCACCAGCAG		Structure strand
24[127]9[135]	TTTCAGCGGTAAATGAATTTTCTGGAGCCACCAGTTGGGC		Structure strand
24[143]5[151]	AAACAACTGTTTAATTTGCGCTCAGTACCGAGCTCGAATT		Structure strand
24[231]26[216]	CAGAAAACCAAGAGAAGTAATCGTAAATTTTGGCTATACTTAACGGGG		Structure strand
25[64]24[80]	AGCGAATAAGTTTATTTTGTCACATTGCTTTC		Structure strand
25[224]10[216]	GACCATAAATAAGTTTAGCATGTCGACCCTGTAATACTTT		Structure strand
26[159]12[144]	CACCCTCCACAGGCTTACCAGTCCCGGAA		Structure strand
26[207]6[208]	TTGCTCAGCTGGATAGTACAAAGGATTGCCTGAGAGTCTTAGATGG		Structure strand
26[239]7[247]	TACTGGTAATCAAAAACCCGAACGTCGATAAAAACAGGAA		Structure strand
27[96]10[96]	GACAAGCCTCTGTTATGTTGGCACGGAAAAATCGGTCTGAGAGACT		Structure strand

27[112]14[120]	TTAGCCAGGGATAGCAACAACGCCAATCATAACGACCTGC		Structure strand
27[136]7[151]	AGGAACCCCACCCTCATATGGGATCAACATACCACATTAATTGTGTGT		Structure strand
28[191]15[183]	CTCAGAACTGGGAAGGCGGGCCTCTTCGCTATGGCGAAAG		Structure strand
29[56]15[79]	AAACGATTCGTGTGAGAAACAATAACGGATTCGCCTGA		Structure strand
29[136]27[135]	GATAGCAGGTCACCAGTACAAACTAGCCCAAT		Structure strand
29[192]13[215]	GAAAGTATTGTCGGTGGCGATGTAGGTAAAGATTCAAAT		Structure strand
29[232]28[216]	ATTTACCGCGTCATACATGTGCCCGTATAAAC		Structure strand
30[95]14[88]	GTGAATTATTGAGGGAGGGAAGGTCGGTCCAATCGCAAGA		Structure strand
30[119]29[135]	CCGGAGGACTAATACCAAGCGCGAAACAATCTAGAGTAAAAAACCATC		Structure strand
30[183]16[192]	CAGAACCAGTTGGGTAACGCCTATAACAGTTGCAAATGGT		Structure strand
30[207]17[223]	GGAACCTAGGTTGAGGCAGGTCAGACGATTGCAACTAAAAACGAGTA		Structure strand
30[223]15[239]	AGCCCTGCTGCCCGCAGTTTGACCGGGGCGCGAGCTGAAAATAAATCA		Structure strand
31[112]1[119]	TCACCAGTCACAGGAAGTTTCCATTTGCCCCAGCAGAG		Structure strand
31[144]19[143]	AGCGCGTTTTCATCGCGATTACCCAAATCAACGTAACATTCAGTGA		Structure strand
1[56]0[40]	AAAGGGAACCGTCTATCATTATAATCAGTG		Structure strand
1[80]19[95]	TATTAAAGAACCGGTCGCAAGGTGTATTCGGT		Structure strand
1[216]0[200]	TCTTAGCCTCCTGTTGCTCGTCATAAACATC		Structure strand
2[183]19[191]	TTACCTGCCGCGCCTGTGCTGTTCTGGTGACTCTAACGGA		Structure strand
5[104]6[128]	CTTGAGTCGTGCCAGCTGCATTAATGAACGGCTGCCCGC		Structure strand
8[63]10[56]	AGAGGTGTATTAACACCTACATTTAATGCCTGCAACA		Structure strand
9[80]8[64]	TTCATTTGTTTAATGGAAACAGAAGATAAAAC		Structure strand
11[64]9[79]	AGAAGATGATGAAACAAAACAAAATTAACAAT		Structure strand
11[216]9[239]	AGAAGCCTTTATTAGCTAAATCGGAACATTATAATCATAT		Structure strand
14[159]15[159]	AAACAGGACAGATGAGACCAGGCGCATCCA		Structure strand
15[184]16[208]	GGGGATAACCTGTTTAGCTATATTTTCATTTATTAGAT		Structure strand
17[96]15[95]	CGAGGGTATTCATCTTCTGACCTAACGCGAGA		Structure strand
19[128]18[112]	TCTGCTCAAAGCTTTGACCCCCAGCGATTCAG		Structure strand
19[144]19[127]	ATAAGCGTGTTTTCACGGTCATACCGGGATTGCCCTTCACAACACTCA		Structure strand
24[55]7[47]	TCTTACGTTTTTATTTTCATCCTGAATAACCTCAAATATC		Structure strand
24[111]7[111]	ATTAATTGTATCGGTATTAAGACGCTGATG		Structure strand
24[183]6[160]	GAGGGGGTGTATCACCTACCAGACCGGAACGTGCCGGGTC		Structure strand
24[207]8[192]	AAATTTGCAAAAGAAGCAGAGGTCCTATCTAT		Structure strand
25[32]9[47]	TCATCGAGAACAAAGTACAGCAAATGAAAAAT		Structure strand
25[96]8[96]	AAATGTCGTCTTTCCCCGAAGAGTCAATAG		Structure strand
25[192]9[207]	TGTTTAGATACCAGGCCAGAATTAATGCCGGA		Structure strand
27[32]10[32]	AACTGAACAATGGAAGTACCATATCAAAATTACTGAGAGCCAGCATTT		Structure strand
27[160]9[175]	ACCAGAGCCGCCATGTGGCCTTTAGTGGGAAAGTGCCATGTTTCGTCT		Structure strand
30[63]17[63]	ATGATTTTTTGTTTAAAATAAGAATAAACTCG		Structure strand
30[79]0[80]	ACCAAAAGTACCCGACTTGAGCCACAACCATCAACCGATAGACTCCAA		Structure strand
30[159]16[144]	AGCTAGCGATCAGGTTCCGAGGCTGGCTGAC		Structure strand
31[32]15[31]	TTACCAGAATGAAAATAGCAGCCTAATAACATAATATAAAAGATGATG		Structure strand
31[176]0[168]	GAGCCGCCAGTTGAGAAAAACGAACTGTGGTGCTGCGGCC		Structure strand
13[136]12[120]	AACTGACCTTTGTGAGAGATAGACTTTCTCCG		Structure strand
15[136]13[135]	TGTGTACAACGGTGTCGAAATCCGGGGAACCG		Structure strand

27[24]13[39]	GCCGAATTCGGGACAAGAATTGGATTATACTT		Structure strand
27[56]12[56]	ACAACATAAAGGTGGCAATTACCTGAGAAC		Structure strand
27[216]12[216]	CCTTGAGTAACAGGCTTAATCAACGCAAGGAT		Structure strand
28[71]13[71]	TAGAAAATACATGCCCAGGTTTAACGTAAA		Structure strand
28[103]13[103]	ACAAAGGGCGACATTCATGCTGATGCAAAAAC		Structure strand
28[167]13[167]	AATCAAAATCACCACAAGAATCGGCGAAAC		Structure strand
28[215]12[184]	AGTACTCCTCAAGAGAAGCCACCAGCCGGATAGGCCGGAGACAGGCC		Structure strand
1[56]0[40]	AAAGGGAACCGTCTATCATTATAATCAGTG		DNA-PAINT docking site
1[80]19[95]	TATTAAAGAACCGGTCGCAAGGTGTATTCGGT		DNA-PAINT docking site
1[216]0[200]	TCTTAGCCTCCTGTTGCTCGTCATAAACATC		DNA-PAINT docking site
2[183]19[191]	TTACCTGCCGCGCCTGTGCTGTTCTGGTGACTCTAACGGA		DNA-PAINT docking site
5[104]6[128]	CTTGAGTCGTGCCAGCTGCATTAATGAACGGCTGCCCGC		DNA-PAINT docking site
8[63]10[56]	AGAGGTGTATTAACACCTACATTTAATGCCTGCAACA		DNA-PAINT docking site
9[80]8[64]	TTCATTTGTTTAATGGAAACAGAAGATAAAAC		DNA-PAINT docking site
11[64]9[79]	AGAAGATGATGAAACAAAACAAAATTAACAAT		DNA-PAINT docking site
11[216]9[239]	AGAAGCCTTTATTAGCTAAATCGGAACATTATAATCATAT		DNA-PAINT docking site
14[159]15[159]	AAACAGGACAGATGAGACCAGGCGCATCCA		DNA-PAINT docking site
15[184]16[208]	GGGGATAACCTGTTTAGCTATATTTTCATTTATTAGAT		DNA-PAINT docking site
17[96]15[95]	CGAGGGTATTCATCTTCTGACCTAACGCGAGA		DNA-PAINT docking site
19[128]18[112]	TCTGCTCAAAGCTTTGACCCCCAGCGATTCAG		DNA-PAINT docking site
19[144]19[127]	ATAAGCGTGTTTTCACGGTCATACCGGGATTGCCCTTCACAACACTCA		DNA-PAINT docking site
24[55]7[47]	TCTTACGTTTTTATTTTCATCCTGAATAACCTCAAATATC		DNA-PAINT docking site
24[111]7[111]	ATTAATTGTATCGGTATTAAGACGCTGATG		DNA-PAINT docking site
24[183]6[160]	GAGGGGGTGTATCACCTACCAGACCGGAACGTGCCGGGTC		DNA-PAINT docking site
24[207]8[192]	AAATTTGCAAAAGAAGCAGAGGTCCTATCTAT		DNA-PAINT docking site
25[32]9[47]	TCATCGAGAACAAAGTACAGCAAATGAAAAAT		DNA-PAINT docking site
25[96]8[96]	AAATGTCGTCTTTCCCCGAAGAGTCAATAG		DNA-PAINT docking site
25[192]9[207]	TGTTTAGATACCAGGCCAGAATTAATGCCGGA		DNA-PAINT docking site
27[32]10[32]	AACTGAACAATGGAAGTACCATATCAAAATTACTGAGAGCCAGCATTT		DNA-PAINT docking site
27[160]9[175]	ACCAGAGCCGCCATGTGGCCTTTAGTGGGAAAGTGCCATGTTTCGTCT		DNA-PAINT docking site
30[63]17[63]	ATGATTTTTTGTTTAAAATAAGAATAAACTCG		DNA-PAINT docking site
30[79]0[80]	ACCAAAAGTACCCGACTTGAGCCACAACCATCAACCGATAGACTCCAA		DNA-PAINT docking site
30[159]16[144]	AGCTAGCGATCAGGTTCCGAGGCTGGCTGAC		DNA-PAINT docking site
31[32]15[31]	TTACCAGAATGAAAATAGCAGCCTAATAACATAATATAAAAGATGATG		DNA-PAINT docking site
31[176]0[168]	GAGCCGCCAGTTGAGAAAAACGAACTGTGGTGCTGCGGCC		DNA-PAINT docking site
2[9]2[10]	TTGATTAAATCAGCTCCAATAGGAACGAATTAACCGTCTTCT		Connector strand
4[15]6[248]	TGAGTAGAAGATAGATCGAGCATGTAAGTTGAATATAA		Connector strand
5[232]5[15]	CCGTAAATTGTAAACGTTAAACTCAAACT		Connector strand
6[247]3[15]	GCAAATATGCAAAGCGTTTTGTTATAAATTTTTGTTAGTAATAAC		Connector strand
7[248]24[232]	GATTGTAATCAGAAAAGCTCAGGTCTTATTATAGTCACAGTT		Connector strand
9[240]11[7]	GTACCCCGGTTGATACAAACACCAAATTGTAATTCGACA		Connector strand
11[8]25[23]	ACTCGTATAGACTTGATTAGAGCCGTCAACACTAACAAAACCAAG		Connector strand

