Supplementary Information

Stepwise Assembly of Nanocluster Guided by DNA Origami Frames with High-throughput

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1. Materials and methods:

Folding DNA origami frames: Octahedral DNA origami frames (DOFs) were folded by mixing long scaffold DNA chains and ~120 different short staple DNA sequences by one-step annealing process. Briefly, 10 nM scaffold DNA (M13mp18, Bayou Biolab) were mixed with 100 nM of each staple DNA in 1×TAE buffer containing 12.5 mM Mg²⁺. The mixture was firstly heated to 90 °C rapidly and then slowly cooling down to 20 °C over 21 hours using polymerase chain reaction (PCR) machine. The product was then stored at 4 °C and ready for use. Note that the DOFs used in the 1st and 2nd strategies were slightly different in the extracted DNA sticky ends from vertices, as shown in the sequence section.

DNA functionalized on Au nanoparticles: Au colloids we purchased from Ted Pella were 10 nm gold nanoparticles (NPs) functionalized with citric acid. The Au nanoparticles (AuNPs) used in both two strategies were modified with different thiolated DNA: the 1^{st} strategy used NPs functionalized with thiolated DNA A and B together, and the 2^{nd} strategy used NPs functionalized with thiolated DNA F (see the sequence section for details). For the 1^{st} strategy, thiolated DNA A and B were added to the AuNPs with molar ratio of 150:1 between DNA and AuNPs, respectively. For the 2^{nd} strategy, thiolated DNA F were added to the AuNPs with molar ratio of 300:1 between DNA and AuNPs. After 1 h, the sodium dodecyl sulfate (SDS) and phosphate buffer (PB, 100 mM) were added to the solution to bring to a concentration of 0.01% for SDS and 10 mM for phosphate. After another 1 h, 2 M NaCl was gradually added over 5 hours to a final concentration of 0.3 M. Then the solution was put on rotating apparatus overnight. The DNA functionalized AuNPs were purified by centrifuging for 1 h at 20,000 rcf to remove the supernatant containing unreacted DNA. After repeating the centrifugation procedure three times, the AuNPs were finally resuspended in 0.1 M PBS buffer. The concentration of the AuNPs was measured by UV-vis spectroscope.

Fabrication of DNA/magnetic beads conjugates: Streptavidin capped on magnetic beads (MBs, $\sim 1 \mu m$) used in this experiment were purchased from New England Biolabs. Biotin-modified ssDNA *A*' and buffer (12.5 mM Mg²⁺, 1×TAE) were mixed with MBs, and rotated at room temperature for 2 hours. After that, the mixture was rinsed several times to remove the unattached ssDNA *A*'.

Transmission electron microscope (TEM) image: The carbon coated copper grids were glow discharged for 30 s before use. The 5 μ L sample solution was dropped onto a carbon coated copper grid and deposited for 20 min, and then the excess solution was slowly wicked away with filter paper. After rinsing by buffer (12.5 mM Mg²⁺, 1×TAE) twice, the sample was negatively stained by 5 μ L 2% (weight/volume) uranyl acetate aqueous solution for 15 s and the excess staining solution was immediately removed. The sample was imaged in JEOL-2100 TEM operating at 200 kV.

DLS measurement: The instrument we used was Malvern Zetasizer Nano-ZSE, which was equipped with a 633 nm laser source and based on the principle of dynamic light scattering (DLS) to measure the hydrodynamic size of nanoclusters.

Brief protocol: In the 1st strategy, we firstly capped both sulfhydryl DNA A and B on the AuNPs. In step 1, the modified AuNPs called *p*-AB were added into the solution containing s-A' surface. AuNPs could bind with the surface of MBs tightly by the interactions between sticky end A and A'. After rotating for 12 h at room temperature, the supernatant was removed and the sample was rinsed four times with buffer (12.5 mM Mg²⁺, 1×TAE). In step 2, we added ssDNA B'C' to the rinsed solution at a molar ratio of 3:1 for ssDNA B'C' : AuNPs. The solution was shaken at 1,000 rpm for 12 h at 35 °C and then rinsed four times with method similar as mentioned above. In this procedure, complementary base-pairings between B'C' and B only occurred on the top hemisphere of the AuNPs and was not affected by severe steric hindrance. After sufficient reaction time, we added the substituted chain A'' (molar ratio of A'' and A' was 5:1), which contained three more complementary bases than A, to separate patchy particles from the surface. Then, we put the solution of octahedral DOFs which had two vertices stretched out with DNA chains F into the solution we obtained from step 3 at a 1:3 molar ratio, and shook at 1,000 rpm for 12 h at 38 °C (step 4). After 12 h of adequate reaction, the dimes were produced.

In the 2nd strategy, the DOFs had one specific vertex stretching out DNA sticky ends *O*, which were complementary with DNA *O*' on the surface MBs (Figure 3a). In step 1, 5 μ L (10 nM) DOFs were added into MBs solution and reacted for at least 12 h to be installed on *s*-*O*' surface. Another four vertices in the middle-plane were designed to 'active' (*F*) for grasping the AuNPs. We added AuNPs functioned with strand *F*' into the solution at a 10:1 molar ratio for AuNPs and DOFs. The mixture was shaken at 1,000 rpm for 12 h at 35 °C in step 2. After that, the solution was rinsed for several times. Finally, 'fuel DNA' *O*'' was put into the solution to release the clusters, which were then separated from the surface by magnets.

DNA sequences: DNA oligonucleotides we used were ordered from Sangon Biotech (Shanghai, China). The thiolated DNA strands were purified by HPLC, while the other DNA strands were purified by PAGE. The DOFs we designed have totally six vertices,

labeled from Octa I to Octa VI (as shown in the Figure S7). Each vertex stretched out four sticky ends for assembly with NPs. The sequences were listed as follows (5' to 3').

(1). DNA sequences used in the 1st strategy

The DOFs used in the 1st strategy had two 'active' vertices: Octa II and Octa IV.

Name	Sequence
A	ATTGGATTGGAAGTATTTTTTTTTTTTTC6H12-SH

(2). DNA sequences used in the 2nd strategy

The DOFs used in the 2^{nd} strategy had five vertexes: Octa $\ensuremath{\,I}$, Octa $\ensuremath{\,I\!I}$, Octa $\ensuremath{\,I\!I}$, Octa $\ensuremath{\,I\!I}$, Octa

${\bf V}$ and Octa ${\bf V}.$

Name	Sequence
0'	Biotin-TTTTTTTTTTTTTTTCTCTCTCTATCCTAACCTTCAT
0"	ATGAAGGTTAGGATAGAAGAGAG
F'	SH-C6H12- TTTAGTATTGATAAGGAT
Octa I-O ₁	AGAGCCTAATTTGATTTTTGTTTAAATCCTGAAATAAAGAATTTTTTTT
Octa I-O ₂	TGTAGCATTCCAACGTTAGTAAATGAAGTGCCGCGCCACCCTTTTTTTT
Octa II-F ₁	AATAGCAATAGCACCAGAAGGAAACCTAAAGCCACTGGTAATTTATCCTTATCAATACT
Octa II-F ₂	GACAGGAGGTTGAAACAAATAAATCCGCCCCCCCCGCCACCCTTATCCTTATCAATACT
Octa II-F ₃	CAGAATCAAGTTTCGGCATTTTCGGTTAAATATATCACCAGTTTATCCTTATCAATACT
Octa II-F4	TCATATGGTTTACGATTGAGGGAGGGAAACGCAATACATAC
Octa III-F ₁	CAACGCTCAACAGCAGAGGCATTTTCAATCCAATGATAAATATTATCCTTATCAATACT
Octa III-F ₂	ATCAAAATCATATATGTAAATGCTGAACAAACACTTGCTTCTTTATCCTTATCAATACT
Octa III-F ₃	TGATTGCTTTGAGCAAAAGAAGATGAAATAGCAGAGGTTTTGTTATCCTTATCAATACT
Octa Ⅲ-F ₄	AACGGGTATTAAGGAATCATTACCGCCAGTAATTCAACAATATTATCCTTATCAATACT
Octa Ⅳ -F ₁	GCTCACAATTCCGTGAGCTAACTCACTGGAAGTAATGGTCAATTATCCTTATCAATACT
Octa IV -F ₂	GGCCCTGAGAGAAGCAGGCGAAAATCATTGCGTAGAGGCGGTTTATCCTTATCAATACT
Octa IV -F ₃	TTTGCGGATGGCCAACTAAAGTACGGGCTTGCAGCTACAGAGTTATCCTTATCAATACT
Octa Ⅳ -F ₄	CTTAAACAGCTTATATATTCGGTCGCTTGATGGGGAACAAGATTATCCTTATCAATACT
Octa V -F ₁	CAAATGCTTTAAAAAATCAGGTCTTTAAGAGCAGCCAGAGGGTTATCCTTATCAATACT
Octa V-F ₂	CTTCATCAAGAGAAATCAACGTAACAGAGATTTGTCAATCATTTATCCTTATCAATACT
Octa V-F ₃	AAAGATTCATCAGGAATTACGAGGCATGCTCATCCTTATGCGTTATCCTTATCAATACT
Octa V-F ₄	AAACGAAAGAGGGCGAAACAAAGTACTGACTATATTCGAGCTTTATCCTTATCAATACT

