Visualization of the Cellular Uptake and Trafficking of DNA Origami Nanostructures in Cancer Cells

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Section 1. Materials and Methods

Design of DNA origami nanostructures

DNA nanoparticles were designed using software called cadnano. p7560 scaffold DNA was amplified and extract from M13 bacteriophage following a published protocol.[1] p425 scaffold was cut from p7560 by restriction enzyme. All oligonucleotides and siRNA were purchased from IDT and used as received.

Preparation of p425 scaffold

p425 scaffold DNA was acquired from p7560 by restriction digestion using enzyme BsaAI (NEB, Catalog # R0531L). In a typical restriction reaction with volume of 100 μL, 500 nM of p7560 was mixed with 5000 nM of helper strands (sequences) in 1× cutsmart buffer added with 5 μL of BsaAI (5 U/μL). The mixture was incubated at 37°C for 3 hours following a 20 min heat inactivation at 65°C. The reaction solution was then subject to 0.7% agarose gel electrophoresis and the p425 DNA band was dissected out and extracted from gel using a ZymocleanTM Gel DNA Recovery Kit from Zymo Research (Catalog # D4008).

Assembly of DNA origami nanostructures

Small tetrahedron (ST), small rod (SR), large tetrahedron (LT), and large rod (LR) were prepared by mixing 5 fold of staple strands with 1 fold of scaffold DNA (p425 for ST and SR, p7560 for LT and LR) in an aqueous buffer containing 5 mM of Tris base, 1 mM of EDTA, and 10 mM of $MgCl_2$. The mixture was then subject to the following thermal annealing protocol: 65°C for 5 min, 60°C to 25°C over a period of 18 hours. Excessive staple DNA was removed using Amicon 100 KDa centrifugal filter with a centrifugation speed of 3000 G and a minimal of 3 times of washing to completely remove free DNA staple strands. DON concentrations were calculated from UV absorbance at 260 nm. Fluorophore (Cy5 or Alexa488) conjugated DNA was loaded onto DONs at a molar ratio of fluorophore-DNA: Handle = 1: 1. After thorough mixing, the solutions were incubated for at least 2 hours at room temperature under constant shaking prior to subsequent experiments.

Attaching gold nanoparticles onto DONs for TEM studies

Gold nanoparticles (AuNPs) with diameter of 5 nm were tethered with 5'-SH-TTTTTTTTTT TTTTTTTTTT-3' following a previously published protocol.[2] DNA-tethered AuNPs were then added to LR (36 handles on Face-1) at a molar ratio of LR: AuNP = 1: 30 under room temperature for 2 hours. The mixed solution was then subject to a 1% native agarose gel electrophoresis and the product band was excised and extracted using Freeze ’N Squeeze column. No EtBr was added for this experiment to avoid introducing cytotoxicity to cellular studies.

Agarose gel electrophoresis

DONs were subjected to 1% of native agarose gel electrophoresis for 2 hours (gel prepared in 0.5×TBE buffer supplemented with 10 mM $MgCl_2$ and 0.005% (v/v) EtBr). If product purification is necessary, the target gel bands were excised and placed into a Freeze ’N Squeeze column (Bio-Rad Laboratories, Inc.). The gel was crushed into fine pieces by a microtube pestle in the column, and the column was then centrifuged at 7000 g for 5 minutes. Samples that were extracted through the column were collected for TEM or AFM imaging.

Atomic force microscopy

AFM images were obtained using a Multimode 8 system under peak force tapping mode (Bruker). 5 μL of purified sample was applied onto the surface of a freshly cleaved mica chip and left for approximately 2 minutes to allow for adsorption. 60 μL of 1×TE buffer with 10 mM $MgCl_2$ was then added onto the mica surface. The AFM tip used was on the short and thin cantilevers in the SNL-10 silicon nitride cantilever chip (Bruker).

Transmission electron microscopy

For imaging of DONs, 3 μL of samples were adsorbed for 30 minutes onto glow-discharged, carbon-coated TEM copper grids. The grids were then stained for 10 seconds using a 1% aqueous uranyl formate solution containing 10 mM NaOH. Imaging was performed using a Hitachi 7700 microscope operated at 80 kV.

For imaging of cells, H1299 cells (~60,000) were seeded into 24-well plate and incubated with AuNP tagged LRs (AuNP concentration of 2.5 nM) at 37ºC for designated time points. Wash and then fix the cells twice with 2.5% glutaraldehyde in 0.1 M cacodylate buffer (pH 7.4). Cells were then rinsed with 0.1 M cacodylate buffer twice before post-fixation in 1% osmium tetroxide for 1 hour. After additional buffer rinses, cells were dehydrated through an ethanol series to 100% ethanol. Cells were infiltrated with a mixture of 100% ethanol and Eponate 12 resin for 3 hours, and then pure Eponate 12 resin overnight. Celsl were embedded in multiwall plate and then placed in a 60°C oven for polymerization. Ultrathin sections were cut on a Leica UltraCut microtome at 70-80 nm and placed on Formvar and carbon coated 200 mesh copper grids. Sections were then stained with 5% uranyl acetate for 15 mins followed by 2% lead citrate for 15 mins. Cells were then imaged with a Hitachi 7700 microscope operated at 80 kV.

Nuclease resistance study

20 μL of DONs (mass: 400 ng) was added with 2.2 μL of non-heat-inactivated fetal bovine serum (FBS) to reach a final concentration of 10% FBS. The solutions were then immediately incubated at 37°C within a thermal cycler for designated time (from 0 to 16 hours). Right after incubation, all samples were run on a 1% native agarose gel electrophoresis.

Cell Culture

H1299 lung cancer cell lines were kindly provided by Dr. Shi-Yong Sun (Emory University, GA). This cell line was maintained in RPMI 1640 with 10% FBS. Cells were maintained in a humidified incubator at 37°C, 5% CO_2. DMS53 cell lines were kindly provided by Dr. Shingming Deng (Emory University). SCLC cell lines DMS53 cell line was kindly provided by Dr. Xingming Deng (Emory University). DMS53 cultured in Weymouth's medium supplemented with 5% FBS as previously described (PMID:23824742).

Confocal Microscopy

Cells were incubated with Cy5-labeled DON structures (250nM) on glass coverslips (Lab-Tek II chamber slide, Nunc International) at 37ºC for different time points. Then washed three times with PBS and fixed with 4% paraformaldehyde. Nuclear staining was performed by mounting Pro-Longed gold anti-fade reagent with DAPI (Invitrogen, Carlsbad CA). Cells were imaged on Leica Sp8 inverted microscope. For localization studies in H1299 cells (~18,000) into 4-well chambered glass and incubate at 37ºC over-night for cells to settle down. For lysosome staining, cells were treated with lyso-Tracker Green DND-26 at the concentration of 1μM together with DONs-Cy5 at the concentration of 250nM for 8 hours. For nucleus staining, add Hoechst 33324 to the concentration of 1μg/ml then incubate for 30mins. Wash the cells with PBS, and then add 500μL FluoroBrite DMEM Media before the cells are subject to confocal microscope.