13[8]26[240]	CATTATCATTAATTCAAGAATGCTAATATCAGAGAGGAGTG		Connector strand
14[23]16[240]	AGAAACCATGATTATCGTACCGACAAAAGGTAAAGTGTAGCATT		Connector strand
15[240]28[8]	TACAGTTATCATCATATTCCCCAGAAGAGCTATCGCAAGAA		Connector strand
17[8]18[240]	TGTCCAGAAGCCCTTTTTAATCCTCATTAATAGTATCAAAGCG		Connector strand
19[3]0[248]	GCGCCTGTTTATCAACAGAGGAGTCTGTCCATCACGCACCA		Connector strand
22[15]21[15]	TCCTAATTTATGCATCAAAAAAAGCCCGAAAGACAAGAAAAA		Connector strand
24[23]7[15]	TATCATTCCAAGAACCTGACTTACCGGGTATTACTAATAAGGAATT		Connector strand
27[237]13[7]	TGATACAGGTAAGTTCCAATAGCAATGAGCGGAATTGAGTAA		Connector strand
28[7]27[236]	ACAATGAAATAACCCATTAAAAGTAAGCCTCAGAGCATTTGA		Connector strand
30[23]17[7]	TTACACCGACGACGACATGTTCAGCTAATGCAGAACAATTC		Connector strand
31[16]31[15]	AGATAGCCATTATAGATAAGTCCTGAACTAGAAAAGTAAGC		Connector strand
31[240]0[240]	ACAAATAATCAAATATTTCGAGCTTCAAAAAT		Connector strand
13[136]12[120]	AACTGACCTTTGTGAGAGATAGACTTTCTCCGCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
15[136]13[135]	TGTGTACAACGGTGTCGAAATCCGGGGAACCGCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
27[24]13[39]	GCCGAATTCGGGACAAGAATTGGATTATACTTCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
27[56]12[56]	ACAACATAAAGGTGGCAATTACCTGAGAACCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
27[216]12[216]	CCTTGAGTAACAGGCTTAATCAACGCAAGGATCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
28[71]13[71]	TAGAAAATACATGCCCAGGTTTAACGTAAACGGTTGTACTGTGACCGATTC		3'-Biotin docking site
28[103]13[103]	ACAAAGGGCGACATTCATGCTGATGCAAAAACCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
28[167]13[167]	AATCAAAATCACCACAAGAATCGGCGAAACCGGTTGTACTGTGACCGATTC		3'-Biotin docking site
28[215]12[184]	AGTACTCCTCAAGAGAAGCCACCAGCCGGATAGGCCGGAGACAGGCCCGGTTGTACTGTGACCGATTC		3'-Biotin docking site

Table S2 | Staple sequences for drift markers. The color matches the staples in the strand diagram shown in **Supplementary Figure 1**.

Position	Sequence	Color	Description
0[111]1[95]	TAAATGAATTTTCTGTATGGGATTAATTTCTTTTGATCTACATA		DNA-PAINT docking site
0[143]1[127]	TCTAAAGTTTTGTCGTCTTTCCAGCCGACAATTGATCTACATA		DNA-PAINT docking site
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGATTGATCTACATA		DNA-PAINT docking site
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAGTTGATCTACATA		DNA-PAINT docking site
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAATTGATCTACATA		DNA-PAINT docking site
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAATTGATCTACATA		DNA-PAINT docking site
1[96]3[95]	AAACAGCTTTTTGCGGGATCGTCAACACTAAATTGATCTACATA		DNA-PAINT docking site
1[224]3[223]	GTATAGCAAACAGTTAATGCCCAATCCTCATTGATCTACATA		DNA-PAINT docking site
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAATTGATCTACATA		DNA-PAINT docking site
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAGTTGATCTACATA		DNA-PAINT docking site
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGATTGATCTACATA		DNA-PAINT docking site
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCATTTGATCTACATA		DNA-PAINT docking site
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCGTTGATCTACATA		DNA-PAINT docking site
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTTTTGATCTACATA		DNA-PAINT docking site
3[96]5[95]	ACACTCATCCATGTTACTTAGCCGAAAGCTGCTTGATCTACATA		DNA-PAINT docking site
3[160]4[144]	TTGACAGGCCACCACCAGAGCCGCGATTTGTATTGATCTACATA		DNA-PAINT docking site
3[224]5[223]	TTAAAGCCAGAGCCGCCACCCTCGACAGAATTGATCTACATA		DNA-PAINT docking site

4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCATTGATCTACATA		DNA-PAINT docking site
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGATTGATCTACATA		DNA-PAINT docking site
5[96]7[95]	TCATTCAGATGCGATTTTAAGAACAGGCATAGTTGATCTACATA		DNA-PAINT docking site
5[224]7[223]	TCAAGTTTCATTAAAGGTGAATATAAAAGATTGATCTACATA		DNA-PAINT docking site
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACTTTGATCTACATA		DNA-PAINT docking site
6[79]4[80]	TTATACCACCAAATCAACGTAACGAACGAGTTGATCTACATA		DNA-PAINT docking site
6[111]4[112]	ATTACCTTTGAATAAGGCTTGCCCAAATCCGCTTGATCTACATA		DNA-PAINT docking site
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTATTGATCTACATA		DNA-PAINT docking site
6[175]4[176]	CAGCAAAAGGAAACGTCACCAATGAGCCGCTTGATCTACATA		DNA-PAINT docking site
6[207]4[208]	TCACCGACGCACCGTAATCAGTAGCAGAACCGTTGATCTACATA		DNA-PAINT docking site
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACCTTGATCTACATA		DNA-PAINT docking site
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCATTGATCTACATA		DNA-PAINT docking site
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTCTTGATCTACATA		DNA-PAINT docking site
7[96]9[95]	TAAGAGCAAATGTTTAGACTGGATAGGAAGCCTTGATCTACATA		DNA-PAINT docking site
7[160]8[144]	TTATTACGAAGAACTGGCATGATTGCGAGAGGTTGATCTACATA		DNA-PAINT docking site
7[224]9[223]	AACGCAAAGATAGCCGAACAAACCCTGAACTTGATCTACATA		DNA-PAINT docking site
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCCTTGATCTACATA		DNA-PAINT docking site
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATATTTGATCTACATA		DNA-PAINT docking site
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTATTGATCTACATA		DNA-PAINT docking site
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCATTGATCTACATA		DNA-PAINT docking site
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCATTGATCTACATA		DNA-PAINT docking site
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCTTTGATCTACATA		DNA-PAINT docking site
9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTATTGATCTACATA		DNA-PAINT docking site
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAATTGATCTACATA		DNA-PAINT docking site
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGATTGATCTACATA		DNA-PAINT docking site
10[79]8[80]	GATGGCTTATCAAAAAGATTAAGAGCGTCCTTGATCTACATA		DNA-PAINT docking site
10[111]8[112]	TTGCTCCTTTCAAATATCGCGTTTGAGGGGGTTTGATCTACATA		DNA-PAINT docking site
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTACTTGATCTACATA		DNA-PAINT docking site
10[175]8[176]	TTAACGTCTAACATAAAAACAGGTAACGGATTGATCTACATA		DNA-PAINT docking site
10[207]8[208]	ATCCCAATGAGAATTAACTGAACAGTTACCAGTTGATCTACATA		DNA-PAINT docking site
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAATTGATCTACATA		DNA-PAINT docking site
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGCTTGATCTACATA		DNA-PAINT docking site
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGCTTGATCTACATA		DNA-PAINT docking site
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGATTGATCTACATA		DNA-PAINT docking site
13[64]15[63]	TATATTTTGTCATTGCCTGAGAGTGGAAGATTTTGATCTACATA		DNA-PAINT docking site
13[96]15[95]	TAGGTAAACTATTTTTGAGAGATCAAACGTTATTGATCTACATA		DNA-PAINT docking site
13[128]15[127]	GAGACAGCTAGCTGATAAATTAATTTTTGTTTGATCTACATA		DNA-PAINT docking site
13[192]15[191]	GTAAAGTAATCGCCATATTTAACAAAACTTTTTTGATCTACATA		DNA-PAINT docking site
13[224]15[223]	ACAACATGCCAACGCTCAACAGTCTTCTGATTGATCTACATA		DNA-PAINT docking site
13[256]15[255]	GTTTATCAATATGCGTTATACAAACCGACCGTTTGATCTACATA		DNA-PAINT docking site
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCATTGATCTACATA		DNA-PAINT docking site
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCGTTGATCTACATA		DNA-PAINT docking site
15[96]17[95]	ATATTTTGGCTTTCATCAACATTATCCAGCCATTGATCTACATA		DNA-PAINT docking site
15[160]16[144]	ATCGCAAGTATGTAAATGCTGATGATAGGAACTTGATCTACATA		DNA-PAINT docking site