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Octa-1	TCAAAGCGAACCAGACCGTTTTATATAGTC
Octa-2	GCTTTGAGGACTAAAGAGCAACGGGGAGTT
Octa-3	GTAAATCGTCGCTATTGAATAACTCAAGAA
Octa-4	AAGCCTTAAATCAAGACTTGCGGAGCAAAT
Octa-5	ATTTTAAGAACTGGCTTGAATTATCAGTGA
Octa-6	GTTAAAATTCGCATTATAAACGTAAACTAG
Octa-7	AGCACCATTACCATTACAGCAAATGACGGA
Octa-8	ATTGCGTAGATTTTCAAAACAGATTGTTTG
Octa-9	TAACCTGTTTAGCTATTTTCGCATTCATTC
Octa-10	GTCAGAGGGTAATTGAGAACACCAAAATAG
Octa-11	CTCCAGCCAGCTTTCCCCTCAGGACGTTGG
Octa-12	GTCCACTATTAAAGAACCAGTTTTGGTTCC
Octa-13	TAAAGGTGGCAACATAGTAGAAAATAATAA
Octa-14	GATAAGTCCTGAACAACTGTTTAAAGAGAA
Octa-15	GGTAATAGTAAAATGTAAGTTTTACACTAT
Octa-16	TCAGAACCGCCACCCTCTCAGAGTATTAGC
Octa-17	AAGGGAACCGAACTGAGCAGACGGTATCAT
Octa-18	GTAAAGATTCAAAAGGCCTGAGTTGACCCT
Octa-19	AGGCGTTAAATAAGAAGACCGTGTCGCAAG
Octa-20	CAGGTCGACTCTAGAGCAAGCTTCAAGGCG
Octa-21	CAGAGCCACCACCCTCTCAGAACTCGAGAG
Octa-22	TTCACGTTGAAAATCTTGCGAATGGGATTT
Octa-23	AAGTTTTAACGGGGTCGGAGTGTAGAATGG
Octa-24	TTGCGTATTGGGCGCCCGCGGGGTGCGCTC
Octa-25	GTCACCAGAGCCATGGTGAATTATCACCAATCAGAAAAGCCT
Octa-26	GGACAGAGTTACTTTGTCGAAATCCGCGTGTATCACCGTACG
Octa-27	CAACATGATTTACGAGCATGGAATAAGTAAGACGACAATAAA
Octa-28	AACCAGACGCTACGTTAATAAAACGAACATACCACATTCAGG
Octa-29	TGACCTACTAGAAAAAGCCCCAGGCAAAGCAATTTCATCTTC
Octa-30	TGCCGGAAGGGGACTCGTAACCGTGCATTATATTTTAGTTCT
Octa-31	AGAACCCCAAATCACCATCTGCGGAATCGAATAAAAATTTTT
Octa-32	GCTCCATTGTGTACCGTAACACTGAGTTAGTTAGCGTAACCT
Octa-33	AGTACCGAATAGGAACCCAAACGGTGTAACCTCAGGAGGTTT
Octa-34	CAGTTTGAATGTTTAGTATCATATGCGTAGAATCGCCATAGC
Octa-35	AAGATTGTTTTTAACCAAGAAACCATCGACCCAAAAACAGG
Octa-36	TCAGAGCGCCACCACATAATCAAAATCAGAACGAGTAGTATG
Octa-37	GATGGTTGGGAAGAAAAATCCACCAGAAATAATTGGGCTTGA
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(3). Staple DNA for octahedral DOFs (Octa-1 to Octa-120)