Flow Cytometry for DONs cell internalization study

DMS53 and H1299 cells (~60,000) were seeded into 24-well plate and incubated with different structures of DONs-Cy5 or DONs-Alexa488 at 37ºC for different time points. After washing the cells twice with PBS, we collected cell for flow cytometry analysis. Flow Jo software was used to quantify the % of Cy5 or Alexa positive cells as well as median intensity of the signal.

Quantitative polymerase chain reaction

H1299 cells (~60,000) were seeded into 24-well plate and incubated with DONs (7 nM) at 37ºC for 4 hrs. After treatment, cells were washed twice using PBS and incubated for 15 min in PBS containing 0.5 U/μL Benzonase to degrade DONs adsorbed onto the well plate. Cells were subsequently washed, trypsinized, collected,counted and lysed using 250 μL DNAzol Reagent. After careful mixing, lysates were transferred to new tubes and left for 15 min. The mixtures were then centrifuged for 10 min at 7000 RPM. Supernatant were carefully recovered, added with 250 μL of 100% ethanol, inverted 2–3 times, and left for 15 min at -20 ºC before centrifugation for 10 min at 13000 RPM. Supernatant were carefully removed and the pellets (invisible) were washed with 500 μL of 75% cold ethanol once and then left air dry. DNA was dissolved in 50 μL of 8 mM NaCl and stored at -20 ºC for later PCR reactions. SR solutions with known numbers were used as standards for small DONs, and LRs were used as standards for large DONs. The primers were designed to target p425 scaffold DNA (and p7560 scaffold DNA since p425 DNA is part of p7560 DNA) with an amplicon size of 254 bp (Forward primer: CTGGTCGTGTGACTGGTGAA; Reverse primer: ATCAGTGAGGCCACCGAGTA). PCR reactions were performed in 20 μL of total volume containing 10 μL of SYBR Green qPCR SuperMix (Bio-Rad Laboratories, USA), 1 μL of primers (0.5 μM), 1 μL of template, and 8 μL of nuclease free water. All components were mixed in 96-well plates. The thermal conditions during reaction were 2 min at 50 ºC, 10 min at 95 ºC followed by 40 thermal cycles at 95 ºC for 15 s and 60 ºC for 1 min. Each reaction was run in duplicates. C_t values were acquired (using Applied Biosystem 7500) for each reaction and used for standard curve plotting and DONs copy number calculations.[3]

Pharmacological inhibition study

For cellular internalization pathway, DMS53, H1299, or HeLa cells (~60,000) were seeded into 12-well plate and incubate at 37ºC overnight for cells to settle down. To inhibit Scavenger receptor, pre-treat the cells with Poly I at the concentration of 40 μg/ml for 30 mins; Cytochlasin D at the concentration of 0.25 μM for 15mins to block non-receptor mediated endocytosis; MβCD at the concentration of 625 nM for 30 mins to block caveolin-dependent endocytosis; Sucrose at the concentration of 100 mM for 30 mins to block clathrin-dependent endocytosis. Add DONs-Cy5 at the concentration of 250 nM then incubate for 8 hours with the presence of chemicals. Wash the cells with PBS and collected for flow cytometry analysis.

Statistical Analysis

All flow cytometry results represent the average of three independent experiments and are expressed as mean±SD. One-way ANOVA were used to compare the difference among the 3 experiments. P-value less than or equal to 0.05 is considered statistically significant.

Section 2. Additional Figures and Tables

Table S1. Specific design parameters of DONs. Loading site refer to the number of fluorophore being loaded onto DONs.

DNP	Scaffold (nt)	Mass (bp)	Dimensions (nm^3)	Loading sites
ST	425	384	4×2×11 per edge	24
SR	425	396	4×4×32	28
LT	7560	6456	7.2×12×47 per arm	36
LR	7560	6144	8×8×127	36

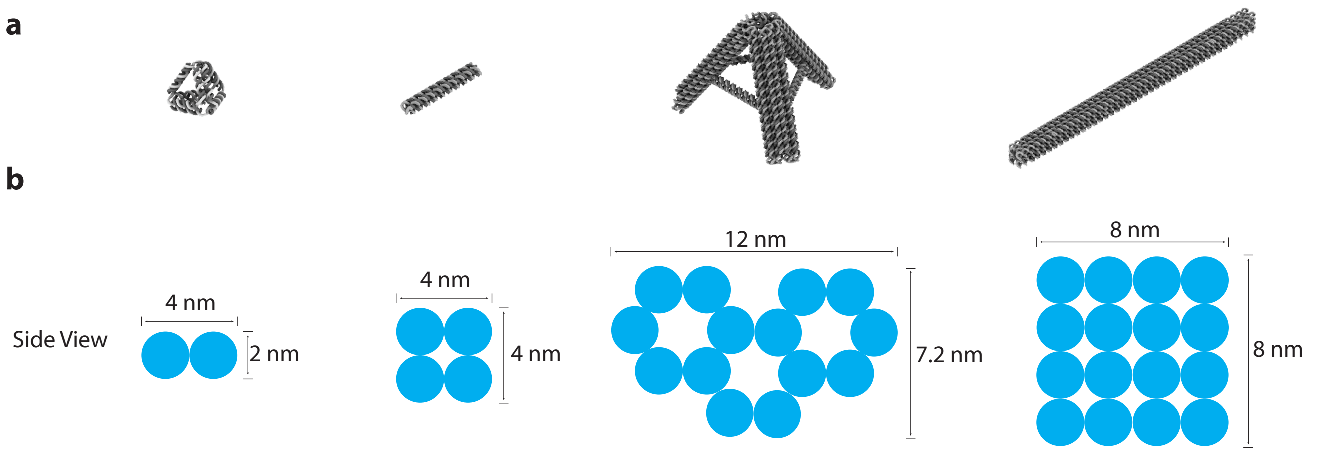


Figure S1. Schematic illustrations on calculating DONs dimensions. **a**. 3D schematics of DONs. **b**. Side view of ST's edge, SR, LT's arm, and LR.