15[224]17[223]	CCTAAATCAAAATCATAGGTCTAAACAGTATTGATCTACATA		DNA-PAINT docking site
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCATTGATCTACATA		DNA-PAINT docking site
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAGTTGATCTACATA		DNA-PAINT docking site
17[96]19[95]	GCTTTCCGATTACGCCAGCTGGCGGCTGTTTCTTGATCTACATA		DNA-PAINT docking site
17[224]19[223]	CATAAATCTTTGAATACCAAGTGTTAGAACTTGATCTACATA		DNA-PAINT docking site
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGATTGATCTACATA		DNA-PAINT docking site
18[79]16[80]	GATGTGCTTCAGGAAGATCGCACAATGTGATTGATCTACATA		DNA-PAINT docking site
18[111]16[112]	TCTTCGCTGCACCGCTTCTGGTGCGGCCTTCCTTGATCTACATA		DNA-PAINT docking site
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCATTGATCTACATA		DNA-PAINT docking site
18[175]16[176]	CTGAGCAAAAATTAATTACATTTTGGGTTATTGATCTACATA		DNA-PAINT docking site
18[207]16[208]	CGCGCAGATTACCTTTTTTAATGGGAGAGACTTTGATCTACATA		DNA-PAINT docking site
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGTTTGATCTACATA		DNA-PAINT docking site
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAGTTGATCTACATA		DNA-PAINT docking site
19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTCTTGATCTACATA		DNA-PAINT docking site
19[96]21[95]	CTGTGTGATTGCGTTGCGCTCACTAGAGTTGCTTGATCTACATA		DNA-PAINT docking site
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTATTGATCTACATA		DNA-PAINT docking site
19[224]21[223]	CTACCATAGTTTGAGTAACATTTAAAATATTTGATCTACATA		DNA-PAINT docking site
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATGTTGATCTACATA		DNA-PAINT docking site
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCCTTGATCTACATA		DNA-PAINT docking site
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAATTGATCTACATA		DNA-PAINT docking site
21[224]23[223]	CTTTAGGGCCTGCAACAGTGCCAATACGTGTTGATCTACATA		DNA-PAINT docking site
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCATTGATCTACATA		DNA-PAINT docking site
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCTTTGATCTACATA		DNA-PAINT docking site
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACTTTGATCTACATA		DNA-PAINT docking site
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAATTGATCTACATA		DNA-PAINT docking site
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGATTGATCTACATA		DNA-PAINT docking site
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTTTTGATCTACATA		DNA-PAINT docking site
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTATTGATCTACATA		DNA-PAINT docking site
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAATTGATCTACATA		DNA-PAINT docking site
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTTTTGATCTACATA		DNA-PAINT docking site
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATATTGATCTACATA		DNA-PAINT docking site
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAATTGATCTACATA		DNA-PAINT docking site
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATCTTGATCTACATA		DNA-PAINT docking site
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAGTTGATCTACATA		DNA-PAINT docking site
7[56]9[63]	ATGCAGATACATAACGGGAATCGTCATAAATAAAGCAAAGTTGATCTACATA		DNA-PAINT docking site
7[120]9[127]	CGTTTACCAGACGACAAAGAAGTTTTGCCATAATTCGATTGATCTACATA		DNA-PAINT docking site
7[184]9[191]	CGTAGAAAATACATACCGAGGAAACGCAATAAGAAGCGCATTGATCTACATA		DNA-PAINT docking site
7[248]9[255]	GTTTATTTTGTCACAATCTTACCGAAGCCCTTTAATATCATTGATCTACATA		DNA-PAINT docking site
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTCTTGATCTACATA		DNA-PAINT docking site
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCATTGATCTACATA		DNA-PAINT docking site
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTGTTGATCTACATA		DNA-PAINT docking site
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCGTTGATCTACATA		DNA-PAINT docking site
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAATTGATCTACATA		DNA-PAINT docking site
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAGTTGATCTACATA		DNA-PAINT docking site

11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAATTGATCTACATA		DNA-PAINT docking site
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCTTTGATCTACATA		DNA-PAINT docking site
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGCTTGATCTACATA		DNA-PAINT docking site
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCATTGATCTACATA		DNA-PAINT docking site
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAATTGATCTACATA		DNA-PAINT docking site
14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCATTGATCTACATA		DNA-PAINT docking site
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGTTTGATCTACATA		DNA-PAINT docking site
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAATTGATCTACATA		DNA-PAINT docking site
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTCTTGATCTACATA		DNA-PAINT docking site
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCGTTGATCTACATA		DNA-PAINT docking site
21[184]23[191]	TCAACAGTTGAAAGGAGCAAATGAAAAATCTAGAGATAGATTGATCTACATA		DNA-PAINT docking site
1[160]2[144]	TTAGGATTGGCTGAGACTCCTCAATAACCGATTTGATCTACATA		DNA-PAINT docking site
4[47]2[48]	GACCAACTAATGCCACTACGAAGGGGGTAGCATTGATCTACATA		DNA-PAINT docking site
4[79]2[80]	GCGCAGACAAGAGGCAAAAGAATCCCTCAGTTGATCTACATA		DNA-PAINT docking site
4[111]2[112]	GACCTGCTCTTTGACCCCCAGCGAGGGAGTTATTGATCTACATA		DNA-PAINT docking site
4[175]2[176]	CACCAGAAAGGTTGAGGCAGGTCATGAAAGTTGATCTACATA		DNA-PAINT docking site
4[207]2[208]	CCACCCTCTATTCACAAACAAATACCTGCCTATTGATCTACATA		DNA-PAINT docking site
4[239]2[240]	GCCTCCCTCAGAATGGAAAGCGCAGTAACAGTTTGATCTACATA		DNA-PAINT docking site
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAATTGATCTACATA		DNA-PAINT docking site
5[160]6[144]	GCAAGGCCTCACCAGTAGCACCATGGGCTTGATTGATCTACATA		DNA-PAINT docking site
8[47]6[48]	ATCCCCCTATACCACATTCAACTAGAAAAATCTTGATCTACATA		DNA-PAINT docking site
8[79]6[80]	AATACTGCCCAAAAGGAATTACGTGGCTCATTGATCTACATA		DNA-PAINT docking site
8[111]6[112]	AATAGTAAACACTATCATAACCCTCATTGTGATTGATCTACATA		DNA-PAINT docking site
8[175]6[176]	ATACCCAACAGTATGTTAGCAAATTAGAGCTTGATCTACATA		DNA-PAINT docking site
8[207]6[208]	AAGGAAACATAAAGGTGGCAACATTATCACCGTTGATCTACATA		DNA-PAINT docking site
8[239]6[240]	AAGTAAGCAGACACCACGGAATAATATTGACGTTGATCTACATA		DNA-PAINT docking site
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCATTGATCTACATA		DNA-PAINT docking site
9[160]10[144]	AGAGAGAAAAAAATGAAAATAGCAAGCAAACTTTGATCTACATA		DNA-PAINT docking site
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATGTTGATCTACATA		DNA-PAINT docking site
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCGTTGATCTACATA		DNA-PAINT docking site
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAATTGATCTACATA		DNA-PAINT docking site
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGTTTGATCTACATA		DNA-PAINT docking site
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTTTTGATCTACATA		DNA-PAINT docking site
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTTTTGATCTACATA		DNA-PAINT docking site
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCATTGATCTACATA		DNA-PAINT docking site
13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATTTTGATCTACATA		DNA-PAINT docking site
16[47]14[48]	ACAAACGGAAAAGCCCCAAAAACACTGGAGCATTGATCTACATA		DNA-PAINT docking site
16[79]14[80]	GCGAGTAAAAATATTTAAATTGTTACAAAGTTGATCTACATA		DNA-PAINT docking site
16[111]14[112]	TGTAGCCATTAAAATTCGCATTAAATGCCGGATTGATCTACATA		DNA-PAINT docking site
16[175]14[176]	TATAACTAACAAAGAACGCGAGAACGCCAATTGATCTACATA		DNA-PAINT docking site
16[207]14[208]	ACCTTTTTATTTTAGTTAATTTCATAGGGCTTTTGATCTACATA		DNA-PAINT docking site
16[239]14[240]	GAATTTATTTAATGGTTTGAAATATTCTTACCTTGATCTACATA		DNA-PAINT docking site
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGTTTGATCTACATA		DNA-PAINT docking site
17[160]18[144]	AGAAAACAAAGAAGATGATGAAACAGGCTGCGTTGATCTACATA		DNA-PAINT docking site

20[47]18[48]	TTAATGAACTAGAGGATCCCCGGGGGGTAACGTTGATCTACATA		DNA-PAINT docking site
20[79]18[80]	TTCCAGTCGTAATCATGGTCATAAAAGGGGTTGATCTACATA		DNA-PAINT docking site
20[111]18[112]	CACATTAAAATTGTTATCCGCTCATGCGGGCCTTGATCTACATA		DNA-PAINT docking site
20[175]18[176]	ATTATCATTCAATATAATCCTGACAATTACTTGATCTACATA		DNA-PAINT docking site
20[207]18[208]	GCGGAACATCTGAATAATGGAAGGTACAAAATTTGATCTACATA		DNA-PAINT docking site
20[239]18[240]	ATTTTAAAATCAAAATTATTTGCACGGATTCGTTGATCTACATA		DNA-PAINT docking site
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTACTTGATCTACATA		DNA-PAINT docking site
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAATTGATCTACATA		DNA-PAINT docking site
0[79]1[63]	ACAACTTTCAACAGTTTCAGCGGATGTATCGGTTGATCTACATA		DNA-PAINT docking site
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACTTTGATCTACATA		DNA-PAINT docking site
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAATTTGATCTACATA		DNA-PAINT docking site
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAATTTGATCTACATA		DNA-PAINT docking site
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCATTGATCTACATA		DNA-PAINT docking site
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACCTTGATCTACATA		DNA-PAINT docking site
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGTTTGATCTACATA		DNA-PAINT docking site
21[248]23[255]	AGATTAGAGCCGTCAAAAAACAGAGGTGAGGCCTATTAGTTTGATCTACATA		DNA-PAINT docking site
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGATTGATCTACATA		DNA-PAINT docking site
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTATTGATCTACATA		DNA-PAINT docking site
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAGTTGATCTACATA		DNA-PAINT docking site
4[63]6[56]	Biotin-ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5'-Biotin modification
4[127]6[120]	Biotin-TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5'-Biotin modification
4[191]6[184]	Biotin-CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5'-Biotin modification
4[255]6[248]	Biotin-AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5'-Biotin modification
18[63]20[56]	Biotin-ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5'-Biotin modification
18[127]20[120]	Biotin-GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5'-Biotin modification
18[191]20[184]	Biotin-ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5'-Biotin modification
18[255]20[248]	Biotin-AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5'-Biotin modification
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

Table S3 | Staple sequences for DNA origami structures for 10-"color" *in vitro* Exchange-PAINT demonstration (odd digits).