Octa-38 CTCCTTAACGTAAGAAACCAATCAATAATTCATCGAGAACAGA Octa-39 AGACACCTTACCGCAGAACTCGCCATGATTTTACGTCCAGACAA Octa-40 GCCAGCTAGGCGATAGCTAGACTAGAATAAGACCTTTTTAACCTGT Octa-41 CCGACTTATTAGGAACGCCATCAAAAATGAGTAACAACCCCA Octa-42 GTCCAATAGCGGAAACCAGACGACATATCAACGCAAGGGA Octa-43 CCAAAATACAATATGATATTCAACCGTAAGGCTATCAGGTAA Octa-44 AACAGTACTTGAAAACATATGAGACGGGTCTTTTTAACGGGAAGGGA Octa-45 TTTCACCGCATTAAAGTCGGGAAACCTGATTGAATTACACCCA Octa-46 GAGAATAGAACTTTTCAACGTTATGCAGCGGAATTAGA Octa-47 ATAATTAAATTTAAAAGTCGGGAAACCTGATTTTAACAACGCC Octa-48 GCACCCAGCGTTTTTTACCAGGTATATGCACGGCAAATAGA Octa-49 GGAAGCGCCCACAAACAGTTAATGCCCGACTCCCAAGAATA Octa-49 GGAAGCGCCCACAAACAGTTAATGCCGCACACACCACCC Octa-50 GTTTGCCTATTCACAGGGCAAGGCAAAGAACTACATAAGGGTAACCC Octa-51 CGCGGAAGTTACAGGGCAAAGAACCACACCACAAACCCCC Octa-52 AGAAGCAACCAAGCCAAGCCAAGGAATTACACTAATGGGATACC Octa-54 CAGTACCAGGCCAAAGAACTACACTAATGGGAAGCC Octa-55 ATTAAGTATAAAGCGGCAAAGAACCACCACCAAAACCAGGACA Octa-56 TGCTAAACAGATGAAGAACCACCACCACAAGAATTAATGGAA Octa-57 CAGCCCTGGATTTAAGGGCGCCAAAGAACCACCACCAAAGAACCAAGCAAG		
Otta-40 GCCAGCTAGGCGATAGCTTAGATTAAGACCTTITTAACCTGT Otta-41 CCGACTTATAGGGAAGCCACGACGACGACGACGACCATATTCAACGCCAGGGA Otta-42 GTCCAATAGCGAGAACCCAGACGACGACGACGATATTCAACGCAAGGGA Otta-43 CCAAAATACAATATGATATTCAACCGTTAGGCTATCAGGTAA Otta-44 AACAGTACTGAAAACATATGAGACGGGTCTTITTTAATGGA Otta-45 TTTCACCGCATTAAAGTCGGGAAACCTGATTGAATTACCCA Otta-44 GAGAATAGAGCCTTACCGTCTATCAAATGGAGGGGAATTAGA Otta-45 TTTCACCGCATTAAAGTCGGGAAACCTGATTTTAACAACGCC Otta-47 ATAATTAAATTTAAAAACTTITTCAGGTATTCTAGGCGAATTATACA Otta-48 GCACCCACGCGTTTTTTATCCGGTATTCTAGGCGAATTATCA Otta-49 GGAAGCGCCCCACAAACAGTTAATGCCCCGACCCCACACCCCC Otta-50 GTTTGCCTATTCACAGGCAAGGCAAAGAATACACTAATGCCAAAACTCC Otta-51 CGCGAGCTTAGTTTTTCCCAATCGGCAAAGAAACTAATAGGGTACC Otta-52 AGAAGCAACCAAGGCAAAGAATACACTAATAGGGTACC Otta-53 ATTAAGTATAAAGCGGCCAAAAGATTAACGAAACTAATAGGGTACC Otta-54 CAGTGCCTACATGGGAAGTAGAACCACCAAGGAAAGAAACTAATAGGGAACCAGCCAG	Octa-38	CTCCTTAACGTAGAAACCAATCAATAATTCATCGAGAACAGA
Octa-41 CCGACTTATTAGGAACGCCATCAAAAATGAGTAACCACCCCA Octa-41 CCGACTTATTAGCGAGACCACGACGACGACGATATTCAACGCCAGGGA Octa-42 GTCCAATAGCGAGACCAGACGACGACGACTATTCAACGCAAGGGA Octa-43 CCAAAATACAATATGATATTCAACCGTTAGGCTATCAGGTAA Octa-44 AACAGTACTTGAAAACATATGAGACGGGTCTTTTTAATGGA Octa-45 TTTCACCGCATTAAAGTCGGGAAACCTGATTTGAATTACCCA Octa-46 GAGAATAGAGCCCTTACCGTCTATCAAATGGAGGCGAATTAAGA Octa-47 ATAATTAAATTTAAAAACTTTTCAGGTCATTCAAGGCGGAATTATCA Octa-48 GCACCCACGCGTTTTTTACCGGTATTCTAGGCGAATTATTCA Octa-49 GGAAGCGCCCCACAAACAGTTAATGCCCCGACCCCACACCCCC Octa-50 GTTTGCCTATTCACAGGCAGGCAAGGCAAAGCGCAACCCACACCCC Octa-51 CGCGAGCTTAGTTTTTCCCAATTCTGCGCAACGCAAACTCC Octa-52 AGAAGCAACCAAGCCAAAAGAATACACTAATGGGGAACC Octa-53 ATTAAGTATAAAGCGGCAAAGGAAACCAACTAATAGGGACCAGTCA Octa-54 CAGTGCCTACATGGGAATTAACCGTCCCCAAGAACACCAGGCCAGTCA Octa-55 ATAAGGCGCCAAAAGTAACCCACGAGCCATAAACGGCCAGGCAA Octa-56 TGCTAAACAGATGAAGGAAACCCACCAGAGCCATGAAAGGA Octa-57 CAGCCTGAATTAACCCTAAGGGCAAAGCCCATGAAAGGAA Octa-58 CGGAACATTAACCCTAAGGCAAAGACACCACCACCACTAATGCAGAA Octa-59 CGCCTGAATTAACCCTAAACGGCAAAGACACCACCACCACTAATAGGAA <td>Octa-39</td> <td>AGACACCTTACGCAGAACTGGCATGATTTTCTGTCCAGACAA</td>	Octa-39	AGACACCTTACGCAGAACTGGCATGATTTTCTGTCCAGACAA
Oeta-42 GTCCAATAGCGAGAACCAGACGACGACGATATTCAACGCAAGGGA Oeta-42 GTCCAATAGCAATAGGAGACGACGACGATATTCAACGGCAAGGGA Oeta-43 CCAAAATACAATAGAATATGAACGGTTAGGCTATCAGGGAA Oeta-44 AACAGTACTGAAAACATATGAGACGGGTCTTITTAATGGA Oeta-45 TITCACCGCATTAAAGTCGGGAAACCTGATTGAATTACCAA Oeta-46 GAGAATAGAGCCTTACCGTCTATCAAATGGAGCGGAATTAGA Oeta-47 ATAATTAAATTAAAAACTITTTCAACATGGAGCGGAATTAGA Oeta-48 GCACCCAGCGTTTTTTAACAGACGAATTATTCA Oeta-49 GGAAGCGCCCACAAACGTTAATGGCGCGACACCCCACACCCCC Oeta-50 GTTTGCCTATTCAAGGCAGGCCAGGCCAGCCACCACACCCCC Oeta-51 CGCGAGGTTAGTTTTCCCAATTCTGGCGCAAGGCAAACTACT Oeta-52 AGAAGCAACCAAGGCAAAGAATACACTAATAGGGTAACCC Oeta-53 ATTAAGTATAAAGCGGCCAAAGGAAAGAAACTAATAGGGTACC Oeta-54 CAGTGCCTACAAGGCAAAGAATTACCGTCACAGGAAGCAAGC	Octa-40	GCCAGCTAGGCGATAGCTTAGATTAAGACCTTTTTAACCTGT
Octa-43 CCAAAATACAATATGATATTCAACCGTTAGGCTATCAGGTAA Octa-44 AACAGTACTTGAAAACATATGAGAGCGGGTCTTTTTTAATGGA Octa-45 TITCACCGCATTAAAGTCGGGAAACCTGATTGGAATTAGCCA Octa-45 GAGAATAGAGCCTTACCGTCATCAAATGGAGCGGAATTAGA Octa-46 GAGAATAGAGCCTTACCGTCATCAAATGGAGCGGAATTAGA Octa-47 ATAATTAAATTTAAAAAACTTTTAACAACTTTTAACAACGCC Octa-48 GCACCCAGCAAAAAGTTAATGCGGCATTAGGCGGCAATCAACGCC Octa-49 GGAAGCGCCCACAAAACAGTTAATGCGCGAGCCCCACACACCACCC Octa-50 GTTTGCCTATTCACAGGCAGGCAAGAGCGCACCAACCACCACCC Octa-51 CGCGAGCTTAGTTTTTCCCAATTCTGCGCAAGTGTAAAGCCT Octa-52 AGAAGCAACCAAGCGCAAAGAGAAACCACAAGAGTAAATGAGGAAACCCC Octa-53 ATTAAGTATAAAGCGGCAAAGGAAAACACACAAGAAACTAATAGGGTAACC Octa-54 CAGTGCCTACATGGGAATTACCGAAGGCAAAAGGAAACGACCAGCAGTCA Octa-55 ATAAGGCCCCAAAAGTTGAGAATTAAGGAAACGACCACGCAGTCA Octa-56 TGCTAAACAGATGAAGAAAACCACCACCAGAAATTAAAAAGGCT Octa-57 CAGCCTGATTACCAAGGCCAAAAGGCTAATTGAACAGGCAAGACCAGCCAG	Octa-41	CCGACTTATTAGGAACGCCATCAAAAATGAGTAACAACCCCA
Octa-44 AACAGTACTTGAAAACATATGAGACGGGTCTTTTTTAATGGA Octa-45 TTTCACCGCATTAAAGTCGGGAAACCGTGATTGAATTGCA Octa-45 TTTCACCGCATTAAAGTCGGGAAACCGTGATTGAATTGCA Octa-46 GAGAATAGAGCCTTACCGTCTATCAAATGGAGCGGAATTAGA Octa-47 ATAATTAAATTTAAAAAACTTTTTCAAACTTTTAACAACGCC Octa-48 GCACCCAGCGGTTTTTATCCGGTATTCTAGGCGAATTATCA Octa-49 GGAAGCGCCCCCAAAACAGTTAATGCCCCGACTCCTCAAGATA Octa-50 GTTTGCCTATTCACAGGCAGGTCAGACGCCACCACCACCACCC Octa-51 CGCGAGCTTAGTTTTTCCCAATCTGCGCAAGTGTAAAGCCT Octa-52 AGAAGCAACCAAGCCAAAGCAAAGAATACCATAATGGCAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAAGGAAAACAAGTAACACTAATAGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAAGCGGACCAGTCA Octa-55 ATAAGGCGCCAAAAGTGAAGAAACCACCACAGAAGACAGAC	Octa-42	GTCCAATAGCGAGAACCAGACGACGATATTCAACGCAAGGGA
Octa-45 TTTCACCGCATTAAAGTCGGGAAACCTGATTTGAATTACCCA Octa-45 TTTCACCGCGCATTAAAGTCGGGAAACCTGATTGAATTACCACAGGC Octa-46 GAGAATAGAGCCTTACCGTCATCCAAATGGAGCGGAATTAGA Octa-47 ATAATTAAATTTAAAAACTTTTTCAAACTTTTAACAACGCC Octa-48 GCACCCAGCGCTTTTTTTATCCGGTATTCTAGGCGAATTATTCA Octa-49 GGAAGCGCCCACAAACAGTTAATGCCCCGACTCCTCCAAGATA Octa-50 GTTTGCCTATTCACAGGCAGGCCAGACGCACCCACACACCACCC Octa-51 CGCGAGCTTAGTTTTTCCCAATTCTGCGCAAGTGTAAAGCCT Octa-52 AGAAGCAACCAAGGCAAAGAAACCTAATGGCAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAAGGAAACCAACAAGTAATGGGACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAAGGAGAT Octa-55 ATAAGGCGCCAAAAGTTGAGATTTAGGATAACGGACCAGTCA Octa-56 TGCTAAACAGATGAAGAAACCACCAGAAGTAATGAGGACCAGGCAA Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCAACCAGCGGCCAAAGACTAATTGAGAAACCACCAGAA Octa-59 CGCCTGAATTACCTAACGGCCAAAGACTAATTGAGAAAAGCA Octa-59 CGCCTGAATTAACCTAACGGCAGAGGCCAATGAACGGCCAGAAGA Octa-60 ACGCGAGGCTACAACGTCAAAGGACACCACCACCACTATATGGAGAA Octa-61 CAGCGAGGCTAACACGAGAGGACTTTACCTTAGCAGAAAAGCC Octa-62	Octa-43	CCAAAATACAATATGATATTCAACCGTTAGGCTATCAGGTAA
Octa-46 GAGAATAGAGCCTTACCGTCTATCCAAATGGAGCGGAATTAGA Octa-47 ATAATTAAATTTAAAAAACTTTTTCCAAACTTTTAACAAC	Octa-44	AACAGTACTTGAAAAACATATGAGACGGGTCTTTTTAATGGA
Octa-47 ATAATTAAAATTTTAAAAAACTTTTTCAAACTTTTAACAAC	Octa-45	TTTCACCGCATTAAAGTCGGGAAACCTGATTTGAATTACCCA
Octa-48 GCACCCAGCGTTTTTTATCCGGTATTCTAGGCGAATTATTCA Octa-49 GGAAGCGCCCACAAACAGTTAATGCCCCGAACTCCTCAAGATA Octa-50 GTTTGCCTATTCACAGGCAGGTCAGACGCCACCACCACCACCC Octa-51 CGCGAGCTTAGTTTTCCCAAGCCAAGTCAAAGCCCAACCACCACC Octa-52 AGAAGCAACCAAGCCAAAAGAATACCATAATGCCAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAAGCAAAAGAAACTAATAGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT Octa-55 ATAAGGCGCCAAAAGTTGAGAATTTAGGATAACGGACCAGTCA Octa-56 TGCTAAACAGATGAAGAAAACCACCAGAGAAAGTTAAAAAGGGCT Octa-56 TGCTAAACAGATGAAGAAAACCACCAGCAGAAGACTATTTAAAAAAAGGCT Octa-58 CGGAATAATTCAACCAGGCGCCAAAAGACTTATTTTAACGCAAA Octa-59 CGCCTGAATTACCCTAATCTTGACAAGAGACGACGCAGAAGAA Octa-60 ACGCGGAGGCTACAACAGTACCTTTTACAAGAGCAGACCATGAAAGA Octa-61 CAGCGCAACATTAAAAGAGAGTACCTTTTACTGAATATAATGAA Octa-62 GGACGTTTAATTCTACCGAGAGACCACCACCACTAATATGAGAA Octa-63 AAAGCGCCAAAGTTTATACTTACCGAGGGTTTTCCAAAGCAATAAAGCC Octa-64 GAGCTCGTTGTAAACGCCAGGGGTTTCCAAAGCAATAAAGCC Octa-65 AATTATTGTTTCAGCGGGGGATCACCTCTCTGTAGCTCAAC Octa-64 GAGCTCGTTGAAACGCCGGGATCGCCCACTTCTGTAGCTCAAC Octa-65<	Octa-46	GAGAATAGAGCCTTACCGTCTATCAAATGGAGCGGAATTAGA
Octa-49 GGAAGCGCCCACAAACAGTTAATGCCCCGACTCCTCAAGATA Octa-50 GTTTGCCTATTCACAGGCAGGTCAGACGCCACCACACACCACCC Octa-51 CGCGAGCTTAGTTTTTCCCAATTCTGCGCAAGTGTAAAGCCT Octa-51 CGCGAGCATAGTTTTTCCCAATTCTGCGCAAGGTAAAGCCT Octa-52 AGAAGCAACCAAGCCAAAGCAAAGAAAACTAATGGCAAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAAGCAAAGAAACTAATGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAAT Octa-55 ATAAGGCGCCAAAAAGTTGAGATTTAGCGTTCCACAAGGACAGGTCA Octa-56 TGCTAAACAGATGAAGAAACCACCAGGAATATTAAAAAAGGCT Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAAGAAGAG Octa-59 CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGA Octa-59 CGCCTGAATTACCAACAGTACCTTTTACAAATCGCGCAGAGAAA Octa-60 ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAA Octa-61 CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAA Octa-62 GGACGTTTAATTTCGACGAGAAACACCACCACCACATAATGCAGAT Octa-62 GACGTTGTAAACGCCAGGAGAACACCACCACCACATAATGCAGAAA Octa-63 AAAGCCCAAAGTTTATCTTACGAAGACCCACCACAATAAAGGCAAAA Octa-64 GAGCTCGTTGTAAACGCCAGGGGCTTTCCAAGCCAATAAAGGC Octa-65 AATTATGTTTTCAGCCTTTAGCGTCAGCCCTTCTGTAGCGGAAAC	Octa-47	ΑΤΑΑΤΤΑΑΑΤΤΤΑΑΑΑΑΑΑCTTTTTCAAACTTTTAACAACGCC
Octa-50 GTTTGCCTATTCACAGGCAGGTCAGACGCCACCACCACCACCCC Octa-51 CGCGAGCTTAGTTTTTCCCAATTCTGCGCAAGTGTAAAGCCT Octa-52 AGAAGCAACCAAGCCAAAGCAAAGAATACACTAATGCCAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAGGCAAAGAAACTAATAGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT Octa-55 ATAAGGCGCCAAAAGTTGAGATTTACGGTTCCACAAGTAAGCAGAT Octa-56 TGCTAAACAGATGAAGAAACCACCAGGAATTTAAGAAGGCCAGGCA Octa-56 TGCTAAACAGATGAAGAAACCACCAGAGAATTTAAAAAAAGGCT Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAAGAAGAGC Octa-59 CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGA Octa-60 ACGCGAGGCTACAACAGTACCTTTTACAAAGCGCAGAGAAA Octa-61 CAGCGAGGCTACAACAGTACCTTTTACTGAATATAGAA Octa-62 GGACGTTTAATTTCGACGAGAAACACCACCACCAATAATGAAGAA Octa-63 AAAGCGCCAAAAGTTATCTTTACCGAAGCCCAATAATGAGTAA Octa-64 GAGCTCGTTGTAAACGCCAGGGGTTTTCCAAAGCCAATAAAGCC Octa-65 AATTATTGTTTCATGCCTTTAGCGTCACCCTTCTGTAGCGAAAC Octa-64 GAGCTCGTTGTAAACGCGGGAGCTCAATGCACGGAAAC Octa-65 AATTATTGTTTCAGCGCAGGGCATCACCCTTCTGTAGCGAAAC Octa-66 AAGTTTCAGACAGCGGGAGCTCACCCTTCTGTAGCGCAACAC <	Octa-48	GCACCCAGCGTTTTTTATCCGGTATTCTAGGCGAATTATTCA