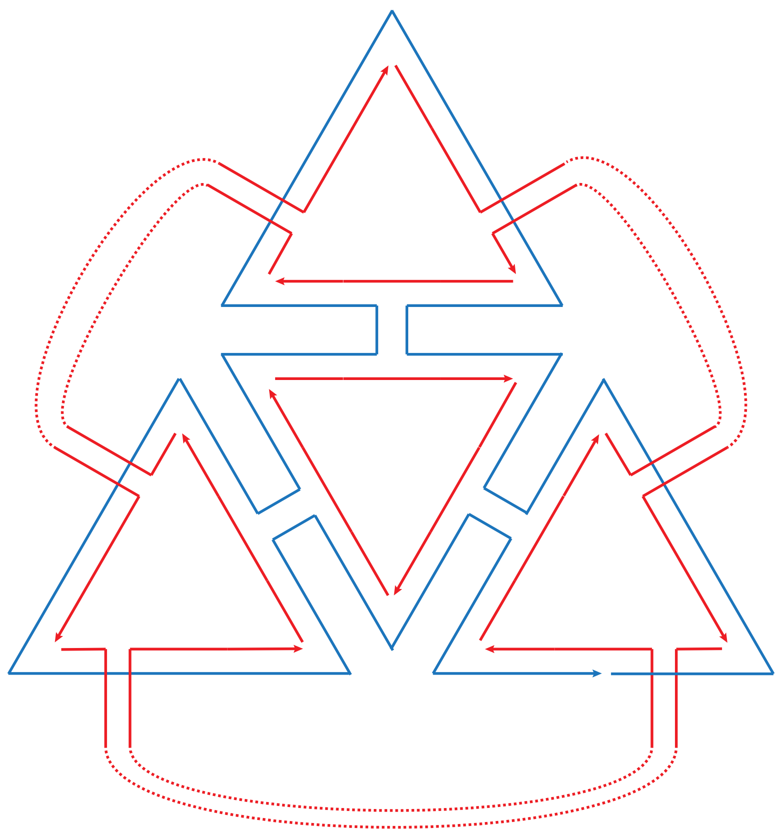


Figure S2. Strand diagram of ST. Scaffold DNA: blue; Staples: red. Single stranded DNA handles are extended from both the 5' and 3' ends of staples for capturing of fluorophore.

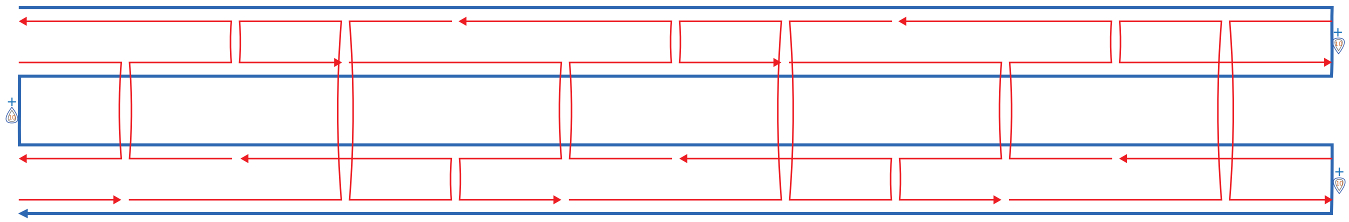


Figure S3. Strand diagram of SR. Scaffold DNA: blue; Staples: red. Single stranded DNA handles are extended from both the 5' and 3' ends of staples for capturing of fluorophore.

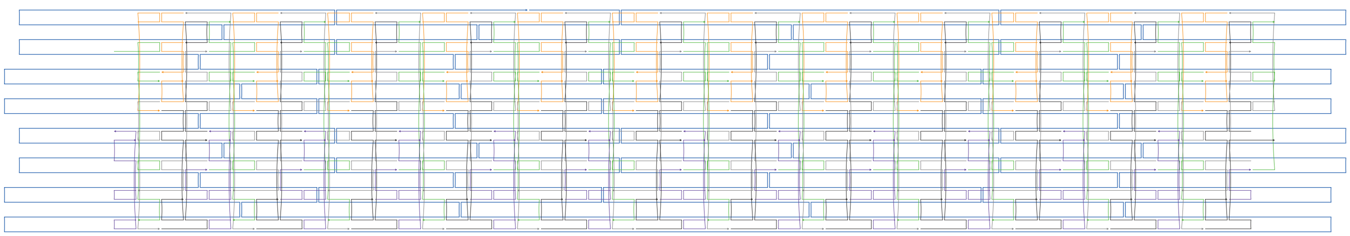


Figure S4. Strand diagram of LR. Scaffold DNA: blue; Staples: orange (Face-1), green (Face-2), black (Face-3), pink (Face-4), and grey (core). Single stranded DNA handles are extended from 5' end of orange staples on Face-1 for capturing fluorophore.