Position	Sequence	Color	Description (number)
0[111]1[95]	AAGGAATTGCGAATAATAATTTTTGTCGCTGA		5,9
0[143]1[127]	TCAGCGGAGTGAGAATAGAAAGGTTTTGCGG		5,9
0[175]0[144]	TATGGGATTTTGCTAAACAACTTTCAACAGTT		5,9
0[79]1[63]	GAAAATCTCCAAAAAAAAAGGCTCCAACCATCG		5,9
1[160]2[144]	GGTGTATCTTGATATAAGTATAGCGACAGCAT		5,9
2[47]0[48]	TACGAAGGCGCCGACAATGACAACAAAAGGAG		5,9
3[160]4[144]	AAAGCGCAAAATCCTCATTAAAGCGGTCAATC		5,9
5[160]6[144]	GCGTCAGAGCGACAGAATCAAGTTGTCAGGAC		5,9
7[160]8[144]	CGGAATAATATAAAAGAAACGCAAGGAATCGT		5,9
10[271]8[272]	AGAAACGATTTAAGAAAAGTAAGCGAGGAA		3,5,9
11[160]12[144]	TGCGGGAGGGCGTTTTAGCGAACCCAATAAAG		3,5,9
12[271]10[272]	AGAACAAGCCTAATTTGCCAGTTCCAAATA		3,5,9
13[160]14[144]	AATGCAGACGACAATAAACAACATGTCATTGC		3,5,9
14[271]12[272]	TATTTAACTGTCTTTCCTTATCACTCATCG		3,5,9
15[160]16[144]	TTGAAATAATCTTCTGACCTAAATCAACCCGT		3,5,9
16[271]14[272]	GGCTTAGGTTCTTACCAGTATAAATCGCCA		3,5,9
17[160]18[144]	GTGAGTGAGAAACAGTACATAAATGCAAGGCG		3,5,9
18[271]16[272]	TATTCATTTCAATAGTGAATTTAAACCTCC		3,5,9
19[160]20[144]	TATTTGCAGGTTAGAACCTACCATGGGAAACC		3,5,9
2[271]0[272]	TTCTGAAAAGCCCAATAGGAACCACAAACT		3,5,9
20[271]18[272]	CACCAGAACGGATTCGCCTGATTGGCGAAT		3,5,9
21[160]22[144]	CAACTAATCTAAAATATCTTTAGGGAGTCCAC		3,5,9
22[271]20[272]	AAAAATCTCGTTATTAATTTTAAAAGAAAC		3,5,9
4[271]2[272]	CCACCCTCGTAACAGTGCCCGTACCTATTA		3,5,9
6[271]4[272]	ATTTGGGACCGGAACCGCCTCCCAGAGCCA		3,5,9
8[271]6[272]	ACGCAATATATTGACGGAAATTATTGAGCC		3,5,9
9[160]10[144]	TTGAGCGCACCCTGAACAAAGTCAAGAGCTTA		3,5,9
0[47]1[31]	CCTTTAATTGTATCGGTTTATCATGATACCG		3,5,7,9
1[32]3[31]	ATAGTTGCACCAACCTAAAACGCTTTGACC		3,5,7,9
11[32]13[31]	TTTAGCTAACCCTCATATATTTGATTCAAA		3,5,7,9
13[32]15[31]	AGGGTGAGGAAGATTGTATAAGTTAAAATT		3,5,7,9
15[32]17[31]	CGCATTAGACGACAGTATCGGCGCACCGCT		3,5,7,9
17[32]19[31]	TCTGGTGTACCGAGCTCGAATTAATTGTTA		3,5,7,9
19[32]21[31]	TCCGCTCAGCTGATTGCCCTTCGTCCACGC		3,5,7,9
3[32]5[31]	CCCAGCGACCGGATATTCATTATGAATAAG		3,5,7,9
5[32]7[31]	GCTTGCCATGCAGATACATAACACACTATC		3,5,7,9
7[32]9[31]	ATAACCCAAGCAAAGCGGATTGTTCAAATA		3,5,7,9
9[32]11[31]	TCGCGTTAACGAGTAGATTTAGATAACCTG		3,5,7,9
21[120]23[127]	TAGGGTTGAGTGTTGAACGTGGACTCCAACGACCTGAA		1,3,7,9
21[56]23[63]	TCCTGTTTGATGGTGGACCATCACCCAAATCACGAGAAAG		1,3,7,9
21[96]23[95]	ATAAATCACCGTCTATCAGGGCGAGACATTCT		1,3,7,9

23[32]22[48]	ACGGGGAAAGCCGGCGAACGTGGAGTTTTTT		1,3,7,9
23[64]22[80]	GAAGGGAAACCAGTAATAAAAGGTGGCCCA		1,3,7,9
23[96]22[112]	GGCCAACAGAGATAGAACCCTTCTGTCAAAGG		1,3,7,9
21[184]23[191]	ATAGATAATACATTTGTCAACAGTTGAAAGGAGCGCGAAC		1,3,5,7,9
21[224]23[223]	CAAACAAACCCTCAATCAATATAAAAATAC		1,3,5,7,9
21[248]23[255]	AAATCCTTTGCCCGAAAAAGCATCACCTTGCTAAAACAGA		1,3,5,7,9
21[32]23[31]	TGGTTTGGGTGCCGTAAAGCACAGAGCTTG		1,3,5,7,9
23[128]23[159]	AGCGTAAGAATACGTGGCACAGACAATATTT		1,3,5,7,9
23[160]22[176]	TTGAATGGCTATTAGTCTTTAATATTGAGG		1,3,5,7,9
23[192]22[208]	TGATAGCCCTAAAACATCGCCATTCTGGTCAG		1,3,5,7,9
23[224]22[240]	CGAACGAACCACCAGCAGAAGATGAACCTCA		1,3,5,7,9
23[256]22[272]	GGTGAGGCGGTCAGTATTAACACGCAAATG		1,3,5,7,9
2[111]0[112]	TTGAGGACGGGAGTTAAAGGCCGCAACAACTA		9
2[79]0[80]	TTCCATTATAACCGATATATTCGTCACGTT		9
0[207]1[191]	TCTTTCCAGACGTTAGTAAATGAATTTAGTAC		Structure Staple
0[239]1[223]	ATAGTTAGCGTAACGATCTAAAGCAGAACCG		Structure Staple
0[271]1[255]	ACAACGCCTGTAGCATTCCACAGAATTTTCAG		Structure Staple
1[128]4[128]	GATCGTCGGGTAGCAACGGCTACCATGTTACTTAGCCACCGAAC		Structure Staple
1[192]4[192]	CGCCACCCAGTACCAGGCGGATAAGTTCCAGTAAGCGTCAAGACGATT		Structure Staple
1[224]3[223]	CCACCCTGAGAAGGATTAGGATATACAGGA		Structure Staple
1[256]4[256]	GGATAGCACATGAAAGTATTAAGAGGGGTCAGTGCCTTGAAGAGCCGC		Structure Staple
1[64]4[64]	CCCACGCAAACGGGTAAAATACGTAACAAAGTACAACGGAGCTGACCT		Structure Staple
1[96]3[95]	GGCTTGCATAAAGACTTTTTCATGCTGATAAA		Structure Staple
10[111]8[112]	TTTTAAATACCTTTAATTGCTCCTTCAAATGC		Structure Staple
10[143]9[159]	ATTGCTGATTTTTGCGGATGGCTTGAGGGTAA		Structure Staple
10[175]8[176]	AACTGAACTAATATCAGAGAGATATAAAGG		Structure Staple
10[207]8[208]	AAAACAGGGTTAAGCCCAATAATAGCAGTATG		Structure Staple
10[239]8[240]	AAATAGCAGAAATAGCAATAGCTAAAGAACTG		Structure Staple
10[47]8[48]	ATTCTGCGTTAATTCGAGCTTCAATGACTATT		Structure Staple
10[79]8[80]	GAAGTTTCAGCAAACTCCAACAGTGACCAT		Structure Staple
11[128]13[127]	GGCAAAGCATAAAGCTAAATCGCTATTTTT		Structure Staple
11[192]13[191]	TAGTTGCTAGAAGGCTTATCCGGTAACAATAG		Structure Staple
11[224]13[223]	TCCTGAATACCGCGCCCAATAGTATCCCAT		Structure Staple
11[256]13[255]	TTCCAGAGCAAGCCGTTTTTATTTCCAATCAA		Structure Staple
11[64]13[63]	GAAAAGGTCTTTATTTCAACGCAATCAAATCA		Structure Staple
11[96]13[95]	TAGCATTATATGACCCTGTAATACTCTAGCTG		Structure Staple
12[111]10[112]	AAAAACATACATCCAATAAATCATTCAACATG		Structure Staple
12[143]11[159]	CCTCAGAGAATTAGCAAAATTAAGTCCCGACT		Structure Staple
12[175]10[176]	GAACGCGAGTTTTGAAGCCTTAAGAGAATT		Structure Staple
12[207]10[208]	TCAGATATATTTTGCACCCAGCTAATAACATA		Structure Staple
12[239]10[240]	GGAATCATTCTTACCAACGCTAACAAAAATGA		Structure Staple
12[47]10[48]	ATTTTTAGATATTTTCATTTGGGGGATTCCCA		Structure Staple
12[79]10[80]	GGAGAAGCGGCATCAATTCTACTGTGTCTG		Structure Staple

13[128]15[127]	GAGAGATCTGGAGCAAACAAGAGCTTTCAT		Structure Staple
13[192]15[191]	ATAAGTCCGACAAAAGGTAAAGTAATAAGGCG		Structure Staple
13[224]15[223]	CCTAATTTCGAGCCAGTAATAACATAATTA		Structure Staple
13[256]15[255]	TAATCGGCAACGCCAACATGTAATATATGCGT		Structure Staple
13[64]15[63]	CCATCAATCCCGGTTGATAATCAGGCTCATTT		Structure Staple
13[96]15[95]	ATAAATTAATCGTAAAACTAGCATAAAATAAT		Structure Staple
14[111]12[112]	GAACGGTAATGCCGGAGAGGGTAGGTTGTACC		Structure Staple
14[143]13[159]	CTGAGAGTCTACAAAGGCTATCAGGTTCAGCT		Structure Staple
14[175]12[176]	CCAGACGAACGCGCCTGTTTATCATTCTAA		Structure Staple
14[207]12[208]	AAAGTACCTGAACAAGAAAAATAACAAGCAAA		Structure Staple
14[239]12[240]	AGGCATTTTACGAGCATGTAGAAATCATCGTA		Structure Staple
14[47]12[48]	CAAAAACAGAAAGGCCGGAGACAGGGATAAAA		Structure Staple
14[79]12[80]	ATATGTACATGATATTCAACCGTTTTTGCG		Structure Staple
15[128]18[128]	CAACATTCCGTGGGAACAAACGATTACGCCAGCTGGCGGGTAAC		Structure Staple
15[192]18[192]	TTAAATAAAAACTTTTTCAAATATTAAATCGTCGCTATTAAACAATTT		Structure Staple
15[224]17[223]	CTAGAAACAAATCCAATCGCAAAATCCTTG		Structure Staple
15[256]18[256]	TATACAAATTGGGTTATATAACTAAAGACGCTGAGAAGAGTCAATTAC		Structure Staple
15[64]18[64]	TTTAACCATCGTAACCGTGCATCTGCGCCATTCGCCATTCTGCCTGCA		Structure Staple
15[96]17[95]	TCGCGTCTGGGATAGGTCACGTTGTGGGAAGG		Structure Staple
16[111]14[112]	ACCGTAATGGCCTTCCTGTAGCCAGAATCGAT		Structure Staple
16[143]15[159]	CGGATTCTAAATGTGAGCGAGTAATTAATGGT		Structure Staple
16[175]14[176]	TTAATTTCCCGACCGTGTGATAAATTCTGT		Structure Staple
16[207]14[208]	ACGCGAGAGAATAAACACCGGAATGAGAATAT		Structure Staple
16[239]14[240]	TGCTGATGAAGCCTGTTTAGTATCTTAGGCAG		Structure Staple
16[47]14[48]	GAGGGGACAATTTTTGTTAAATCAAAAAGCCC		Structure Staple
16[79]14[80]	TGGGCGCAATAGGAACGCCATCAGTCAATC		Structure Staple
17[224]19[223]	AAAACATAAACATCAAGAAAACAGATGAAT		Structure Staple
17[96]19[95]	GCGATCGGTTGTAAAACGACGGCCGGGTGCCT		Structure Staple
18[111]16[112]	TCACGACGTGCGGGCCTCTTCGCTGCGGATTG		Structure Staple
18[143]17[159]	ATTAAGTTGAAAGGGGGATGTGCTCAATATAT		Structure Staple
18[175]16[176]	TTTTAATGATAACCTTGCTTCTGATTTTAG		Structure Staple
18[207]16[208]	TTACATTTATTAATTTTCCCTTAGGACAAAGA		Structure Staple
18[239]16[240]	GATGAAACAGCGATAGCTTAGATTTATGTAAA		Structure Staple
18[47]16[48]	TCCCCGGGCCGGAAACCAGGCAAAGCCAGTTT		Structure Staple
18[79]16[80]	AGCTTGCAAGGCTGCGCAACTGTGTGTAGA		Structure Staple
19[224]21[223]	ATACAGTAGATGATGGCAATTCAGACTTTA		Structure Staple
19[96]21[95]	AATGAGTGGGAGAGGCGGTTTGCGAATCCCTT		Structure Staple
2[143]1[159]	CGGAACGAACCCTCAGCAGCGAAACCGGAATA		Structure Staple
2[175]0[176]	CGAGAGGGACCGTACTCAGGAGGTTTTCTG		Structure Staple
2[207]0[208]	TTTTGCTCTCAGAACCGCCACCCTTTTTGTCG		Structure Staple
2[239]0[240]	CTCCTCAACAGAGCCACCACCCTCCAGCCCTC		Structure Staple
20[111]18[112]	ACGCGCGGAGCTAACTCACATTAATTTCCCAG		Structure Staple
20[143]19[159]	TGTCGTGCTGCCCGCTTTCCAGTCATCAAAAT		Structure Staple
20[175]18[176]	AATGGAAGCGTAAAACAGAAATATTACCTT		Structure Staple