Octa-51 CGCGAGCTTAGTTTTCCCAATTCTGCGCAAGTGTAAAGCCT Octa-52 AGAAGCAACCAAGCCAAGGCAAAGAATACACTAATGCCAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAGGCAAAGAAACTAATAGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT Octa-55 ATAAGGCGCCAAAAGTGAGAATTAGGATAACGGACCAGTCA Octa-56 TGCTAAACAGATGAAGAAACCACCAGGAATTTAAGAAAAGGGCT Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCCAACCAGCGCCAAAGACTTATTTTAACGAAA Octa-59 CGCCTGAATTACCCTAGCGCCAAAGACTTATTTTAACGAAA Octa-59 CGCCTGAATTACCCTAACAGGCCGCAAAGACCTTGACAAGAA Octa-60 ACGCGAGGCTACAACAGTACCTTTTACCAAAGCAGACCATGAAAGA Octa-61 CAGCGAAGCTTAAAAAGAGAGTACCTTTACTGAATATAATGAA Octa-62 GGACGTTTAATTTCGACGAGAAACACCACCACCACTAATGCAGAT Octa-64 GAGCTCGTTGTAAACGCCAGGGATTTCCCAAAGCCAATAAAGCC Octa-64 GAGCTCGTTGTAAACGCCAGGGATTCCCACCCTTCTGTAGCTCAAC Octa-65 AATTATTGTTTTCATGCGTTAAGCGTCAGATAACGGAAAC Octa-67 ACAAAGAAATTAACAGGTCTAAGGACTACGCTGAGATACCCCT Octa-67 ACAAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTAACGGAATC Octa-68 AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTATACGGAATCC Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC	Octa-49	GGAAGCGCCCACAAACAGTTAATGCCCCGACTCCTCAAGATA
Octa-52 AGAAGCAACCAAGCCAAAGCCAAAGGAATACACTAATGCCAAAACTCC Octa-53 ATTAAGTATAAAGCGGCAAGGCAAAGCAAGCAAGGAAACTAATAGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT Octa-55 ATAAGGCGCCAAAAGTTGAGAATTACCGTTCCACAAGTAAGCAGAT Octa-56 TGCTAAACAGATGAAGAAACCACCAGAAATTAACAGGACCAGTCA Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAACGCAA Octa-59 CGCCTGAATTACCCTAATCTTGACAAGACAGCACGAGCATGAAAGA Octa-60 ACGCGAGGCTACAACAGTACCTTTTACTGAAAGACCAGCAGAGAAA Octa-61 CAGCGAAGGCTACAACAGTACCTTTTACTGAATATGAAA Octa-62 GGACGTTTAATTTCGACAAGAGAGCCCATCAAATATGAGAA Octa-63 AAAGCGCCAAAGTTTATCTTACCGAAGCCCACACACACAC	Octa-50	GTTTGCCTATTCACAGGCAGGTCAGACGCCACCACCACCACCC
Octa-53 ATTAAGTATAAAGCGGCAAGGCAAAGAAACTAATAGGGTACC Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT Octa-55 ATAAGGCGCCAAAAGTTGAGATTTACGGTTACCGACAGGCAGTCA Octa-56 TGCTAAACAGATGAAGAAACCACCAGAATTTAAGAAACGGACCAGTCA Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCAACCCAGGCGCAAAGACTTATTTTAACGCAA Octa-59 CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGA Octa-60 ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAA Octa-61 CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAA Octa-62 GGACGTTTAATTTCGACGAGAAACACCACCACCACTAATGAGAAA Octa-63 AAAGCGCCAAAGTTTATCTTACCGAAGACCACCACCACTAATGAGAAA Octa-64 GAGCTCGTTGTAAACGCCAGGGGTTTTCCAAAGCAAAAAGCC Octa-65 AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAAC Octa-66 AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAAC Octa-67 ACAAAGAAATTAAGCTGGGCTTAATTGTATACAACGGAATC Octa-68 AACAAAAATTAACTAGGTCTGAGAGACTACGCCAGAGATAGCACGAATAGC Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAATGGATAAGC	Octa-51	CGCGAGCTTAGTTTTTCCCAATTCTGCGCAAGTGTAAAGCCT
Octa-54 CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT Octa-55 ATAAGGCGCCAAAAGTTGAGATTTACGATCAACGGACCAGTCA Octa-56 TGCTAAACAGATGAAGAAACCACCAGAATTTAAAAAAAGGCT Octa-57 CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA Octa-58 CGGAATAATTCAACCCAGCGCCCAAAGACTTATTTTAACGCAA Octa-59 CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGA Octa-60 ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAA Octa-61 CAGCGAAGCATTAAAAGAGAGAACACCACCACTAATGAAGAA Octa-62 GGACGTTTAATTTCGACGAGAAACACCACCACTAATGCAGAAT Octa-63 AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGATA Octa-64 GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCC Octa-65 AATTATTGTTTACGCAGGAGAACCACCCACTTAATGAGTAA Octa-65 AATTATTGTTTACGCGTCAGATAGCACGGAAAC Octa-66 AAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCC Octa-66 AAGTTTCAGACAGCCGGGATCGTCAGCCTTCTGTAGCTCAAC Octa-67 ACAAAAAATTAGGTAGGGCTTAATTGTATACAACGGAAATC Octa-68 AACAAAAATAACTAGGTCGAGAGACTACGCTGAGATTACGACGGAATC Octa-69 CATAACCTAAATCAACAGTCCAGAAAACGTCATAAGGATAGC Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC Octa-70 CACGAACAATTCGTGTGGGCATCAATTCTTTAGCAAAAATTACG	Octa-52	AGAAGCAACCAAGCCAAAAGAATACACTAATGCCAAAACTCC
Octa-55ATAAGGCGCCAAAAGTTGAGATTTAGGATAACGGACCAGTCAOcta-56TGCTAAACAGATGAAGAAACCACCAGAAATTTAAAAAAAGGCTOcta-57CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGAOcta-58CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAACGCAAOcta-59CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGAOcta-60ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-61CAGCGAACATTAAAAGAGAGAGTACCTTTACTGAATATAATGAAOcta-62GGACGTTTAATTTCGACGAGAGAACCACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGATAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCACAGCACGGAAACOcta-65AATTATTGTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCCAACOcta-67ACAAAAAATAACTAGGTCGGAGACACCACCGCTGAGTTTCCCTOcta-68AACAAAAATAACTAGGTCTGAGAGACTACGCTGAAAGCOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATATAGGATAGCOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATATAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-53	ATTAAGTATAAAGCGGCAAAGGAAACTAATAGGGTACC
Octa-56TGCTAAACAGATGAAGAAACCACCAGAATTTAAAAAAAAGGCTOcta-57CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGAOcta-58CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAACGCAAOcta-59CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGAOcta-60ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-61CAGCGAAGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-62GGACGTTTAATTTCGACGAGAGAACCACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGATAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTAAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAAACACCACCTGAGATTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTAGCAAAATTACG	Octa-54	CAGTGCCTACATGGGAATTTACCGTTCCACAAGTAAGCAGAT
Octa-57CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGAOcta-58CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAACGCAAOcta-59CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGAOcta-60ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-61CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAAOcta-62GGACGTTTAATTTCGACGAGAAACACCACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGTAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAAATCOcta-68AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGATTACGOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATATAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-55	ATAAGGCGCCAAAAGTTGAGATTTAGGATAACGGACCAGTCA
Octa-58CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAACGCAAOcta-59CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGAOcta-60ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-61CAGCGAACATTAAAAGAGAGAGTACCTTTACTGAATATAATGAAOcta-61CAGCGAACATTAAAAGAGAGAGTACCTTTACTGAATATAATGAAOcta-62GGACGTTTAATTTCGACGAGAAACACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGTAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTAAGGTCTGAGAGACTACGCTGAGATACCAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGATAGCACGGAAACCOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAAATTACG	Octa-56	TGCTAAACAGATGAAGAAACCACCAGAATTTAAAAAAAGGCT
Octa-59CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGAOcta-60ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-61CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAAOcta-62GGACGTTTAATTTCGACGAGAAACACCACCACTAATGCAGATOcta-63AAAGCGCCCAAAGTTTATCTTACCGAAGCCCACTAATGCAGATOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGAGCTACGCTGAGTTTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAAATTACG	Octa-57	CAGCCTTGGTTTTGTATTAAGAGGCTGACTGCCTATATCAGA
Octa-60ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAAOcta-61CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAAOcta-61CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAAOcta-62GGACGTTTAATTTCGACGAGAAACACCACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGTAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGAACTACGCTGAGATTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAAATTACG	Octa-58	CGGAATAATTCAACCCAGCGCCAAAGACTTATTTTAACGCAA
Octa-61CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAAOcta-62GGACGTTTAATTTCGACGAGAAACACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCACTAATGAGTAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGAGCTACGCTGAGTTTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-59	CGCCTGAATTACCCTAATCTTGACAAGACAGACCATGAAAGA
Octa-62GGACGTTTAATTTCGACGAGAAACACCACCACTAATGCAGATOcta-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCACTAATGAGTAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-60	ACGCGAGGCTACAACAGTACCTTTTACAAATCGCGCAGAGAA
Octa-63AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGTAAOcta-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGAGCTACGCTGAGTTTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-61	CAGCGAACATTAAAAGAGAGTACCTTTACTGAATATAATGAA
Octa-64GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCCOcta-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-62	GGACGTTTAATTTCGACGAGAAACACCACCACTAATGCAGAT
Octa-65AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAACOcta-66AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAACOcta-67ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATCOcta-68AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCTOcta-69CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGCOcta-70CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-63	AAAGCGCCAAAGTTTATCTTACCGAAGCCCAATAATGAGTAA
Octa-66 AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAAC Octa-67 ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATC Octa-68 AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCT Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC Octa-70 CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-64	GAGCTCGTTGTAAACGCCAGGGTTTTCCAAAGCAATAAAGCC
Octa-67 ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATC Octa-68 AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCT Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC Octa-70 CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-65	AATTATTGTTTTCATGCCTTTAGCGTCAGATAGCACGGAAAC
Octa-68 AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCT Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC Octa-70 CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-66	AAGTTTCAGACAGCCGGGATCGTCACCCTTCTGTAGCTCAAC
Octa-69 CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC Octa-70 CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-67	ACAAAGAAATTTAGGTAGGGCTTAATTGTATACAACGGAATC
Octa-70 CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG	Octa-68	AACAAAAATAACTAGGTCTGAGAGACTACGCTGAGTTTCCCT
	Octa-69	CATAACCTAAATCAACAGTTCAGAAAACGTCATAAGGATAGC
	Octa-70	CACGACGAATTCGTGTGGCATCAATTCTTTAGCAAAATTACG
	Octa-71	CCTACCAACAGTAATTTTATCCTGAATCAAACAGCCATATGA
Octa-72 GATTATAAAGAAACGCCAGTTACAAAATTTACCAACGTCAGA	Octa-72	GATTATAAAGAAACGCCAGTTACAAAATTTACCAACGTCAGA
Octa-73 AGTAGATTGAAAAGAATCATGGTCATAGCCGGAAGCATAAGT	Octa-73	AGTAGATTGAAAAGAATCATGGTCATAGCCGGAAGCATAAGT
Octa-74 TAGAATCCATAAATCATTTAACAATTTCTCCCGGCTTAGGTT	Octa-74	TAGAATCCATAAATCATTTAACAATTTCTCCCCGGCTTAGGTT
Octa-75 AAAGGCCAAATATGTTAGAGCTTAATTGATTGCTCCATGAGG	Octa-75	AAAGGCCAAATATGTTAGAGCTTAATTGATTGCTCCATGAGG
Octa-76 CCAAAAGGAAAGGACAACAGTTTCAGCGAATCATCATATTCC	Octa-76	CCAAAAGGAAAGGACAACAGTTTCAGCGAATCATCATATTCC