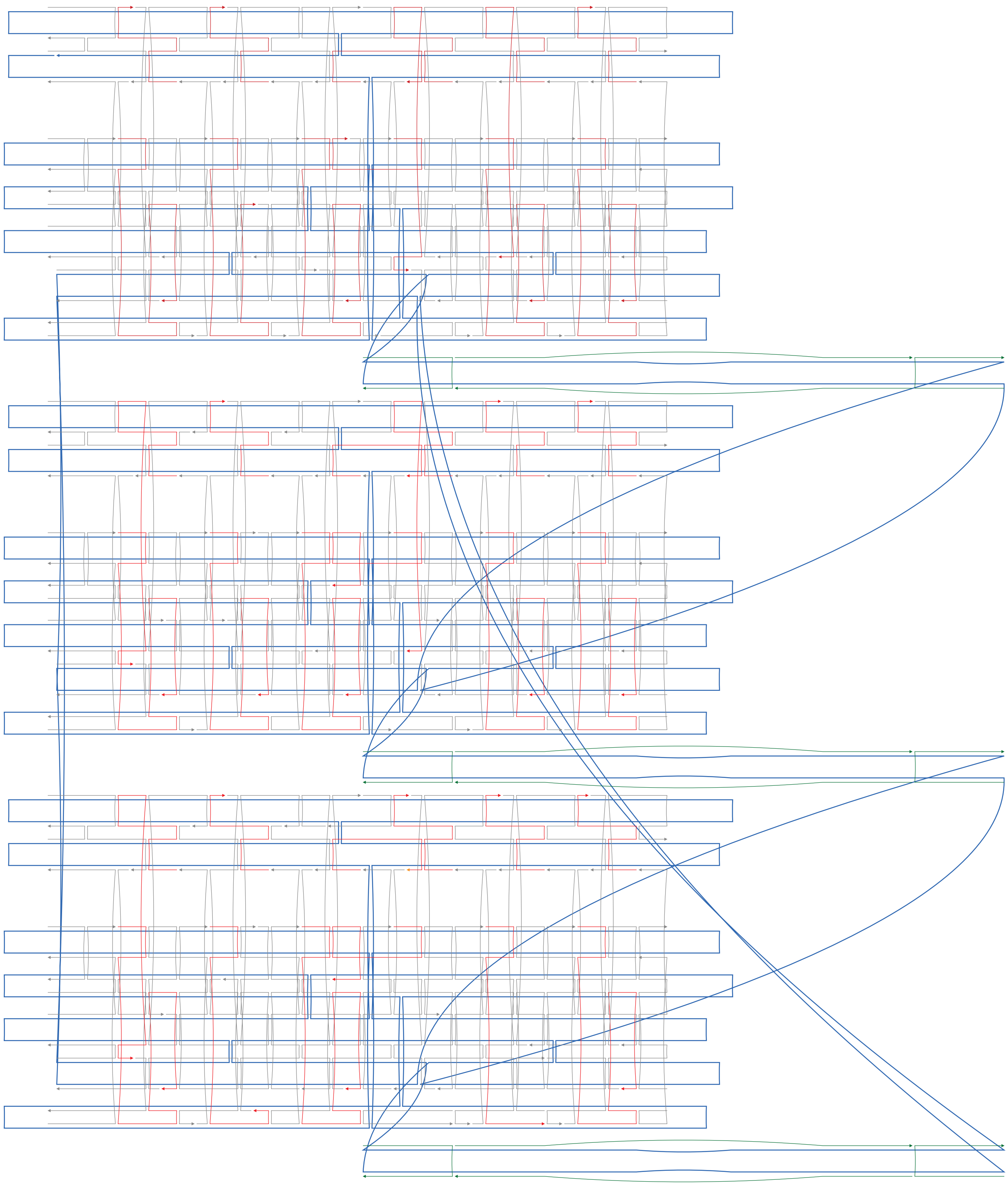


Figure S5. Strand diagram of LT. Scaffold DNA: blue; Staples: red, green, and grey. Single-stranded DNA handles are extended from 5' end of red staples for capturing Cy5-DNA.

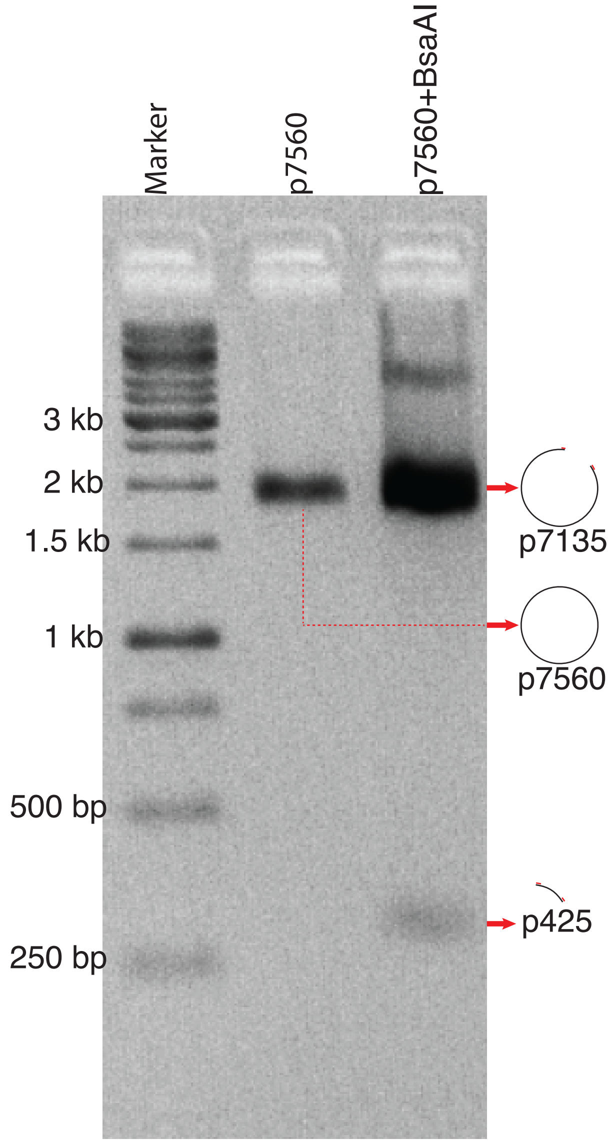


Figure S6. Preparation of p425 by cutting p7560 using BsaAI. Agarose gel electrophoresis (1%) showed the successful production of p425.

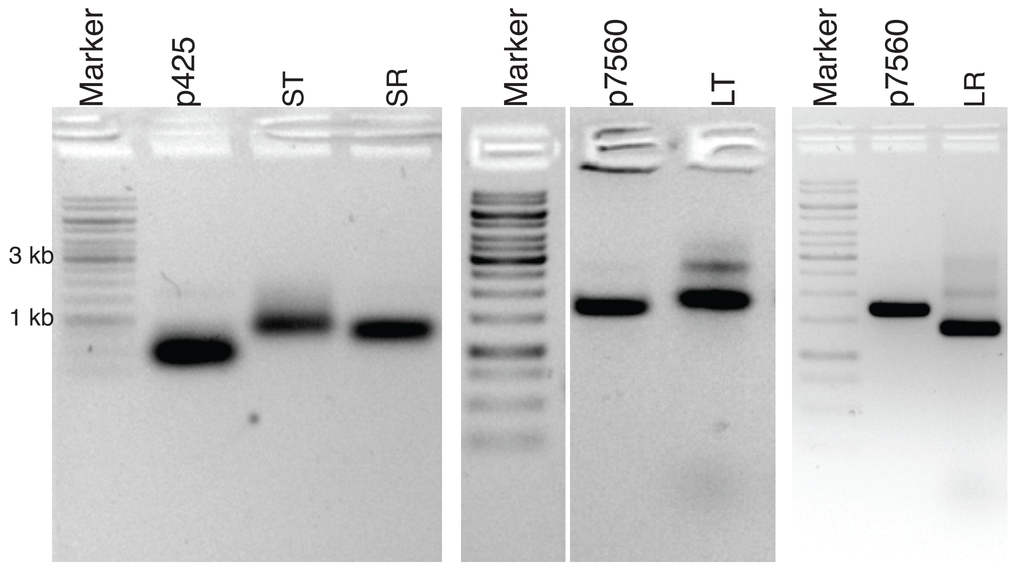


Figure S7. Agarose gel electrophoresis (left: 1.5%, middle and right: 1%) of purified DONs with excessive staples removed by cut-off filters. Discrete bands with expected motilities suggest the successful formation of DONs.