20[207]18[208]	AATCCTGATTTCAGGTTTAACGTCAAAATTAA		Structure Staple
20[239]18[240]	TGATTATCAACAGTACCTTTTACAAAGAAGAT		Structure Staple
20[47]18[48]	CGGGCAACACAATTCCACACAACACTAGAGGA		Structure Staple
20[79]18[80]	CGCCAGGGAAAGTGTAAAGCCTGAGTGCCA		Structure Staple
22[111]20[112]	GCGAAAAAAAAGAATAGCCCGAGAATCGGCCA		Structure Staple
22[143]21[159]	TATTAAAGTTCCAGTTTGGAACAAAGCACTAA		Structure Staple
22[175]20[176]	AAGGTTATAGATTAGAGCCGTCATCTGAAT		Structure Staple
22[207]20[208]	TTGGCAAAAGGATTTAGAAGTATTATCAATAT		Structure Staple
22[239]20[240]	AATATCAATTCGACAACTCGTATTCATATTCC		Structure Staple
22[47]20[48]	GGGGTCGACCCCAGCAGGCGAAAACAGTGAGA		Structure Staple
22[79]20[80]	CTACGTGATTCCGAAATCGGCAATATTGGG		Structure Staple
3[224]5[223]	GTGTACTCGCCAGCATTGACAGCGTTTGCC		Structure Staple
3[96]5[95]	TTGTGTCGTGAACGGTGTACAGACTAATTTCA		Structure Staple
4[111]2[112]	AGGACAGAAAATCCGCGACCTGCTCAGAGGCT		Structure Staple
4[143]3[159]	ATAAGGGAGGAACGAGGCGCAGACCAGAATGG		Structure Staple
4[175]2[176]	AAACAAATGTCTCTGAATTTACCGTGCCGT		Structure Staple
4[207]2[208]	GGCAGGTCTACATGGCTTTTGATGTAGCGGGG		Structure Staple
4[239]2[240]	AGAGCCGCGGTAATAAGTTTTAACGGCTGAGA		Structure Staple
4[47]2[48]	TGACAAGAATTATACCAAGCGCGAAATGCCAC		Structure Staple
4[79]2[80]	ATAGGCTGGATTTGTATCATCGCAGGAAGT		Structure Staple
5[224]7[223]	ATCTTTTTACCATTAGCAAGGCCAAAGACA		Structure Staple
5[96]7[95]	ACTTTAATGAACAACATTATTACAAAAAGAAG		Structure Staple
6[111]4[112]	AACTAACGCATTGTGAATTACCTTTTTGAAAG		Structure Staple
6[143]5[159]	GTTGGGAACTGGCTCATTATACCATGCCTTTA		Structure Staple
6[175]4[176]	AATCAGTACTGTAGCGCGTTTTCTATTCAC		Structure Staple
6[207]4[208]	TCACCAATATAGCCCCCTTATTAGGAGGTTGA		Structure Staple
6[239]4[240]	AGCACCATCATAATCAAAATCACCCCACCACC		Structure Staple
6[47]4[48]	TTCAACTACTGACGAGAAACACCAAGTAATCT		Structure Staple
6[79]4[80]	AGATTCATGGGCTTGAGATGGTTCAGGCGC		Structure Staple
7[120]9[127]	AATGTTTAGACTGGATTCATTGAATCCCCCTTTGATAA		Structure Staple
7[184]9[191]	ATCAATAGAAAATTCACGTAGAAAATACATACAACCCACA		Structure Staple
7[224]9[223]	AAAGGGCAAGACTCCTTATTACAGAGCAAG		Structure Staple
7[248]9[255]	AGGGAGGGAAGGTAAAATAACGGAATACCCAATCTTACCG		Structure Staple
7[56]9[63]	GATAAAAACCAAAATAAATCAGGTCTTTACCCAGCGAACC		Structure Staple
7[96]9[95]	TTTTGCCAGTTCAGAAAACGAGAAGTCAGGAT		Structure Staple
8[111]6[112]	TTTAAACAGAGGGGGTAATAGTAAATAAAACG		Structure Staple
8[143]7[159]	CATAAATATAGCGTCCAATACTGCAGACACCA		Structure Staple
8[175]6[176]	TGGCAACAGTTTATTTTGTCACAGCACCGT		Structure Staple
8[207]6[208]	TTAGCAAATATGGTTTACCAGCGCCGGAAACG		Structure Staple
8[239]6[240]	GCATGATTGACATTCAACCGATTGTCACCAGT		Structure Staple
8[47]6[48]	ATAGTCAGTCGTTTACCAGACGACATACCACA		Structure Staple
8[79]6[80]	AAATCAAAGCGAGAGGCTTTTGCGGTAGAA		Structure Staple
9[128]11[127]	GAGGTCAATATAATGCTGTAGCACAGGCAA		Structure Staple
9[192]11[191]	AGAATTGAGAAGCGCATTAGACGGATCAAGAT		Structure Staple

9[224]11[223]	AAACAATGCCTTTACAGAGAGACAATTTTA		Structure Staple
9[256]11[255]	AAGCCCTTTTTTTTGTTTAACGTCGAGCGTCT		Structure Staple
9[64]11[63]	AGACCGGAATTCCATATAACAGTTCGCGAGCT		Structure Staple
9[96]11[95]	TAGAGAGTATGCAACTAAAGTACGAATAGTAG		Structure Staple
4[63]6[56]	Biotin-ATAAGGGAACCGGATATTCATTACGTCAGGACGTTGGGAA		5'-Biotin
4[127]6[120]	Biotin-TTGTGTCGTGACGAGAAACACCAAATTTCAACTTTAAT		5'-Biotin
4[191]6[184]	Biotin-CACCCTCAGAAACCATCGATAGCATTGAGCCATTTGGGAA		5'-Biotin
4[255]6[248]	Biotin-AGCCACCACTGTAGCGCGTTTTCAAGGGAGGGAAGGTAAA		5'-Biotin
18[63]20[56]	Biotin-ATTAAGTTTACCGAGCTCGAATTCGGGAAACCTGTCGTGC		5'-Biotin
18[127]20[120]	Biotin-GCGATCGGCAATTCCACACAACAGGTGCCTAATGAGTG		5'-Biotin
18[191]20[184]	Biotin-ATTCATTTTTGTTTGGATTATACTAAGAAACCACCAGAAG		5'-Biotin
18[255]20[248]	Biotin-AACAATAACGTAAAACAGAAATAAAAATCCTTTGCCCGAA		5'-Biotin

Table S4 | Staple sequences for DNA origami structures for 10-"color" *in vitro* Exchange-PAINT demonstration (even digits).

Position	Sequence	Color	Description (number)
1[160]2[144]	GGTGTATCTTGATATAAGTATAGCGACAGCAT		2,4,6,8
11[160]12[144]	TGCGGGAGGGCGTTTTAGCGAACCCAATAAAG		2,4,6,8
13[160]14[144]	AATGCAGACGACAATAAACAACATGTCATTGC		2,4,6,8
15[160]16[144]	TTGAAATAATCTTCTGACCTAAATCAACCCGT		2,4,6,8
17[160]18[144]	GTGAGTGAGAAACAGTACATAAATGCAAGGCG		2,4,6,8
19[160]20[144]	TATTTGCAGGTTAGAACCTACCATGGGAAACC		2,4,6,8
21[160]22[144]	CAACTAATCTAAAATATCTTTAGGGAGTCCAC		2,4,6,8
3[160]4[144]	AAAGCGCAAAATCCTCATTAAAGCGGTCAATC		2,4,6,8
5[160]6[144]	GCGTCAGAGCGACAGAATCAAGTTGTCAGGAC		2,4,6,8
7[160]8[144]	CGGAATAATATAAAAGAAACGCAAGGAATCGT		2,4,6,8
9[160]10[144]	TTGAGCGCACCCTGAACAAAGTCAAGAGCTTA		2,4,6,8
21[224]23[223]	CAAACAAACCCTCAATCAATATAAAAATAC		0,4,8
21[248]23[255]	AAATCCTTTGCCCGAAAAAGCATCACCTTGCTAAAACAGA		0,4,8
0[111]1[95]	AAGGAATTGCGAATAATAATTTTTGTCGCTGA		0,4,6,8
0[143]1[127]	TCAGCGGAGTGAGAATAGAAAGGTTTTGCGG		0,4,6,8
0[79]1[63]	GAAAATCTCCAAAAAAAAGGCTCCAACCATCG		0,4,6,8
2[111]0[112]	TTGAGGACGGGAGTTAAAGGCCGCAACAACTA		0,4,6,8
2[47]0[48]	TACGAAGGCGCCGACAATGACAACAAAAGGAG		0,4,6,8
2[79]0[80]	TTCCATTATAACCGATATATTCGTCACGTT		0,4,6,8
21[184]23[191]	ATAGATAATACATTTGTCAACAGTTGAAAGGAGCGCGAAC		0,4,6,8
23[160]22[176]	TTGAATGGCTATTAGTCTTTAATATTGAGG		0,4,6,8
23[192]22[208]	TGATAGCCCTAAAACATCGCCATTCTGGTCAG		0,4,6,8
23[224]22[240]	CGAACGAACCACCAGCAGAAGATGAACCTCA		0,4,6,8
1[32]3[31]	ATAGTTGCACCAACCTAAAACGCTTTGACC		0,2,8
11[32]13[31]	TTTAGCTAACCCTCATATATTTGATTCAAA		0,2,8
13[32]15[31]	AGGGTGAGGAAGATTGTATAAGTTAAAATT		0,2,8