Octa-77GAAATCGATAACCGGATACCGATAGTTGTATCAGCTCCAACGOcta-78TGAATATTATCAAAATAATGGAAAGGGTAATATTATTCCCAAOcta-78GAGGAAGCAGGATTCGGTAAAATACGTAAAACACCCCCCAGOcta-80GGTGATTTTCAGCCGGATAGGACCATTGTGTCAGGGATAGOcta-81CAAGCCCCCACCCTTAGCCCGGATAGGACCATCTGTGGGOcta-82TGTAGATATTACCGGGCGACCGGGTGGGGGGCGCCCTCTTCTGGOcta-83CATCCTATTCAGCCTGAAAGGTAAAGTAAAAAGCAAGCAGCCGTTTOcta-84CAGCCTCATATAAGCGTACCCGGGTGATGTGTGCGGATTCCCOcta-85CATCCTATTCAGCCTGATAGGATAAGCATAGCGCTTTTAAAGATTGCGGTAAATOcta-86AGCGTCACGTATAAAGCATAGGATACGCCCTGGCGCGGCAAATGCGGCGGACAATGGGOcta-87TATAAAGCCGCGAAATATTGTATCGGTTGACGCGGACAATGGGTOcta-88AGACCACTCCATATAAGGATACCCAGCTGTGCGCCGACAATGGGTOcta-90AACAGGTCCCGAAATATGATAACCAGTCGCGCGACAATGGGTOcta-91ACCGCCCCGGAAATAGCAGATCCAACAACGCTTTTAACCATTGCCTGAGAOcta-92TCAAAGGGACCCCGGAAATAGCAGGATCACAACAACCAATGGOcta-93GTAATACCGAAACATGGAGAGCTCACAAATAGGAGAGGATTAGGAOcta-94GAGATAACATTAGAAATAACAAGATAAGGAGAGGATTAGGGAOcta-95CAGATATACCTGAATACCAAGTTAGAGGAGGATTAGCCGGGOcta-94GGGGTGCCAGTGGAACCAACGAGGGCCATTGCGGGCACCATTGGGGCACTATTOcta-95CAGATATACCTGAATACCAAGTTAGAGGAGGACTATTGCGGGGCACTATGGGGCCAGTGGGCGAOcta-97ATGTTTTGGGCGCAACCAACTAGAGGGGGGGGGGGGGGG		-
Octa-79 GAĞGAAGCAĞGATTCGĞĞTAAAATACĞTAAAACACCCCCAĞ Octa-80 GĞTTGATTTCCAĞCAĞACAĞCCCTCATTCĞTCACĞĞĞATAĞ Octa-81 CAAĞCCCCCACCCTTAĞCCCĞĞATAĞĞACĞĞĞĞATAĞ Octa-82 TGTAĞATATTACĞCGĞĞGACĞĞGTĞGĞGTĞCĞĞGCĞCCATCTTCTĞĞ Octa-83 CATCCTATTCAĞCTAAAAĞGTAAAĞTAAAAĞCAAĞCCĞTTT Octa-84 CAĞCTCATATAĞĞGTACAĞGCĞTTGATĞTGTĞĞĞĞATTCĞC Octa-85 CATGCTACAAAGĞGATTAAATGTĞGTACAĞTGĞĞGTAATTCCC Octa-86 AĞCGTCACĞTATAAĞĞATTĞĞĞATCĞĞCGCTTTTTAĞĞAAĞĞ Octa-86 AĞCGTCACĞTAAACĞAGTAĞĞĞĞĞCGACAĞĞGTGTAATATCC Octa-86 AĞCGTCACĞĞAAATTAATTĞTTTĞĞĞĞĞAĞACĞĞĞĞCAACAĞCTTTTTAĞĞAĞ Octa-90 AACAĞGTCCCĞAAATTĞAĞTTĞAĞĞCĞĞACAĞĞĞCGACAĞGCTTTTTA Octa-91 ACTĞCCCTTĞCCCĞTTĞCAĞAĞAĞĞĞĞĞACAAĞĞCTTTTTCT Octa-92 TCAAAĞĞĞĞĞĞATĞĞCCCTTATAATĞAĞĞAĞACTACAACTĞĞĞĞĞĞĞĞ	Octa-77	GAAATCGATAACCGGATACCGATAGTTGTATCAGCTCCAACG
Otherword GGTTGATTTTCCAGCAGACAGCCCTCATTCGTCACGGGATAG Otherword CAAGCCCCCACCCTTAGCCCGGACTAGGTCCAGGCGCCCATCTTCTGG Otherword TGTAGATATTACGCGGCGATCGGTGCGGGCGCCCATCTTCTGG Otherword CATCCTATTCAGCTAAAAGGTAAAAGTAAAAGCAAAGCCAGCC	Octa-78	TGAATATTATCAAAATAATGGAAGGGTTAATATTTATCCCAA
Octa-81 CAAGCCCCCACCCTTAGCCCGGAATAGGACGATCTAAAGTTT Octa-82 TGTAGATATTACGCGGCCGATCGGTGCGGGCGCCATCTTCTGG Octa-83 CATCCTATTCAGCTAAAAGGTAAAGGTAAAGATGAAAAGCAAGC	Octa-79	GAGGAAGCAGGATTCGGGTAAAATACGTAAAACACCCCCCAG
Octa-S2 TGTAGATATTACGCGGCGATCGGTGCGGGCGCCATCTTCTGG Octa-S3 CATCCTATTCAGCTAAAAGGTAAAAGTAAAAAGCAAGCCGTTT Octa-S4 CAGCTCATATAAGCGTACCCGGGTGATGTGTGGGGATCTCC Octa-S5 CATGTCACAAACGGCATTAAATGTGAGCAATTGCGGTAAAT Octa-S6 AGCGTCACGTATAAAGATTGAGTTAAGCCTTITTAAGAAAG Octa-S7 TATAAAGCATCGTAACCAAGTACCGCACCGGCTGAATATCC Octa-S8 ATAGCCCGGAAAATAATTGTATCGGTTGGCCGACAATGAGT Octa-S9 AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGA Octa-S9 AGACAGTTCCCGGAAATTGCACAAGAGGCGCAACAGCTTTTTCT Octa-S9 AGCAGGTCCCGAAAATGGCACCAAGCAGCCGTTTTCTT Octa-90 AACAGGTCCCGAAAATGAGAGAGCCCTTATAAACAACGAAGCAACCAAC	Octa-80	GGTTGATTTTCCAGCAGACAGCCCTCATTCGTCACGGGATAG
Octa-83 CATCCTATTCAGCTAAAAGGTAAAAGTAAAAAGCAAGCCGTTT Octa-83 CATCCTATTAAGCGTACCCCGGTTGATGTGTCGGGATTCTCC Octa-84 CAGCTCATATAAGCGTACCCCGGTTAATGTGACGATTCCC Octa-85 CATGTCACAAACGGCATTAAATGTGAGCAATTCGCGTTAAAT Octa-87 TATAAAGCATCGTAACCAAGTACGCACCGGCCGTAATAATCC Octa-87 TATAAAGCATCGTAACAAGTACGGCACCAGGCTGAATAATCC Octa-88 ATAGCCCGCGAAAATAATTGTATCGGTTCGCCGACAATGAGT Octa-89 AGACAGTTCATATAGGAGAGACCCTTTATAACATTGCCTGAGA Octa-90 AACAGGTCCCGGAAATTGCACTAAAAGAGCCTTTTGAACAATGACGG Octa-91 ACTGCCCTTGCCCCGTTGCAGCAAGCGGCACACCAACCATCG Octa-92 TCAAAGGGGAGATAGCCTTTATAAACTAAAAAGGAAGGATTAGGA Octa-93 GTAATACGCAAACATGAGAGAGACTATACAAGCTGATGGCGGG Octa-92 TCAAAGGGGAGATAGCCCTTATAAATCAAGCTGGTGCGGGAGCCGG Octa-93 GTAATACGCAAACAATGAGAGACAACTACGAGCGGACTATTTG Octa-94 GAGATAACATTGAAACAATAGAAGCAACAACAACAACAACAACTGGGGGACCTATTTT Octa-95 CAGATATACCTGAAACAACAACAACAACAACAACAACAACGCGCCAGTTCCTGGGGGAACTATGGG Octa-97 ATTGTTTGCTTTGAGCGCAAGCAGGGCCCAATTGGGGGCACCATTCAGGGCCACATT Octa-99 CTTCGCTGGGCGCAAGCAGGCCCAATTGGGGCAACCTTCCGGGGAACCAATTCGGCCA Octa-100 TCAGAGGTGGGGTAAACGAGCGCCAGGGCCAACGTGGCCA	Octa-81	CAAGCCCCCACCCTTAGCCCGGAATAGGACGATCTAAAGTTT
Otta-84 CAGCTCATATAAGCGTACCCCGGTTGATGTGTGCGGATTCTCC Otta-85 CATGTCACAAACGGCATTAAATGTGAGCAATTCGCGTTAAAT Otta-85 CATGTCACAAACGGCATTAAAGTTAGGTAGCCCGTTTAAAT Otta-87 TATAAAGCATCGTAACGAAGTACCGGCCCGGCGTAATATCCC Otta-88 ATAGCCCGCGAAAATAATTGTATCGGTCGCCGACAATGAGT Otta-89 AGACAGTTCATATAGGAGAAGCCTTTATAACGTGCCGACAATGAGT Otta-89 AGACAGTTCCATATAGGAGAAGCCCTTATAAACATGCCTGAGAA Otta-90 AACAGGTCCCGAAATTGCATCAAAAAAGATCTTTGATCATCAG Otta-91 ACTGCCCTGCCCCGTTGCAGCAAGCGGCAACAGCTTTTCT Otta-92 TCAAAGGGAGATAGCCCTTATAAATCAAGAGCAACAACATGAG Otta-93 GTAATACGCAAACATGAGAGAATCACAACTAGAGGAGCTATTTC Otta-94 GAGATATACCTTAGAAGAAGAAGAAGTACAACAACAACAACGAGGGCCGG Otta-95 CAGATATTACCTGAATACCAAGTACAAGGGGGACATTTTT Otta-96 CATATAACTAAAGAACAACAACAACATACGAGGGTGCTTTTTTGGGGG Otta-97 ATGTTTTGATCGGAACACAACATACGAGGGCCAATTGGGGCCCCGTCGCCATTCAGGGCGCGCA Otta-98 GGGGGTGCCAGTTGAGACCATTAGGAGGCCCAACTTGGGGCACCGCGCCCATCCGAGGCCGCCAC Otta-99 CTTCGCTGGGGTAAACGACGGCCAAGGGCCCAACTGGGGCCCAAACTAACAACCAAC	Octa-82	TGTAGATATTACGCGGCGATCGGTGCGGGCGCCATCTTCTGG
Otta-85 CATGTCACAAACGGCATTAAATGTGAGCAATTCGCGTTAAAT Otta-86 AGCGTCACGTATAAGAATTGAGTTAAGCCCTTITTAAGAAAG Otta-87 TATAAAGCATCGTAACCAAGTACCGCACCGGCTGTAATATCC Otta-88 ATAGCCCGCGAAAATAATTGTATCGGTTGCCCGACAATGAGT Otta-89 AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGA Otta-90 AACAGGTCCCCGATATGAGCAAGCGGCAACAGCTTTTCT Otta-91 ACTGCCCTGCCCCGTTGCAGCAAGCGGCAACAGCTTTTCT Otta-92 TCAAAGGGAGATAGCCCTTATAAATCAAGAGCAACAACCATCG Otta-93 GTAATACGCAAACTGAGAGAAGCATACAACAGCGGGAGCTATTTC Otta-94 GAGATAACATTAGAAGAATAACATAACAATGAGGAGCTATTTT Otta-95 CAGATATTACCTGAAATACCAAGTTACAACTAGGGAGCTATTTT Otta-96 CATATAACTAATGGAACAACAACAACATACGAGGTGCTTTTTTGGGG Otta-97 ATGTTTTGATCGGAAACGAAGGAGCACTTACGAGGCACCGTCGCCATTCAGGCTGCGCA Otta-98 GGGGGTGCCAGTTGAGACCATTAGATACGAGGGCACGTCGCCGATTCAGGCGCGCCA Otta-99 CTTCGCTGGGGCGAAGCGCCAGGCGCAAGTGCGATCCCCGTGGCGAACTACCAA Otta-100 TCAGAGCTGGGATAACGACGGCCACCGCTGGCGAACTACCAAGCCCAACCTAGCCCGCGCCACCATGGCGACCACCCATAGCTGGGAGACCTACCAACTAAAGTAACAAAGCCCAACCCAACCTAGCACCAACCTAACACAACCAAC	Octa-83	CATCCTATTCAGCTAAAAGGTAAAAGTAAAAAGCAAGCCGTTT