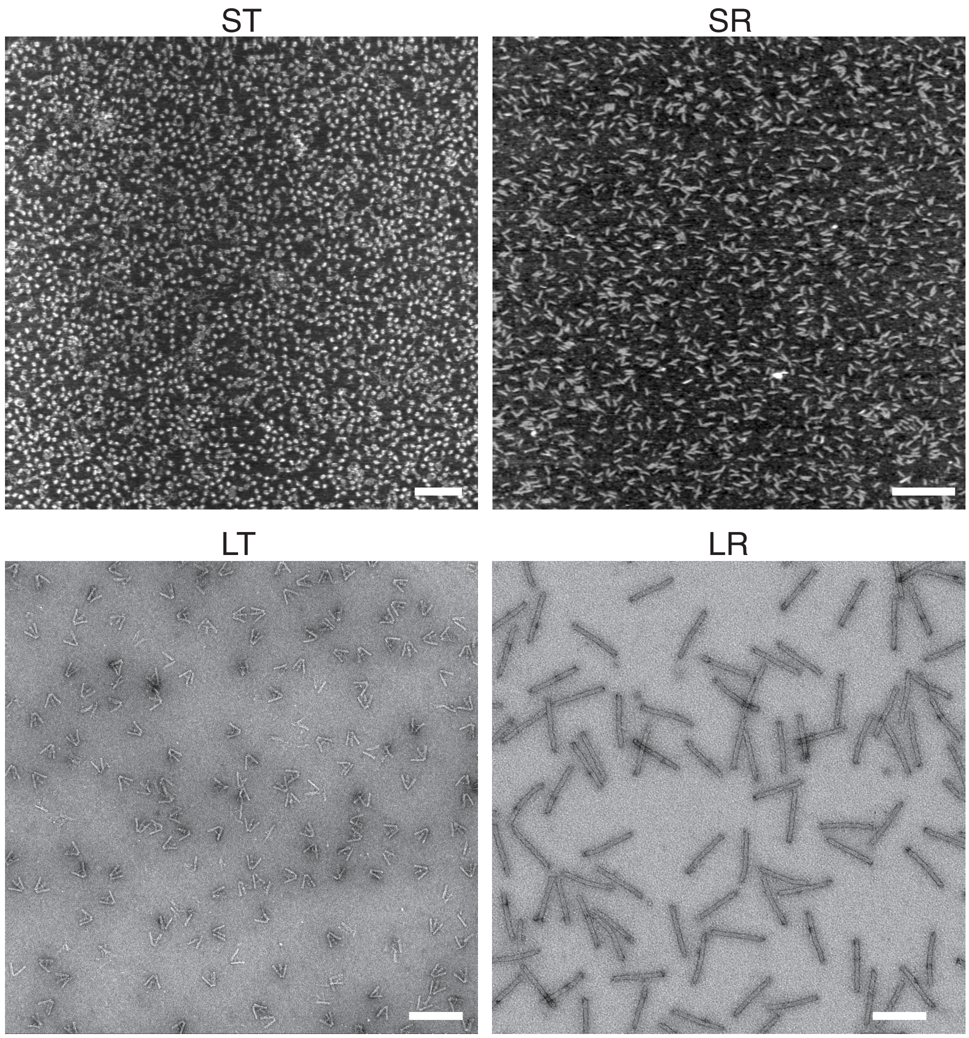


Figure S8. Large scale AFM (for ST, SR) and TEM (for LT, LR) images of DONs. Scale bars: 200 nm.

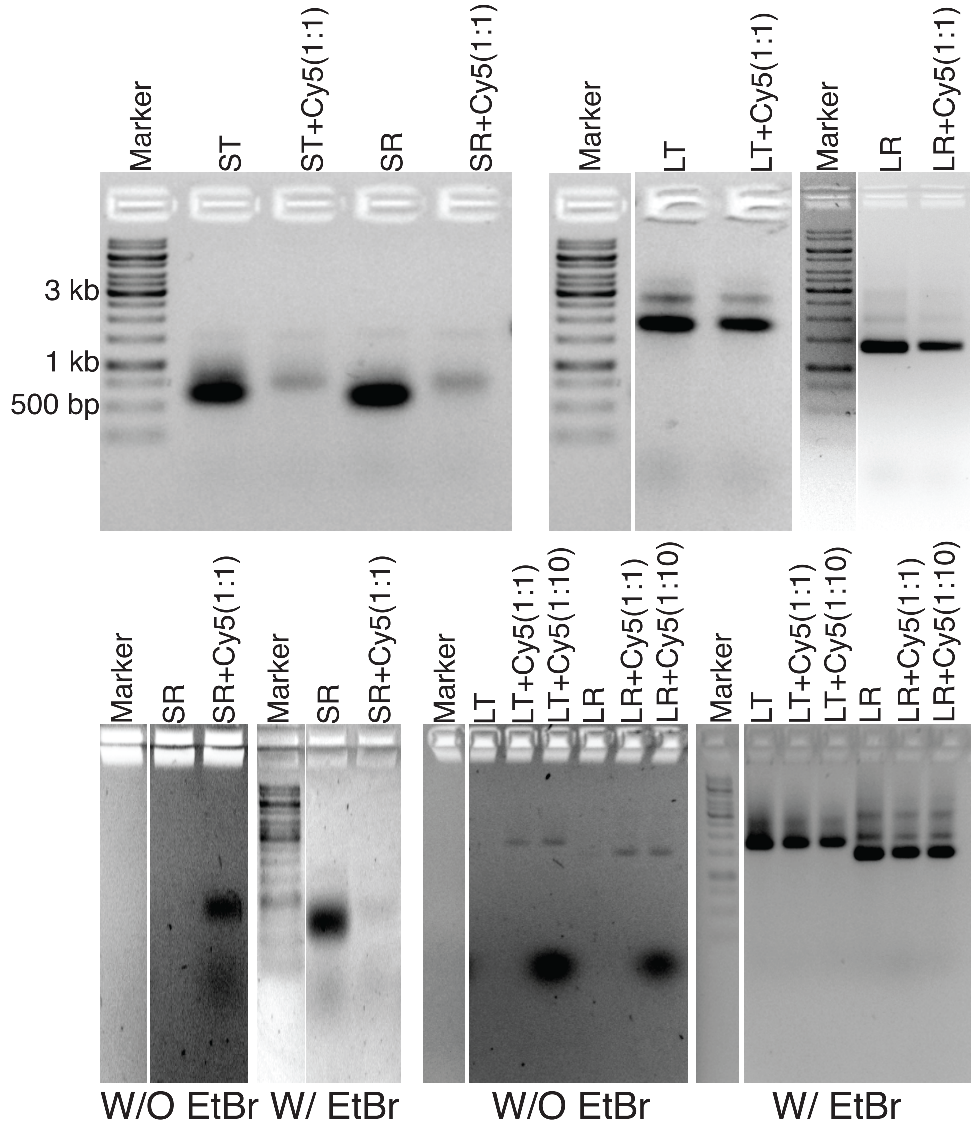


Figure S9. Attachment of Cy5-DNA onto DONs. The presence of Cy5 dimmed the fluorescence of EtBr possibly due to fluorescence resonance energy transfer (FRET) where the emission light of EtBr was absorbed by Cy5. Without EtBr staining, SR-Cy5, LT-Cy5, and LR-Cy5 showed visible bands due to Cy5 fluorescence under UV excitation that exhibited same mobility while under EtBr staining, confirming the successful loading of Cy5-DNA onto DONs. No free Cy5-DNA was observed in the gel at ratio of 1:1 for LT-Cy5 and LR-Cy5, and the presence of excessive amount of Cy5-DNA at ratio of 1:10 led to no observable increase in LT-Cy5 and LR-Cy5 band intensity comparing to that ratio of 1:1, indicating that Cy5-DNA was efficiently loaded onto DONs.