15[32]17[31]	CGCATTAGACGACAGTATCGGCGCACCGCT		0,2,8
17[32]19[31]	TCTGGTGTACCGAGCTCGAATTAATTGTTA		0,2,8
19[32]21[31]	TCCGCTCAGCTGATTGCCCTTCGTCCACGC		0,2,8
3[32]5[31]	CCCAGCGACCGGATATTCATTATGAATAAG		0,2,8
5[32]7[31]	GCTTGCCATGCAGATACATAACACACTATC		0,2,8
7[32]9[31]	ATAACCCAAGCAAAGCGGATTGTTCAAATA		0,2,8
9[32]11[31]	TCGCGTTAACGAGTAGATTTAGATAACCTG		0,2,8
0[207]1[191]	TCTTTCCAGACGTTAGTAAATGAATTTAGTAC		0,2,6,8
0[239]1[223]	ATAGTTAGCGTAACGATCTAAAGCAGAACCG		0,2,6,8
0[271]1[255]	ACAACGCCTGTAGCATTCCACAGAATTTTCAG		0,2,6,8
10[271]8[272]	AGAAACGATTTAAGAAAAGTAAGCGAGGAA		0,2,6,8
12[271]10[272]	AGAACAAGCCTAATTTGCCAGTTCCAAATA		0,2,6,8
14[271]12[272]	TATTTAACTGTCTTTCCTTATCACTCATCG		0,2,6,8
16[271]14[272]	GGCTTAGGTTCTTACCAGTATAAATCGCCA		0,2,6,8
18[271]16[272]	TATTCATTTCAATAGTGAATTTAAACCTCC		0,2,6,8
2[175]0[176]	CGAGAGGGACCGTACTCAGGAGGTTTTCTG		0,2,6,8
2[207]0[208]	TTTTGCTCTCAGAACCGCCACCCTTTTTGTCG		0,2,6,8
2[239]0[240]	CTCCTCAACAGAGCCACCACCCTCCAGCCCTC		0,2,6,8
2[271]0[272]	TTCTGAAAAGCCCAATAGGAACCACAAACT		0,2,6,8
20[271]18[272]	CACCAGAACGGATTCGCCTGATTGGCGAAT		0,2,6,8
22[271]20[272]	AAAAATCTCGTTATTAATTTTAAAAGAAAC		0,2,6,8
4[271]2[272]	CCACCCTCGTAACAGTGCCCGTACCTATTA		0,2,6,8
6[271]4[272]	ATTTGGGACCGGAACCGCCTCCCAGAGCCA		0,2,6,8
8[271]6[272]	ACGCAATATATTGACGGAAATTATTGAGCC		0,2,6,8
21[32]23[31]	TGGTTTGGGTGCCGTAAAGCACAGAGCTTG		0,2,4,8
21[56]23[63]	TCCTGTTTGATGGTGGACCATCACCCAAATCACGAGAAAG		0,2,4,8
21[96]23[95]	ATAAATCACCGTCTATCAGGGCGAGACATTCT		0,2,4,8
23[32]22[48]	ACGGGGAAAGCCGGCGAACGTGGAGTTTTTT		0,2,4,8
23[64]22[80]	GAAGGGAAACCAGTAATAAAAGGTGGCCCA		0,2,4,8
23[96]22[112]	GGCCAACAGAGATAGAACCCTTCTGTCAAAGG		0,2,4,8
0[175]0[144]	TATGGGATTTTGCTAAACAACTTTCAACAGTT		0,2,4,6,8
0[47]1[31]	CCTTTAATTGTATCGGTTTATCATGATACCG		0,2,4,6,8
23[128]23[159]	AGCGTAAGAATACGTGGCACAGACAATATTT		0,2,4,6,8
23[256]22[272]	GGTGAGGCGGTCAGTATTAACACGCAAATG		0,2,4,6,8
21[120]23[127]	TAGGGTTGAGTGTTGAACGTGGACTCCAACGACCTGAA		0,2,4
1[128]4[128]	GATCGTCGGGTAGCAACGGCTACCATGTTACTTAGCCACCGAAC		Structure Staple
1[192]4[192]	CGCCACCCAGTACCAGGCGGATAAGTTCCAGTAAGCGTCAAGACGATT		Structure Staple
1[224]3[223]	CCACCCTGAGAAGGATTAGGATATACAGGA		Structure Staple
1[256]4[256]	GGATAGCACATGAAAGTATTAAGAGGGGTCAGTGCCTTGAAGAGCCGC		Structure Staple
1[64]4[64]	CCCACGCAAACGGGTAAAATACGTAACAAAGTACAACGGAGCTGACCT		Structure Staple
1[96]3[95]	GGCTTGCATAAAGACTTTTTCATGCTGATAAA		Structure Staple
10[111]8[112]	TTTTAAATACCTTTAATTGCTCCTTCAAATGC		Structure Staple
10[143]9[159]	ATTGCTGATTTTTGCGGATGGCTTGAGGGTAA		Structure Staple

10[175]8[176]	AACTGAACTAATATCAGAGAGATATAAAGG		Structure Staple
10[207]8[208]	AAAACAGGGTTAAGCCCAATAATAGCAGTATG		Structure Staple
10[239]8[240]	AAATAGCAGAAATAGCAATAGCTAAAGAACTG		Structure Staple
10[47]8[48]	ATTCTGCGTTAATTCGAGCTTCAATGACTATT		Structure Staple
10[79]8[80]	GAAGTTTCAGCAAACTCCAACAGTGACCAT		Structure Staple
11[128]13[127]	GGCAAAGCATAAAGCTAAATCGCTATTTTT		Structure Staple
11[192]13[191]	TAGTTGCTAGAAGGCTTATCCGGTAACAATAG		Structure Staple
11[224]13[223]	TCCTGAATACCGCGCCCAATAGTATCCCAT		Structure Staple
11[256]13[255]	TTCCAGAGCAAGCCGTTTTTATTTCCAATCAA		Structure Staple
11[64]13[63]	GAAAAGGTCTTTATTTCAACGCAATCAAATCA		Structure Staple
11[96]13[95]	TAGCATTATATGACCCTGTAATACTCTAGCTG		Structure Staple
12[111]10[112]	AAAAACATACATCCAATAAATCATTCAACATG		Structure Staple
12[143]11[159]	CCTCAGAGAATTAGCAAAATTAAGTCCCGACT		Structure Staple
12[175]10[176]	GAACGCGAGTTTTGAAGCCTTAAGAGAATT		Structure Staple
12[207]10[208]	TCAGATATATTTTGCACCCAGCTAATAACATA		Structure Staple
12[239]10[240]	GGAATCATTCTTACCAACGCTAACAAAAATGA		Structure Staple
12[47]10[48]	ATTTTTAGATATTTTCATTTGGGGGATTCCCA		Structure Staple
12[79]10[80]	GGAGAAGCGGCATCAATTCTACTGTGTCTG		Structure Staple
13[128]15[127]	GAGAGATCTGGAGCAAACAAGAGCTTTCAT		Structure Staple
13[192]15[191]	ATAAGTCCGACAAAAGGTAAAGTAATAAGGCG		Structure Staple
13[224]15[223]	CCTAATTTCGAGCCAGTAATAACATAATTA		Structure Staple
13[256]15[255]	TAATCGGCAACGCCAACATGTAATATATGCGT		Structure Staple
13[64]15[63]	CCATCAATCCCGGTTGATAATCAGGCTCATTT		Structure Staple
13[96]15[95]	ATAAATTAATCGTAAAACTAGCATAAAATAAT		Structure Staple
14[111]12[112]	GAACGGTAATGCCGGAGAGGGTAGGTTGTACC		Structure Staple
14[143]13[159]	CTGAGAGTCTACAAAGGCTATCAGGTTCAGCT		Structure Staple
14[175]12[176]	CCAGACGAACGCGCCTGTTTATCATTCTAA		Structure Staple
14[207]12[208]	AAAGTACCTGAACAAGAAAAATAACAAGCAAA		Structure Staple
14[239]12[240]	AGGCATTTTACGAGCATGTAGAAATCATCGTA		Structure Staple
14[47]12[48]	CAAAAACAGAAAGGCCGGAGACAGGGATAAAA		Structure Staple
14[79]12[80]	ATATGTACATGATATTCAACCGTTTTTGCG		Structure Staple
15[128]18[128]	CAACATTCCGTGGGAACAAACGATTACGCCAGCTGGCGGGTAAC		Structure Staple
15[192]18[192]	TTAAATAAAAACTTTTTCAAATATTAAATCGTCGCTATTAAACAATTT		Structure Staple
15[224]17[223]	CTAGAAACAAATCCAATCGCAAAATCCTTG		Structure Staple
15[256]18[256]	TATACAAATTGGGTTATATAACTAAAGACGCTGAGAAGAGTCAATTAC		Structure Staple
15[64]18[64]	TTTAACCATCGTAACCGTGCATCTGCGCCATTCGCCATTCTGCCTGCA		Structure Staple
15[96]17[95]	TCGCGTCTGGGATAGGTCACGTTGTGGGAAGG		Structure Staple
16[111]14[112]	ACCGTAATGGCCTTCCTGTAGCCAGAATCGAT		Structure Staple
16[143]15[159]	CGGATTCTAAATGTGAGCGAGTAATTAATGGT		Structure Staple
16[175]14[176]	TTAATTTCCCGACCGTGTGATAAATTCTGT		Structure Staple
16[207]14[208]	ACGCGAGAGAATAAACACCGGAATGAGAATAT		Structure Staple
16[239]14[240]	TGCTGATGAAGCCTGTTTAGTATCTTAGGCAG		Structure Staple
16[47]14[48]	GAGGGGACAATTTTTGTTAAATCAAAAAGCCC		Structure Staple
16[79]14[80]	TGGGCGCAATAGGAACGCCATCAGTCAATC		Structure Staple