Octa-86 AGGGTCACGTATAAGAATTGAGTTAAGCCCTTTTTAAGAAAG Octa-87 TATAAAGCATCGTAACCAAGTACCGCACCGGCTGTAATATCC Octa-88 ATAGCCCGGAAAATAATTGTATCGGTTCGCCGACAAGTGAGT Octa-89 AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGA Octa-89 AGACAGTCCCTATATAGGAGAAGCCTTTATAACATTGCCTGAGA Octa-90 AACAGGTCCCGAAATTGCATCAAAAAGGATCTTTGATCATCAG Octa-91 ACTGCCCTTGCCCCGTTGCAGCAAGCGGCAACAGCTTTTCT Octa-92 TCAAAGGGAGATAGCCCTTATAAATCAAGACAACCAACCA	Octa-84	CAGCTCATATAAGCGTACCCCGGTTGATGTGTCGGATTCTCC
Octa-87 TATAAAAGCATCGTAACCAAGTACCGCACCGGCTGTAATATCC Octa-88 ATAGCCGCGGAAAATAATTGTATCGGTTCGCCGACAATGAGT Octa-89 AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGA Octa-90 AACAGGTCCCGAAATTGCATCAAAAAGATCTTGCTGACGA Octa-91 ACTGCCCTTGCCCGATGCAGCAAGCGGCAACAGCCTTTTCT Octa-92 TCAAAGGGAGATAGCCCTATAAAATCAAGACAACCATCG Octa-93 GTAATACGCAAACATGAGAGAATAACATGACGGACGGG Octa-94 GAGATAACATTAGAAGAATAACATAAAAAGGAAGGATTAGGA Octa-95 CAGATATACCTGAAATACCAAGATACACAGGGGAGCTATTTT Octa-96 CATATAACTAAGAAACAATGCAGAGGTGTTTTTTGGGG Octa-97 ATGTTTGCTTTGATCGGAACCAACAGGGGGACCTGTTCTTTGGGGG Octa-98 GGGGTGCCAGTGGAGCACATAGAGTGGGGCACCGTGCCCATTGAGGGCGCGA Octa-99 CTTCGGTGGGCGAGACCATAGGAGGGGCACCGTGCGCCATTGAGGCTGCCGCA Octa-90 TCAGAGCTGGGTAAACGAGGGGACAATTAACTGCGGCACCGTGCCTATAACATACAACGA Octa-100 TCAGAGCTGGGTAAACGAGGGGCACCGTGCGCTAAGCCTAGGCTGGCCGCA Octa-101 TTAGCGGTAACAGAGCGCGACGACCACCCTTTTCCAGAAGCCCACACCTA Octa-102 GATATTCTAAATTAAGCAGAACCGCCCACCCATTTCCAAATTCGGAAGCCCAACCCA Octa-103 TGTCGTCATAAGTAAGAAGCGCGCCACCGCCCACACTTCCAAAGCCC Octa-104 CGATTATAAGCGAAGACGCGCCCCCCAACGGGGGAAATAAAT	Octa-85	CATGTCACAAACGGCATTAAATGTGAGCAATTCGCGTTAAAT
Octa-88 ATAGCCCGCGGAAAATAATTGTATCGGTTCGCCGACAATGAGT Octa-89 AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGA Octa-90 AACAGGTCCCGAAATTGCATCAAAAAGATCTTTGATCAGG Octa-91 ACTGCCCTGCCCGAAATTGCATCAAAAAGATCTTTGATCATGAG Octa-92 TCAAAGGGAGATAGCCCTTATAAAATCAAGACAACCACTCG Octa-93 GTAATACGCAAACATGAGAGATTACAACAACAACCATCG Octa-94 GAGATAACATTAGAAGAATAACATAAAAAGGAAGGAATAGGA Octa-95 CAGATATACCTGAATACCAAGATAACATACAAAAAGGAAGG	Octa-86	AGCGTCACGTATAAGAATTGAGTTAAGCCCTTTTTAAGAAAG
Octa-89AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGAOcta-90AACAGGTCCCGAAATTGCATCAAAAAGATCTTTGATCATCAGOcta-91ACTGCCCTTGCCCCGATGCAGCAGCAGCAGCAGCTTTTCTOcta-92TCAAAGGGAGAAGCCCTTATAAAATCAAGACAACCACCATCGOcta-93GTAATACGCAAACATGAGAGACTACAACTAGGAGAGCACCAGCGGOcta-94GAGATAACATTAGAAGAATAACATAAAAAGGAAGGATTAGGAOcta-95CAGATAATCACGAAACATGAGAGATAACAATAAAAAGGAAGG	Octa-87	TATAAAGCATCGTAACCAAGTACCGCACCGGCTGTAATATCC
Octa-90 AACAGGTCCCGAAATTGCATCAAAAAGATCTTTGATCATCAG Octa-91 ACTGCCCTTGCCCCGTTGCAGCAGCAGCAGCAGCTTTTCT Octa-92 TCAAAGGGAGATAGCCCTTATAAATCAAGGAACAACCATCG Octa-93 GTAATACGCAAACATGAGAGAATCACAACAAGCAGCAGCAGCGG Octa-94 GAGATAACATTAGAAGAATAACATAAAAAGGAAGGATTAGGA Octa-95 CAGATATCCTGAATACCAAGTTACAATCAGGAGCTATTTT Octa-96 CATATAACTAATGAACACAACAAGGAGGTATCTTTGGGGG Octa-97 ATGTTTTGCTTTGATCGGAACCAACATACGAGGGTACTTTTCTTGGGGG Octa-97 ATGTTTTGCTTTGATGGAACCAACATACGAGGGCACCTTTTGTGTGGAAATTGTTATCC Octa-99 CTTCGCTGGGCCAGAGCGACGACGACGTGCGGCCCCGTCGCCATTCAGGCTGCGCAA Octa-99 CTTCGCTGGGCCAGGCGGGAGACGACGGCCCAGTGCGATCCCGTAGGCACTACACTCCA Octa-99 CTTCGCTGGGCCAGAGCGGCAGGCCCAGTGCGATCCCGTAGGCTGCGCGCA Octa-100 TCAGAGCTGGGTAAACGACGGCCCAGGGCCCAACCTGTCAGGCTGCGCCACA Octa-101 TTAGCGGTACAGAGCGGGGAACATTAACTGCGGAAGCCTACCGAACCTATATTCT Octa-102 GATATTCTAAATGACAATAACGAACGCCCCCCCCACATTTCTTCACGAGCGCGCGC	Octa-88	ATAGCCCGCGAAAATAATTGTATCGGTTCGCCGACAATGAGT
Octa-91 ACTGCCCTTGCCCCGTTGCAGCAAGCGGCAACAGCTTTTTCT Octa-92 TCAAAGGGAGATAGCCCTTATAAATCAAGACAACCATCG Octa-93 GTAATACGCAAACATGAGAGACTACAACTAGCAGGCCGGG Octa-94 GAGATAACATTAGAAGAATAACATAAAAAGGAAGGATTAGGA Octa-95 CAGATATACCTGAATACCAAGTTACAATCGGGAGCTATTTT Octa-96 CATATAACTAATGAACACAACATACGAGGCTGTTTCTTTGGGG Octa-97 ATGTTTTGCTTTTGATCGGAACCAACGAGGGTACTTTTTCTTTGATAAGAGGTCATT Octa-97 ATGTTTTGCTTTTGATGGGAACCAATACGAGGGCACTTTTTCTTTGATGAGG Octa-97 ATGTTTTGCTTTTGATGGGAACGAAGGGCACGTTCGTGTGGCAAATTGTTATCC Octa-98 GGGGTGCCAGTTGAGACCATTAGATACGGGGCACCGTGCGCACATTGACGTGCGCAA Octa-99 CTTCGCTGGGCCAGGCGAGACGACGGCCCAGTGCGATCCCGTAGGCTGCGCGCA Octa-100 TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCGTAGGCTGCGCACCACCAC Octa-101 TTAGCGGTACAGAGCGCGGAAGCTACGAGGCCCCACCTATTATCTC Octa-102 GATATTCAAGTTGAACGAACGCCCCCCCCACATTTCCCGGCAAGCCTAACCAACC	Octa-89	AGACAGTTCATATAGGAGAAGCCTTTATAACATTGCCTGAGA
Octa-92TCAAAGGGAGATAGCCCTTATAAATCAAGACAACCAACCA	Octa-90	AACAGGTCCCGAAATTGCATCAAAAAGATCTTTGATCATCAG
Octa-93GTAATACGCAAACATGAGAGATCTACAACTAGCTGAGGCCGGOcta-93GAGATAACATTAGAAGAATAACATAACATAGGAAGGATTAGGAOcta-94GAGATAACATTAGAAGAATAACATAACAAGGGAGGATTAGGAOcta-95CAGATATTACCTGAATACCAAGTTACAATCGGGAGCTATTTTOcta-96CATATAACTAATGAACACAAACATACGAGGTGTTTCTTTGGTGGGGOcta-97ATGTTTTGCTTTTGATCGGAACGAGGGTACTTTTTCTTTGATAAGAGGTCATTOcta-98GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCCOcta-99CTTCGCTGGGCGCAGACGACGACGACGACCGTCGCGCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGGGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-91	ACTGCCCTTGCCCCGTTGCAGCAAGCGGCAACAGCTTTTTCT
Octa-94GAGATAACATTAGAAGAATAACATAAAAAGGAAGGATTAGGAOcta-95CAGATATTACCTGAATACCAAGTTACAATCGGGAGCTATTTTOcta-96CATATAACTAATGAACACAACAACATACGAGGTGTTTCTTTGGGGGOcta-97ATGTTTTGCTTTTGATCGGAACGAGGGTACTTTTTCTTTGATAAGAGGTCATTOcta-98GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCCOcta-99CTTCGCTGGGGCGCAGACGACGACGACGACGTCGCGCCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGCGGGAGAACTAACTGCGCATCCCGTAGTAGCATTAACATCCAOcta-102GATATTCTAAATTGAGCCGGAACGAGGGCCCAACTTGGCGCATAGGCTGGCT	Octa-92	TCAAAGGGAGATAGCCCTTATAAATCAAGACAACAACCATCG