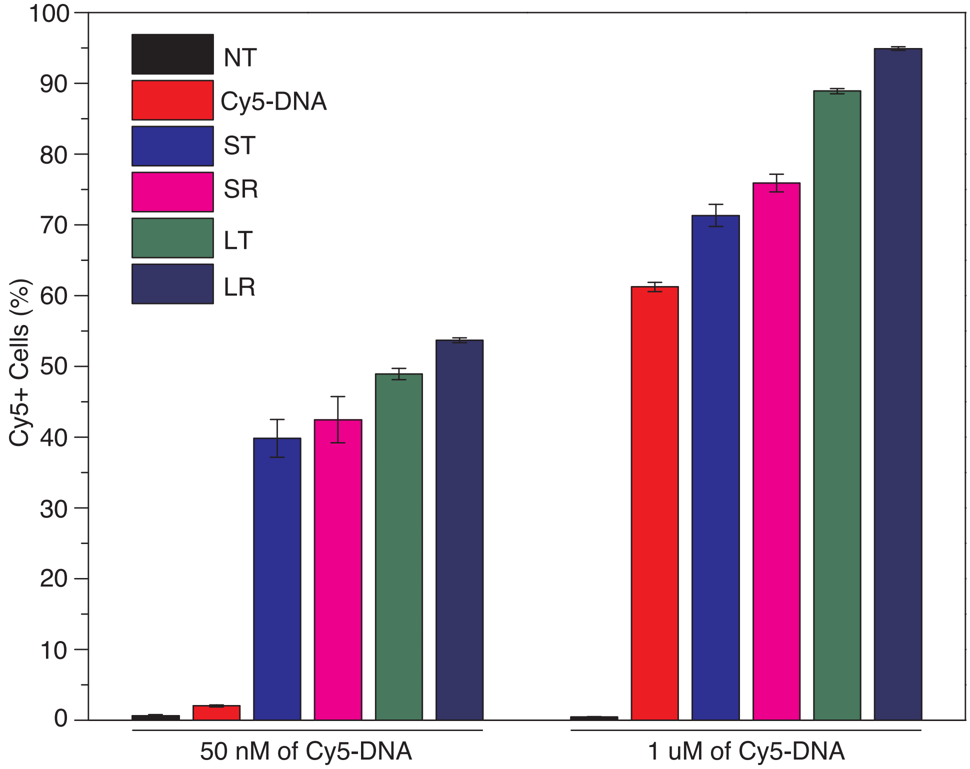


Figure S10. Concentration dependency of DONs uptake into H1299 cells after 4 hours of incubation. Similar trend in DONs cellular uptake was observed at Cy5 concentration of 50 nM and 1 uM comparing to 250 nM (Figure 3a), with larger DONs exhibiting higher uptake efficiency. Well, Cy5-DNA had significant cellular uptake by itself at 1 uM concentration, suggesting that Cy5-DNA may interfere DONs uptake at this condition, thus lower concentration shall be used (e.g. 250 nM).

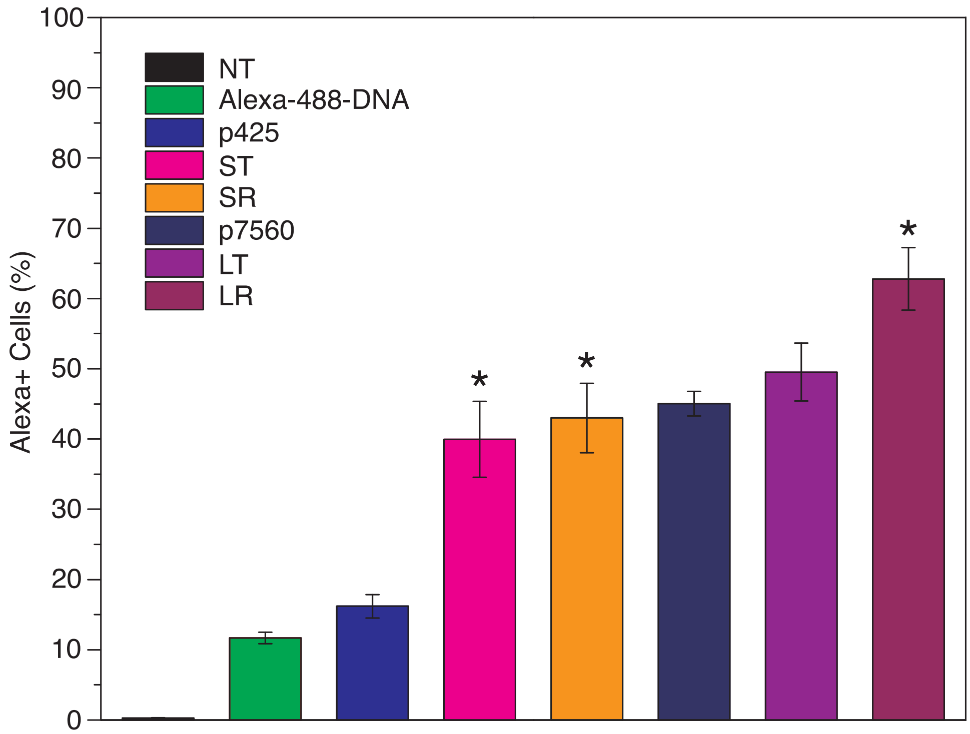


Figure S11. DONs uptake into H1299 cells after 4 hours of incubation with Alexa-488 as the tracking fluorophore at concentration of 250 nM. Similar trend was observed comparing to same experiments with Cy5 as the fluorophore (Figure 3a). ST and SR had higher uptake efficiency than p425 (**P*<0.05), while p7560 exhibited similarly cell uptake as LT but lower uptake efficiency than LR (**P*<0.05). All DONs exhibited significantly higher uptake efficiency than Alexa-488-DNA alone ((**P*<0.05).