17[224]19[223]	AAAACATAAACATCAAGAAAACAGATGAAT		Structure Staple
17[96]19[95]	GCGATCGGTTGTAAAACGACGGCCGGGTGCCT		Structure Staple
18[111]16[112]	TCACGACGTGCGGGCCTCTTCGCTGCGGATTG		Structure Staple
18[143]17[159]	ATTAAGTTGAAAGGGGGATGTGCTCAATATAT		Structure Staple
18[175]16[176]	TTTTAATGATAACCTTGCTTCTGATTTTAG		Structure Staple
18[207]16[208]	TTACATTTATTAATTTTCCCTTAGGACAAAGA		Structure Staple
18[239]16[240]	GATGAAACAGCGATAGCTTAGATTTATGTAAA		Structure Staple
18[47]16[48]	TCCCCGGGCCGGAAACCAGGCAAAGCCAGTTT		Structure Staple
18[79]16[80]	AGCTTGCAAGGCTGCGCAACTGTGTGTAGA		Structure Staple
19[224]21[223]	ATACAGTAGATGATGGCAATTCAGACTTTA		Structure Staple
19[96]21[95]	AATGAGTGGGAGAGGCGGTTTGCGAATCCCTT		Structure Staple
2[143]1[159]	CGGAACGAACCCTCAGCAGCGAAACCGGAATA		Structure Staple
20[111]18[112]	ACGCGCGGAGCTAACTCACATTAATTTCCCAG		Structure Staple
20[143]19[159]	TGTCGTGCTGCCCGCTTTCCAGTCATCAAAAT		Structure Staple
20[175]18[176]	AATGGAAGCGTAAAACAGAAATATTACCTT		Structure Staple
20[207]18[208]	AATCCTGATTTCAGGTTTAACGTCAAAATTAA		Structure Staple
20[239]18[240]	TGATTATCAACAGTACCTTTTACAAAGAAGAT		Structure Staple
20[47]18[48]	CGGGCAACACAATTCCACACAACACTAGAGGA		Structure Staple
20[79]18[80]	CGCCAGGGAAAGTGTAAAGCCTGAGTGCCA		Structure Staple
22[111]20[112]	GCGAAAAAAAAGAATAGCCCGAGAATCGGCCA		Structure Staple
22[143]21[159]	TATTAAAGTTCCAGTTTGGAACAAAGCACTAA		Structure Staple
22[175]20[176]	AAGGTTATAGATTAGAGCCGTCATCTGAAT		Structure Staple
22[207]20[208]	TTGGCAAAAGGATTTAGAAGTATTATCAATAT		Structure Staple
22[239]20[240]	AATATCAATTCGACAACTCGTATTCATATTCC		Structure Staple
22[47]20[48]	GGGGTCGACCCCAGCAGGCGAAAACAGTGAGA		Structure Staple
22[79]20[80]	CTACGTGATTCCGAAATCGGCAATATTGGG		Structure Staple
3[224]5[223]	GTGTACTCGCCAGCATTGACAGCGTTTGCC		Structure Staple
3[96]5[95]	TTGTGTCGTGAACGGTGTACAGACTAATTTCA		Structure Staple
4[111]2[112]	AGGACAGAAAATCCGCGACCTGCTCAGAGGCT		Structure Staple
4[143]3[159]	ATAAGGGAGGAACGAGGCGCAGACCAGAATGG		Structure Staple
4[175]2[176]	AAACAAATGTCTCTGAATTTACCGTGCCGT		Structure Staple
4[207]2[208]	GGCAGGTCTACATGGCTTTTGATGTAGCGGGG		Structure Staple
4[239]2[240]	AGAGCCGCGGTAATAAGTTTTAACGGCTGAGA		Structure Staple
4[47]2[48]	TGACAAGAATTATACCAAGCGCGAAATGCCAC		Structure Staple
4[79]2[80]	ATAGGCTGGATTTGTATCATCGCAGGAAGT		Structure Staple
5[224]7[223]	ATCTTTTTACCATTAGCAAGGCCAAAGACA		Structure Staple
5[96]7[95]	ACTTTAATGAACAACATTATTACAAAAAGAAG		Structure Staple
6[111]4[112]	AACTAACGCATTGTGAATTACCTTTTTGAAAG		Structure Staple
6[143]5[159]	GTTGGGAACTGGCTCATTATACCATGCCTTTA		Structure Staple
6[175]4[176]	AATCAGTACTGTAGCGCGTTTTCTATTCAC		Structure Staple
6[207]4[208]	TCACCAATATAGCCCCCTTATTAGGAGGTTGA		Structure Staple
6[239]4[240]	AGCACCATCATAATCAAAATCACCCCACCACC		Structure Staple
6[47]4[48]	TTCAACTACTGACGAGAAACACCAAGTAATCT		Structure Staple
6[79]4[80]	AGATTCATGGGCTTGAGATGGTTCAGGCGC		Structure Staple

7[120]9[127]	AATGTTTAGACTGGATTCATTGAATCCCCCTTTGATAA		Structure Staple
7[184]9[191]	ATCAATAGAAAATTCACGTAGAAAATACATACAACCCACA		Structure Staple
7[224]9[223]	AAAGGGCAAGACTCCTTATTACAGAGCAAG		Structure Staple
7[248]9[255]	AGGGAGGGAAGGTAAAATAACGGAATACCCAATCTTACCG		Structure Staple
7[56]9[63]	GATAAAAACCAAAATAAATCAGGTCTTTACCCAGCGAACC		Structure Staple
7[96]9[95]	TTTTGCCAGTTCAGAAAACGAGAAGTCAGGAT		Structure Staple
8[111]6[112]	TTTAAACAGAGGGGGTAATAGTAAATAAAACG		Structure Staple
8[143]7[159]	CATAAATATAGCGTCCAATACTGCAGACACCA		Structure Staple
8[175]6[176]	TGGCAACAGTTTATTTTGTCACAGCACCGT		Structure Staple
8[207]6[208]	TTAGCAAATATGGTTTACCAGCGCCGGAAACG		Structure Staple
8[239]6[240]	GCATGATTGACATTCAACCGATTGTCACCAGT		Structure Staple
8[47]6[48]	ATAGTCAGTCGTTTACCAGACGACATACCACA		Structure Staple
8[79]6[80]	AAATCAAAGCGAGAGGCTTTTGCGGTAGAA		Structure Staple
9[128]11[127]	GAGGTCAATATAATGCTGTAGCACAGGCAA		Structure Staple
9[192]11[191]	AGAATTGAGAAGCGCATTAGACGGATCAAGAT		Structure Staple
9[224]11[223]	AAACAATGCCTTTACAGAGAGACAATTTTA		Structure Staple
9[256]11[255]	AAGCCCTTTTTTTTGTTTAACGTCGAGCGTCT		Structure Staple
9[64]11[63]	AGACCGGAATTCCATATAACAGTTCGCGAGCT		Structure Staple
9[96]11[95]	TAGAGAGTATGCAACTAAAGTACGAATAGTAG		Structure Staple
4[63]6[56]	Biotin-TCATCAAGGAACGAGTAGTAAATTCAGTTGAGATTTAGGA		5'-Biotin
4[255]6[248]	Biotin-CACCAGAAGGAACCAGAGCCACCAATTAGAGCCAGCAAAA		5'-Biotin
4[191]6[184]	Biotin-GGCCTTGAATCGGCATTTTCGGTCGAAACCATCGATAGCA		5'-Biotin
4[127]6[120]	Biotin-TGACCAACATGCGATTTTAAGAAGAAAAATCTACGTTA		5'-Biotin
18[63]20[56]	Biotin-GGTCGACTTACGAGCCGGAAGCATTGGTTTTTCTTTTCAC		5'-Biotin
18[255]20[248]	Biotin-CTGAGCAATCGGGAGAAACAATAAGGAGCGGAATTATCAT		5'-Biotin
18[191]20[184]	Biotin-CATTTGAAAAGAAATTGCGTAGATTTGTTTGGATTATACT		5'-Biotin
18[127]20[120]	Biotin-GCCAGGGTTTGCGTTGCGCTCACCAGCTGCATTAATGA		5'-Biotin

Table S5 | Staple sequences for DNA origami structures for *in vitro* Exchange-PAINT demonstration (digits 0 to 3). (Only modified strands are listed)

Position	Sequence	Color	Description (number)
2[47]0[48]	ACGGCTACAAAAGGAGCCTTTAATGTGAGAATTTATACATCTA		0
2[79]0[80]	CAGCGAAACTTGCTTTCGAGGTGTTGCTAATTATACATCTA		0
2[111]0[112]	AAGGCCGCTGATACCGATAGTTGCGACGTTAGTTATACATCTA		0
2[143]1[159]	ATATTCGGAACCATCGCCCACGCAGAGAAGGATTATACATCTA		0
2[175]0[176]	TATTAAGAAGCGGGGTTTTGCTCGTAGCATTTATACATCTA		0
2[207]0[208]	TTTCGGAAGTGCCGTCGAGAGGGTGAGTTTCGTTATACATCTA		0
2[239]0[240]	GCCCGTATCCGGAATAGGTGTATCAGCCCAATTTATACATCTA		0
6[47]4[48]	TACGTTAAAGTAATCTTGACAAGAACCGAACTTTATACATCTA		0
6[239]4[240]	GAAATTATTGCCTTTAGCGTCAGACCGGAACCTTATACATCTA		0
10[47]8[48]	CTGTAGCTTGACTATTATAGTCAGTTCATTGATTATACATCTA		0
10[239]8[240]	GCCAGTTAGAGGGTAATTGAGCGCTTTAAGAATTATACATCTA		0
14[47]12[48]	AACAAGAGGGATAAAAATTTTTAGCATAAAGCTTATACATCTA		0
14[239]12[240]	AGTATAAAGTTCAGCTAATGCAGATGTCTTTCTTATACATCTA		0
18[47]16[48]	CCAGGGTTGCCAGTTTGAGGGGACCCGTGGGATTATACATCTA		0
18[239]16[240]	CCTGATTGCAATATATGTGAGTGATCAATAGTTTATACATCTA		0
22[47]20[48]	CTCCAACGCAGTGAGACGGGCAACCAGCTGCATTATACATCTA		0
22[79]20[80]	TGGAACAACCGCCTGGCCCTGAGGCCCGCTTTATACATCTA		0
22[111]20[112]	GCCCGAGAGTCCACGCTGGTTTGCAGCTAACTTTATACATCTA		0
22[143]21[159]	TCGGCAAATCCTGTTTGATGGTGGACCCTCAATTATACATCTA		0
22[175]20[176]	ACCTTGCTTGGTCAGTTGGCAAAGAGCGGATTATACATCTA		0
22[207]20[208]	AGCCAGCAATTGAGGAAGGTTATCATCATTTTTTATACATCTA		0
22[239]20[240]	TTAACACCAGCACTAACAACTAATCGTTATTATTATACATCTA		0
9[64]11[63]	CGGATTGCAGAGCTTAATTGCTGAAACGAGTATTATCTACATA		1
9[96]11[95]	CGAAAGACTTTGATAAGAGGTCATATTTCGCATTATCTACATA		1
9[128]11[127]	GCTTCAATCAGGATTAGAGAGTTATTTTCATTATCTACATA		1
9[192]11[191]	TTAGACGGCCAAATAAGAAACGATAGAAGGCTTTATCTACATA		1
9[224]11[223]	AAAGTCACAAAATAAACAGCCAGCGTTTTATTATCTACATA		1
9[256]11[255]	GAGAGATAGAGCGTCTTTCCAGAGGTTTTGAATTATCTACATA		1
11[64]13[63]	GATTTAGTCAATAAAGCCTCAGAGAACCCTCATTATCTACATA		1
11[96]13[95]	AATGGTCAACAGGCAAGGCAAAGAGTAATGTGTTATCTACATA		1
11[128]13[127]	TTTGGGGATAGTAGTAGCATTAAAAGGCCGTTATCTACATA		1
11[160]12[144]	CCAATAGCTCATCGTAGGAATCATGGCATCAATTATCTACATA		1
11[192]13[191]	TATCCGGTCTCATCGAGAACAAGCGACAAAAGTTATCTACATA		1
11[224]13[223]	GCGAACCTCCAAGAACGGGTATGACAATAATTATCTACATA		1
11[256]13[255]	GCCTTAAACCAATCAATAATCGGCACGCGCCTTTATCTACATA		1
12[47]10[48]	TAAATCGGGATTCCCAATTCTGCGATATAATGTTATCTACATA		1
12[79]10[80]	AAATTAAGTTGACCATTAGATACTTTTGCGTTATCTACATA		1
12[111]10[112]	TAAATCATATAACCTGTTTAGCTAACCTTTAATTATCTACATA		1
12[175]10[176]	TTTTATTTAAGCAAATCAGATATTTTTTGTTTATCTACATA		1
12[207]10[208]	GTACCGCAATTCTAAGAACGCGAGTATTATTTTTATCTACATA		1
12[239]10[240]	CTTATCATTCCCGACTTGCGGGAGCCTAATTTTTATCTACATA		1