Octa-95CAGATATTACCTGAATACCAAGTTACAATCGGGAGCTATTTTOcta-96CATATAACTAATGAACACAACATACGAGCTGTTTCTTTGGGGOcta-97ATGTTTTGCTTTTGATCGGAACGAGGGGTACTTTTTCTTTTGATAAGAGGTCATTOcta-98GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCCOcta-99CTTCGCTGGGCGCAGACGACGACGATCGGGCCACCGTCGCCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-93	GTAATACGCAAACATGAGAGATCTACAACTAGCTGAGGCCGG
Octa-96CATATAACTAATGAACACAACATACGAGCTGTTTCTTTGGGGOcta-97ATGTTTTGCTTTTGATCGGAACGAGGGGTACTTTTTCTTTTGGTGAAATTGTTATCCOcta-98GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCCOcta-99CTTCGCTGGGCGCAGACGACGACGTACGGGCCACGTCGCCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGGATCCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-103TGTCGTCATAAGTACAGAACCGCCCACCCATTTTCACAGTACAAACTACAACGCCOcta-104CGATTATAAGCGGAGACTTCAAATATCGCGGAAGCCTACGAAGGCACCAACCTAOcta-105AACATGTACGCGAGGGTTTGAAATACCTAAACACATTCTTACCAGTATAAAGCOcta-106GTCTGGATTTTGCGTTTTAAATGCAAGGGCACCAGAGCCCCGCCAGCATTOcta-107GCCTTGAATCTTTCCGGAACCGCCCCCCCAGAGGCGCGCCGCCAGCATTOcta-108CGCTGGTGCTTTCCTGAATCGGCCAACGAGGGTGGTGATTGCCCTTCACCGCCTOcta-110ACATAACTTGCCCTAACTTTAATCATTGCATTATAACAACATTATACAGGAAGOcta-110TGATTATCAACTTTACAACTTTAATCGGCAAAGAGGCGCACCGAACATAATTTACAGGAAGOcta-111GTAGCGCCATTAAATGCAAAGAACGCGCGAAAAAGCTTACAGTAAGGAAGCAACGAAGAACAATAACGAATCATCAATAAGGAATCAAAAAGGAGCAACGAACG	Octa-94	GAGATAACATTAGAAGAATAACATAAAAAGGAAGGATTAGGA
Octa-97ATGTTTTGCTTTTGATCGGAACGAGGGTACTTTTTCTTTTGATAAGAGGTCATTOcta-98GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCCOcta-99CTTCGCTGGGCGCAGACGACGACAGTATCGGGGCACCGTCGCCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCACTACACACCCAOcta-101TTAGCGGTACAGAGCGGGAGAATTAACTGCGGTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTGGCGCATAGGCTGGCT	Octa-95	CAGATATTACCTGAATACCAAGTTACAATCGGGAGCTATTTT
Octa-98GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCCOcta-99CTTCGCTGGGCGCAGACGACCGACGACGATCGGGGCACCGTCGCCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGCGGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-96	CATATAACTAATGAACACAACATACGAGCTGTTTCTTTGGGG
Octa-99CTTCGCTGGGCGCAGACGACAGACAGTATCGGGGCACCGTCGCCATTCAGGCTGCGCAOcta-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-97	ATGTTTTGCTTTTGATCGGAACGAGGGTACTTTTTCTTTTGATAAGAGGTCATT
Octa-100TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCATTAACATCCAOcta-101TTAGCGGTACAGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-98	GGGGTGCCAGTTGAGACCATTAGATACAATTTTCACTGTGTGAAATTGTTATCC
Octa-101TTAGCGGTACAGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCTOcta-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-99	CTTCGCTGGGCGCAGACGACAGTATCGGGGCACCGTCGCCATTCAGGCTGCGCA
Octa-102GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT	Octa-100	TCAGAGCTGGGTAAACGACGGCCAGTGCGATCCCCGTAGTAGCATTAACATCCA
Octa-103TGTCGTCATAAGTACAGAACCGCCACCCATTTTCACAGTACAAACTACAACGCCOcta-104CGATTATAAGCGGAGACTTCAAATATCGCGGAAGCCTACGAAGGCACCAACCTAOcta-105AACATGTACGCGAGTGGTTTGAAATACCTAAACACATTCTTACCAGTATAAAGCOcta-106GTCTGGATTTTGCGTTTTAAATGCAATGGTGAGAAATAAAT	Octa-101	TTAGCGGTACAGAGCGGGAGAATTAACTGCGCTAATTTCGGAACCTATTATTCT
Octa-104CGATTATAAGCGGAGACTTCAAATATCGCGGAAGCCTACGAAGGCACCAACCTAOcta-105AACATGTACGCGAGTGGTTTGAAATACCTAAACACATTCTTACCAGTATAAAGCOcta-106GTCTGGATTTTGCGTTTTAAATGCAATGGTGAGAAATAAAT	Octa-102	GATATTCTAAATTGAGCCGGAACGAGGCCCAACTTGGCGCATAGGCTGGCT
Octa-105AACATGTACGCGAGTGGTTTGAAATACCTAAACACATTCTTACCAGTATAAAGCOcta-106GTCTGGATTTTGCGTTTTAAATGCAATGGTGAGAAATAAAT	Octa-103	TGTCGTCATAAGTACAGAACCGCCACCCATTTTCACAGTACAAACTACAACGCC
Octa-106GTCTGGATTTTGCGTTTTAAATGCAATGGTGAGAAATAAAT	Octa-104	CGATTATAAGCGGAGACTTCAAATATCGCGGAAGCCTACGAAGGCACCAACCTA
Octa-107GCCTTGAATCTTTTCCGGAACCGCCTCCCAGAGCCCAGAGCCGCCGCCAGCATTOcta-108CGCTGGTGCTTTCCTGAATCGGCCAACGAGGGTGGTGATTGCCCTTCACCGCCTOcta-109TGATTATCAACTTTACAACTAAAGGAATCCAAAAAGTTTGAGTAACATTATCATOcta-110ACATAACTTGCCCTAACTTAATCATTGCATTATAACAACATTATTACAGGTAGOcta-111GTAGCGCCATTAAATTGGGAATTAGAGCGCAAGGCGCACCGTAATCAGTAGCGAOcta-112TTATTTTTACCGACAATGCAGAACGCGCGCAAAAAATCTTTCCTTATCATTCCAAGOcta-113TTTCAATAGAAGGCAGCGAACCTCCCGATTAGTTGAAACAATAACGGATTCGCCOcta-114GGGCGACCCCAAAAGTATGTTAGCAAACTAAAAGAGTCACAATCAAT	Octa-105	AACATGTACGCGAGTGGTTTGAAATACCTAAACACATTCTTACCAGTATAAAGC
Octa-108CGCTGGTGCTTTCCTGAATCGGCCAACGAGGGTGGTGATTGCCCTTCACCGCCTOcta-109TGATTATCAACTTTACAACTAAAGGAATCCAAAAAGTTTGAGTAACATTATCATOcta-110ACATAACTTGCCCTAACTTTAATCATTGCATTATAACAACATTATTACAGGTAGOcta-111GTAGCGCCATTAAATTGGGAATTAGAGCGCAAGGCGCACCGTAATCAGTAGCGAOcta-112TTATTTTTACCGACAATGCAGAACGCGCGCGAAAAATCTTTCCTTATCATTCCAAGOcta-113TTTCAATAGAAGGCAGCGAACCTCCCGATTAGTTGAAACAATAACGGATTCGCCOcta-114GGGCGACCCCAAAAGTATGTTAGCAAAACTAAAAGAGTCACAATCAAT	Octa-106	GTCTGGATTTTGCGTTTTAAATGCAATGGTGAGAAATAAAT
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Octa-111 GTAGCGCCATTAAATTGGGAATTAGAGCGCAAGGCGCACCGTAATCAGTAGCGA Octa-112 TTATTTTTACCGACAATGCAGAACGCGCGCGAAAAATCTTTCCTTATCATTCCAAG Octa-113 TTTCAATAGAAGGCAGCGAACCTCCCGATTAGTTGAAACAATAACGGATTCGCC Octa-114 GGGCGACCCCAAAAGTATGTTAGCAAACTAAAAGAGTCACAATCAAT	Octa-109	TGATTATCAACTTTACAACTAAAGGAATCCAAAAAGTTTGAGTAACATTATCAT
Octa-112 TTATTTTTACCGACAATGCAGAACGCGCGCAAAAATCTTTCCTTATCATTCCAAG Octa-113 TTTCAATAGAAGGCAGCGAACCTCCCGATTAGTTGAAACAATAACGGATTCGCC Octa-114 GGGCGACCCCAAAAGTATGTTAGCAAACTAAAAGAGTCACAATCAAT	Octa-110	ACATAACTTGCCCTAACTTTAATCATTGCATTATAACAACATTATTACAGGTAG
Octa-113 TTTCAATAGAAGGCAGCGAACCTCCCGATTAGTTGAAACAATAACGGATTCGCC Octa-114 GGGCGACCCCAAAAGTATGTTAGCAAACTAAAAGAGTCACAATCAAT	Octa-111	GTAGCGCCATTAAATTGGGAATTAGAGCGCAAGGCGCACCGTAATCAGTAGCGA
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	Octa-114	GGGCGACCCCAAAAGTATGTTAGCAAACTAAAAGAGTCACAATCAAT
Octa-116 GTGGGAAATCATATAAATATTTAAATTGAATTTTGTCTGGCCTTCCTGTAGCC	Octa-115	AGCCGAAAGTCTCTCTTTTGATGATACAAGTGCCTTAAGAGCAAGAAACAATGA
	Octa-116	GTGGGAAATCATATAAATATTTAAATTGAATTTTTGTCTGGCCTTCCTGTAGCC