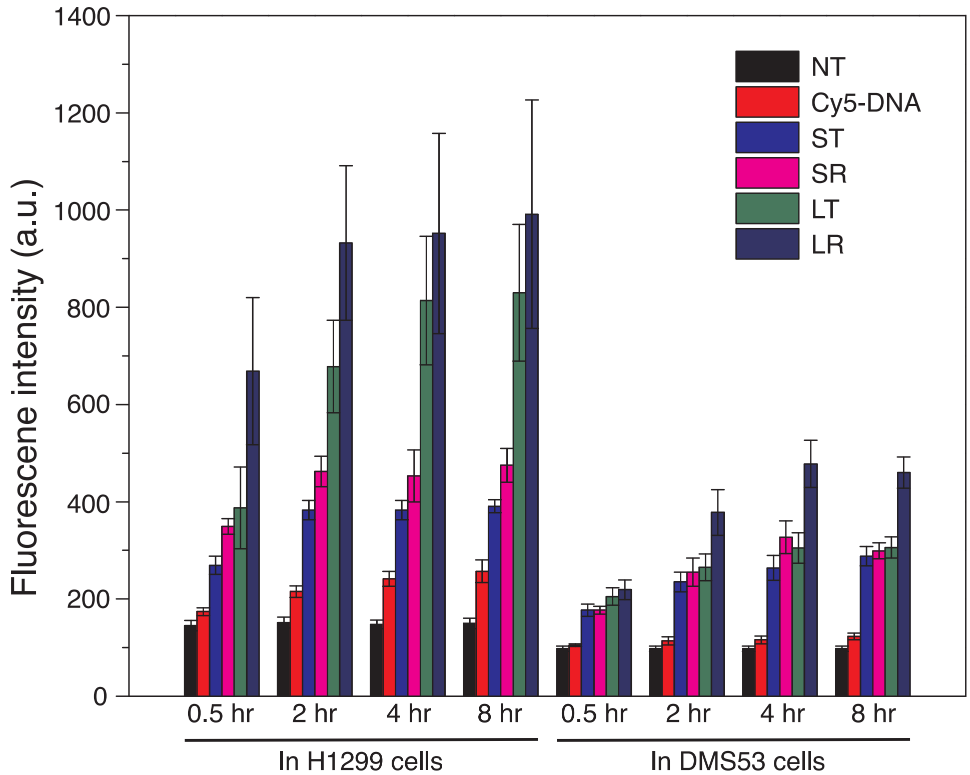


Figure S12. Median fluorescence intensity derived from flow cytometry of H1299 and DMS53 cells after 0.5, 2, 4, and 8 hrs incubation with DONs. Non-treated (NT) and Cy5-DNA treated cells were included as negative controls. Each column represents the average fluorescence intensity of cells from three independent experiments. Error bars represent standard deviations. Same trend was observed as shown in Figure 3a.

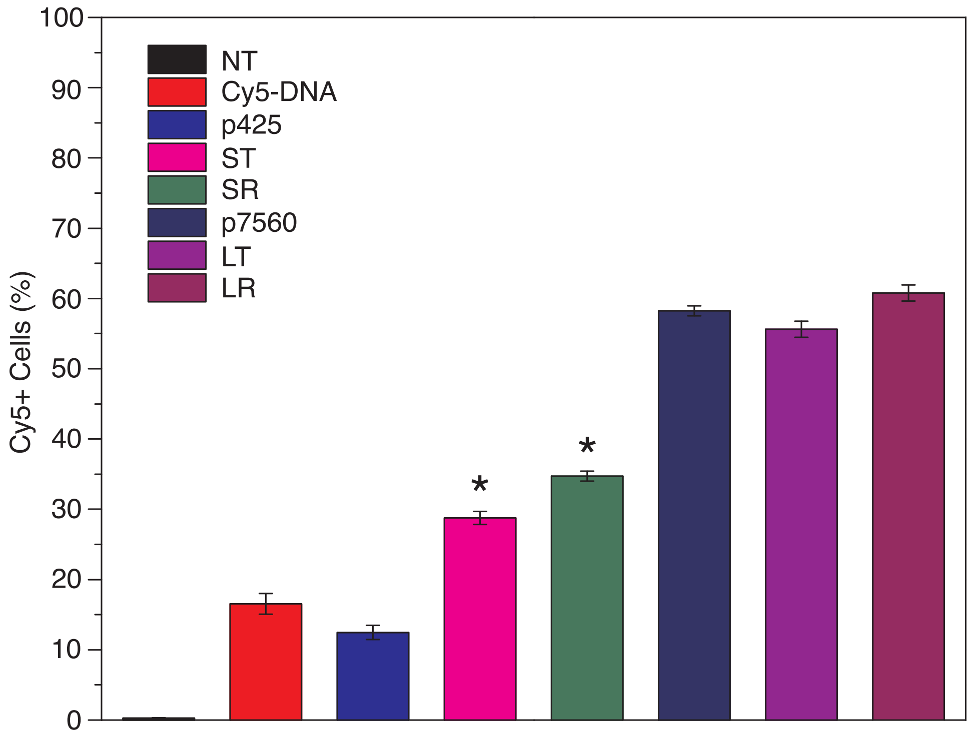


Figure S13. DONs uptake into H1299 cells after 4 hours of incubation. p425 and p7560 scaffolds were included for comparison. Cy5-DNA concentration was set at 250 nM. ST and SR had higher uptake efficiency than p425 (**P*<0.05), while p7560 exhibited similarly high cell uptake as LT and LR, which may attribute to its long and circular nature that formed randomly coiled 3D structures of potent cellular uptake capability.

Table S2. Statistical analysis of cellular uptake of DONs in H1299 and DMS53 cells.

	In H1299 Cell				In DMS53 Cell			
Pairwise comparison	0.5 H	2 H	4 H	8 H	0.5 H	2 H	4 H	8 H
ST vs NT	*	*	*	*	*	*	*	*
ST vs Cy5-DNA	*	*	*	*	*	*	*	*
ST vs SR	*	*	NS	NS	*	NS	*	*
ST vs LT	*	*	*	*	*	*	*	*
ST vs LR	*	*	*	*	*	*	*	*
SR vs NT	*	*	*	*	*	*	*	*
SR vs Cy5-DNA	*	*	*	*	*	*	*	*
SR vs LT	NS	*	*	*	*	NS	*	*
SR vs LR	*	*	*	*	*	*	*	*
LT vs NT	*	*	*	*	*	*	*	*
LT vs Cy5-DNA	*	*	*	*	*	*	*	*
LT vs LR	*	*	NS	NS	*	*	*	*
LR vs NT	*	*	*	*	*	*	*	*
LR vs Cy5-DNA	*	*	*	*	*	*	*	*
Cy5-DNA vs NT	NS	NS	NS	NS	*	NS	*	*

H1299 Cell vs DMS53 Cell				
	0.5 H	2 H	4 H	8 H
ST	*	*	*	*
SR	*	*	*	*
LT	*	*	*	*
LR	*	*	*	*
Cy5-DNA	NS	NS	NS	NS
NT	NS	NS	NS	NS

*Indicates the difference between this pair are statistically significant with $P<0.05$

NS=Non statitically significant

Note: Statistical analysis is based on the flow cytometry data shown in Figure 3a.