13[160]14[144]	GTAATAAGTTAGGCAGAGGCATTTATGATATTTTATCTACATA		1
14[79]12[80]	GCTATCAGAAATGCAATGCCTGAATTAGCATTATCTACATA		1
14[111]12[112]	GAGGGTAGGATTCAAAAGGGTGAGACATCCAATTATCTACATA		1
14[175]12[176]	CATGTAATAGAATATAAAGTACCAAGCCGTTTATCTACATA		1
14[207]12[208]	AATTGAGAATTCTGTCCAGACGACTAAACCAATTATCTACATA		1
0[175]0[144]	TCCACAGACAGCCCTCATAGTTAGCGTAACGATTTCTTCATTA		2
0[207]1[191]	TCACCAGTACAAACTACAACGCCTAGTACCAGTTTCTTCATTA		2
0[239]1[223]	AGGAACCCATGTACCGTAACACTTGATATAATTTCTTCATTA		2
0[271]1[255]	CCACCCTCATTTTCAGGGATAGCAACCGTACTTTTCTTCATTA		2
1[32]3[31]	AGGCTCCAGAGGCTTTGAGGACACGGGTAATTTCTTCATTA		2
4[143]3[159]	TCATCGCCAACAAAGTACAACGGACGCCAGCATTTCTTCATTA		2
4[271]2[272]	AAATCACCTTCCAGTAAGCGTCAGTAATAATTTCTTCATTA		2
5[32]7[31]	CATCAAGTAAAACGAACTAACGAGTTGAGATTTCTTCATTA		2
8[143]7[159]	CTTTTGCAGATAAAAACCAAAATAAAGACTCCTTTCTTCATTA		2
8[271]6[272]	AATAGCTATCAATAGAAAATTCAACATTCATTTCTTCATTA		2
9[32]11[31]	TTTACCCCAACATGTTTTAAATTTCCATATTTTCTTCATTA		2
12[143]11[159]	TTCTACTACGCGAGCTGAAAAGGTTACCGCGCTTTCTTCATTA		2
12[271]10[272]	TGTAGAAATCAAGATTAGTTGCTCTTACCATTTCTTCATTA		2
13[32]15[31]	AACGCAAAATCGATGAACGGTACCGGTTGATTTCTTCATTA		2
16[143]15[159]	GCCATCAAGCTCATTTTTTAACCACAAATCCATTTCTTCATTA		2
16[271]14[272]	CTTAGATTTAAGGCGTTAAATAAAGCCTGTTTTCTTCATTA		2
17[32]19[31]	TGCATCTTTCCCAGTCACGACGGCCTGCAGTTTCTTCATTA		2
20[143]19[159]	AAGCCTGGTACGAGCCGGAAGCATAGATGATGTTTCTTCATTA		2
20[271]18[272]	CTCGTATTAGAAATTGCGTAGATACAGTACTTTCTTCATTA		2
21[32]23[31]	TTTTCACTCAAAGGGCGAAAAACCATCACCTTTCTTCATTA		2
21[56]23[63]	AGCTGATTGCCCTTCAGAGTCCACTATTAAAGGGTGCCGTTTTCTTCATTA		2
21[96]23[95]	AGCAAGCGTAGGGTTGAGTGTTGTAGGGAGCCTTTCTTCATTA		2
21[120]23[127]	CCCAGCAGGCGAAAAATCCCTTATAAATCAAGCCGGCGTTTCTTCATTA		2
21[160]22[144]	TCAATATCGAACCTCAAATATCAATTCCGAAATTTCTTCATTA		2
23[256]22[272]	CTTTAATGCGCGAACTGATAGCCCCACCAGTTTCTTCATTA		2
0[47]1[31]	AGAAAGGAACAACTAAAGGAATTCAAAAAAATTATGAATCTA		3
2[271]0[272]	GTTTTAACTTAGTACCGCCACCCAGAGCCATTATGAATCTA		3
3[32]5[31]	AATACGTTTGAAAGAGGACAGACTGACCTTTTATGAATCTA		3
6[143]5[159]	GATGGTTTGAACGAGTAGTAAATTTACCATTATTATGAATCTA		3
6[271]4[272]	ACCGATTGTCGGCATTTTCGGTCATAATCATTATGAATCTA		3
7[32]9[31]	TTTAGGACAAATGCTTTAAACAATCAGGTCTTATGAATCTA		3
10[143]9[159]	CCAACAGGAGCGAACCAGACCGGAGCCTTTACTTATGAATCTA		3
10[271]8[272]	ACGCTAACACCCACAAGAATTGAAAATAGCTTATGAATCTA		3
11[32]13[31]	AACAGTTTTGTACCAAAAACATTTTATTTCTTATGAATCTA		3
14[143]13[159]	CAACCGTTTCAAATCACCATCAATTCGAGCCATTATGAATCTA		3
14[271]12[272]	TTAGTATCACAATAGATAAGTCCACGAGCATTATGAATCTA		3
15[32]17[31]	TAATCAGCGGATTGACCGTAATCGTAACCGTTATGAATCTA		3
18[143]17[159]	CAACTGTTGCGCCATTCGCCATTCAAACATCATTATGAATCTA		3
18[271]16[272]	CTTTTACAAAATCGTCGCTATTAGCGATAGTTATGAATCTA		3

19[32]21[31]	GTCGACTTCGGCCAACGCGCGGGGTTTTTCTTATGAATCTA		3
19[160]20[144]	GCAATTCACATATTCCTGATTATCAAAGTGTATTATGAATCTA		3
22[271]20[272]	CAGAAGATTAGATAATACATTTGTCGACAATTATGAATCTA		3
23[32]22[48]	CAAATCAAGTTTTTTGGGGTCGAAACGTGGATTATGAATCTA		3
23[64]22[80]	AAAGCACTAAATCGGAACCCTAATCCAGTTTTATGAATCTA		3
23[96]22[112]	CCCGATTTAGAGCTTGACGGGGAAAAAGAATATTATGAATCTA		3
23[128]23[159]	AACGTGGCGAGAAAGGAAGGGAAACCAGTAATTATGAATCTA		3
23[160]22[176]	TAAAAGGGACATTCTGGCCAACAAAGCATCTTATGAATCTA		3
23[192]22[208]	ACCCTTCTGACCTGAAAGCGTAAGACGCTGAGTTATGAATCTA		3
23[224]22[240]	GCACAGACAATATTTTTGAATGGGGTCAGTATTATGAATCTA		3

Table S6 | p8064 scaffold sequence for microtubule-like DNA origami structure

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Table S7 \| M13mp18 scaffold sequence for drift markers and Exchange-PAINT DNA origami structures

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GGCGGTAATATTGTTCTGGATATTACCAGCAAGGCCGATAGTTTG
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Table S8 | DNA-PAINT docking and imager sequences and biotin docking sequence

Description	Sequence
Imager P1*	5′-CTAGATGTAT-dye
Imager P2*	5′-TATGTAGATC-dye
Imager P3*	5′-GTAATGAAGA-dye
Imager P4*	5′-GTAGATTCAT-dye
Imager P5*	5′-CTTTACCTAA-dye
Imager P6*	5′-GTACTCAATT-dye
Imager P7*	5′-CATCCTAATT-dye
Imager P8*	5′-GATCCATTAT-dye
Imager P9*	5′-CACCTTATTA-dye
Imager P10*	5′-CCTTCTCTAT-dye
Imager P11*	5′-GTATCATCAA-dye
Imager P12*	5′-GAATCACTAT-dye
9nt P1 docking site	Strand-TTATACATCTA-3′
9nt P2 docking site	Strand-TTATCTACATA-3′
10nt P2 docking site	Strand-TTGATCTACATA-3′
9nt P3 docking site	Strand-TTTCTTCATTA-3′
9nt P4 docking site	Strand-TTATGAATCTA-3′
9nt P5 docking site	Strand-TTTTAGGTAAA-3′
9nt P6 docking site	Strand-TTAATTGAGTA-3′
9nt P7 docking site	Strand-TTAATTAGGAT-3′
9nt P8 docking site	Strand-TTATAATGGAT-3′
9nt P9 docking site	Strand-TTTAATAAGGT-3′
9nt P10 docking site	Strand-TTATAGAGAAG-3′
9nt P11 docking site	Strand-TTTTGATGATA-3′
9nt P12 docking site	Strand-TTATAGTGATT-3′
Biotinylated P1 docking site for antibody coupling	Biotin-TTATACATCTA-3′
Biotinylated P2 docking site for antibody coupling	Biotin-TTATCTACATA-3′
Biotinylated P3 docking site for antibody coupling	Biotin-TTTCTTCATTA-3′
Biotinylated P4 docking site for antibody coupling	Biotin-TTATGAATCTA-3′
Biotinylated docking site for microtubule-like structure	Biotin-GAATCGGTCACAGTACAACCG-3′

Supplementary Protocol | Flow chamber protocol for Exchange-PAINT imaging

PDMS flow chamber volume: 40 µl

- Rinse flow chamber with 100 µl 1 M KOH
- Rinse flow chamber with 100 µl buffer A twice
- Incubate for 5 min
- Rinse flow chamber with 100 µl buffer A
- Rinse flow chamber with 50 µl 1mg/ml BSA-Biotin in buffer A
- Incubate for 2 min
- Rinse flow chamber with 50 µl 1mg/ml BSA-Biotin in buffer A
- Incubate for 2 min
- Rinse flow chamber with 100 µl buffer A twice
- Rinse flow chamber with 50 µl 0.5 mg/ml Streptavidin in buffer A
- Incubate for 2 min
- Rinse flow chamber with 50 µl 0.5 mg/ml Streptavidin in buffer A
- Incubate for 2 min
- Rinse flow chamber with 100 µl buffer A twice
- Rinse flow chamber with 100 µl buffer B twice
- Incubate for 30 min
- Rinse flow chamber with 100 µl buffer B twice
- Rinse flow chamber with 50 µl 1nM origami in buffer B
- Incubate for 10 min
- Rinse flow chamber with 100 µl buffer B twice
- Attach tubing
- Operate in buffer B