Octa-117	CCCACGCGCAAAATGGTTGAGTGTTGTTCGTGGACTTGCTTTCGAGGTGAATTT
Octa-118	ATGACCACTCGTTTGGCTTTTGCAAAAGTTAGACTATATTCATTGAATCCCCCT
Octa-119	TCCAAATCTTCTGAATTATTTGCACGTAGGTTTAACGCTAACGAGCGTCTTTCC
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2. Supporting figures

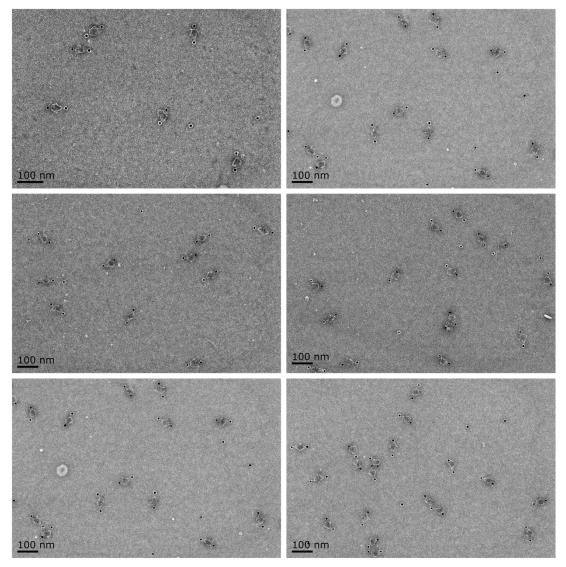


Figure S1. Representative negative stained TEM images for dimers fabricated by the 1st strategy.

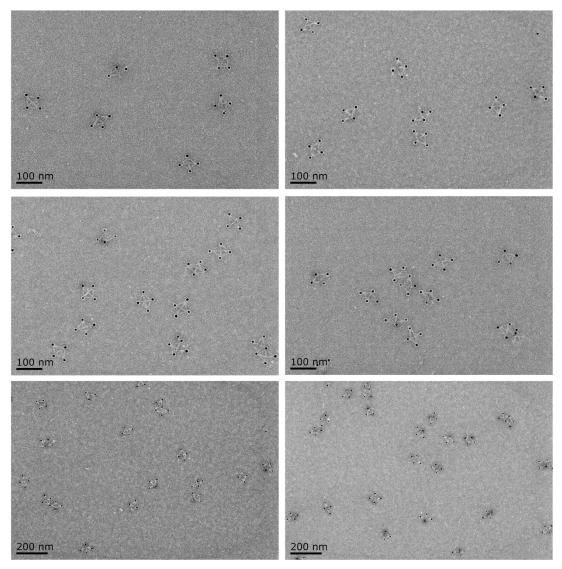


Figure S2. Representative negative stained TEM images for tetramers fabricated by the 2^{nd} strategy.

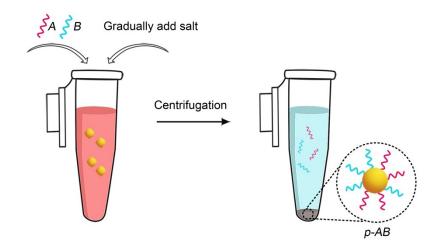


Figure S3. Schematic diagram of DNA functionalized on Au nanoparticles. Salt (NaCl) were gradually added to the tube, after mixing gold nanoparticles (yellow spheres) with DNA (A and B) and aging for two hours. Another 12 hours aging time were needed before centrifuging and rinsing the DNA functionalized nanoparticles (p-AB).

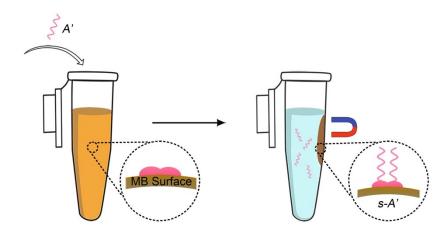


Figure S4. Schematic diagram of DNA functionalized on magnetic beads (MBs). MBs with surface encoded with streptavidin were purchased without further modification. DNA sequences with end contained biotins (A') were mixed with these MBs to attach DNA on the surface (s-A'). By applying magnetic field, excess DNA-biotin sequences could be washed out.

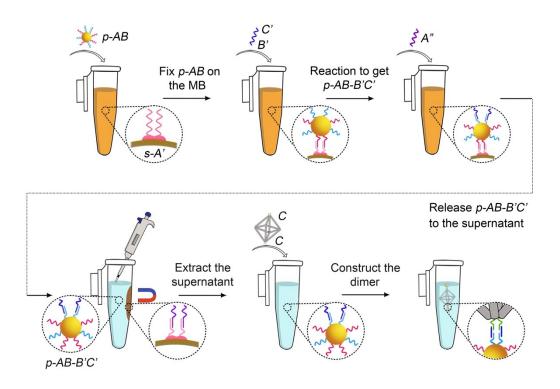


Figure S5. Schematic illustration for dimers assembly realized by the 1st strategy. First, we put the AuNPs *p*-*AB* into the tube containing MBs surface *s*-*A*'. After rotating for 12 h at room temperature, *p*-*AB* were fixed on the surface *s*-*A*' tightly. The supernatant of the tube was removed and the sample was rinsed four times with buffer. Second, we added ssDNA *B*'C' to the tube at a molar ratio of 3:1 for ssDNA *B*'C' : *p*-*AB*. The tube was shaken at 1,000 rpm for 12 h at 35 °C and then rinsed four times with method similar as mentioned above. After that, we added the substituted chain *A*'' at a molar ratio of *A*'' and *A*' for 5:1 to release patchy particles *p*-*AB*-*B*'C' from the *s*-*A*' to the supernatant. Finally, we put the octahedral DOFs into the supernatant at a 1:3 molar ratio with the patchy particles *p*-*AB*-*B*'C'. After been shaken at 1,000 rpm for 12 h at 38 °C, the tube was filled with freshly produced dimer.

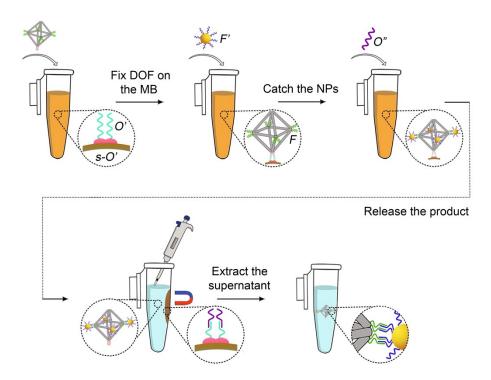


Figure S6. Schematic illustration for dimers assembly realized by the 2^{nd} strategy. First, the DOFs were added into surface *s*-*O*' solution and reacted for 12 h. Second, AuNPs *p*-*F*' was added into the solution at a 10:1 molar ratio for AuNPs and DOFs. After the tube was shaken at 1,000 rpm for 12 h at 35 °C, the solution was rinsed for several times. Finally, 'fuel DNA' *O*'' was put into the solution to release the clusters to the supernatant.

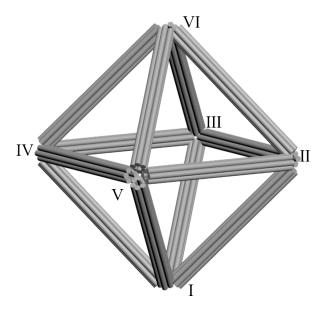


Figure S7. Schematic diagram of the octahedral DOF. The DOF we designed has totally six vertices, as labeled from Octa I to Octa VI.