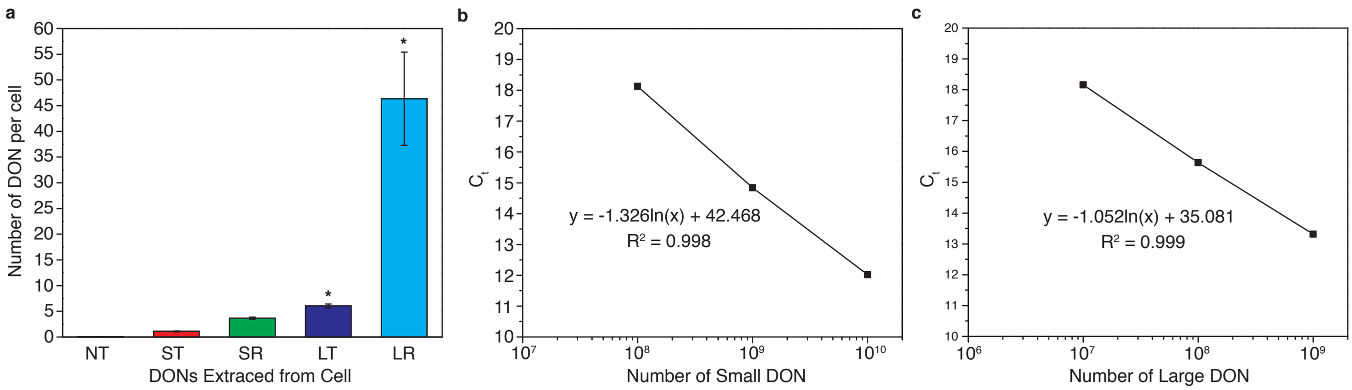


Figure S14. Quantitative PCR quantification of DONs uptake into H1299 cells after 4 hours of incubation. **a**. Number of DONs per cell derived from qPCR. LT and LR exhibited significantly higher number of DONs per cell than ST and SR (**P*<0.05). And rod-shaped DONs had higher uptake than tetrahedron-shaped DONs of similar size. **b**. Standard curve for small DONs. **c**. Standard curve for large DONs. Note that the absolute number of DONs per cell from qPCR was underestimated because significant loss of DONs may happen prior to PCR amplification, such as intracellular nuclease degradation, loss during cellular DNA extraction, loss during ethanol precipitation. And the loss was theoretically more severe for small DONs given p425 scaffold DNA's higher vulnerability to nuclease digestion and lower ethanol precipitation efficiency (since it is shorter and linear).

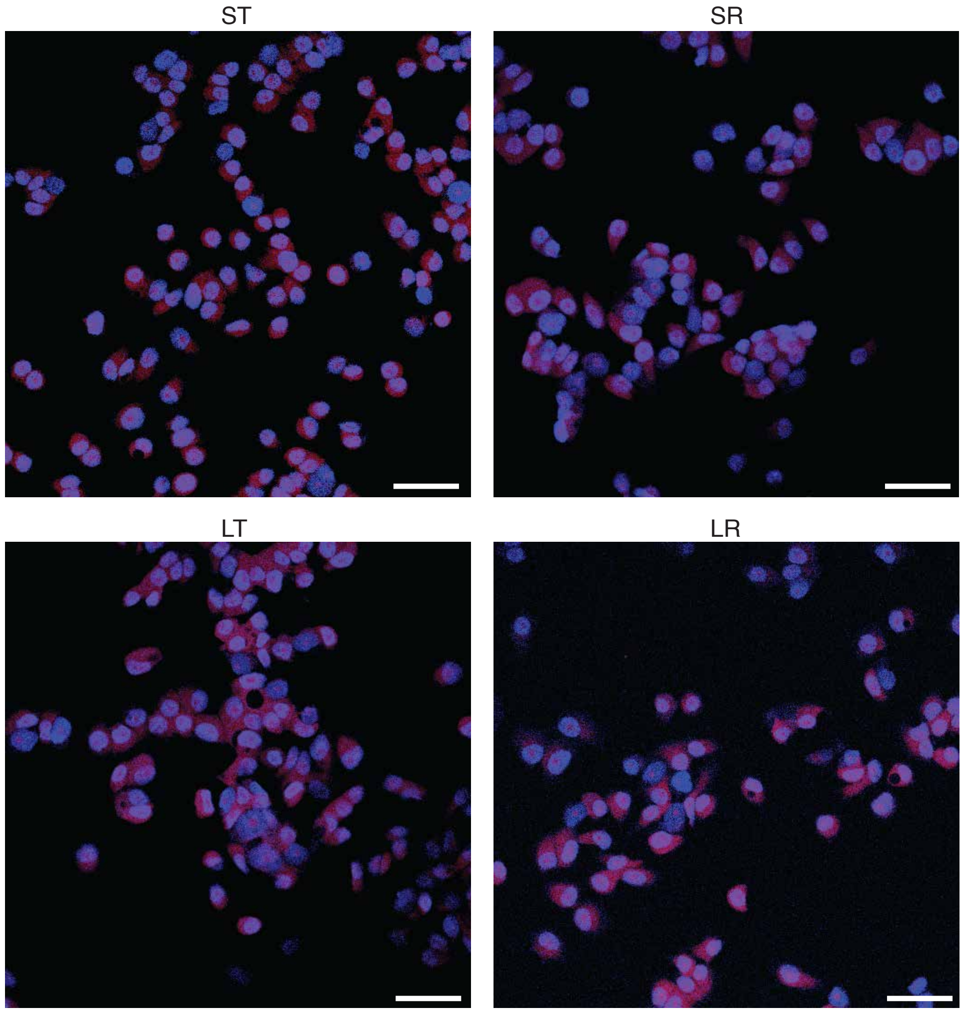


Figure S15. Cellular uptake of DONs in DMS53 cells after 8 hours of incubation studied by confocal. Blue: DAPI, red: Cy5. Scale bars: 25 μm.

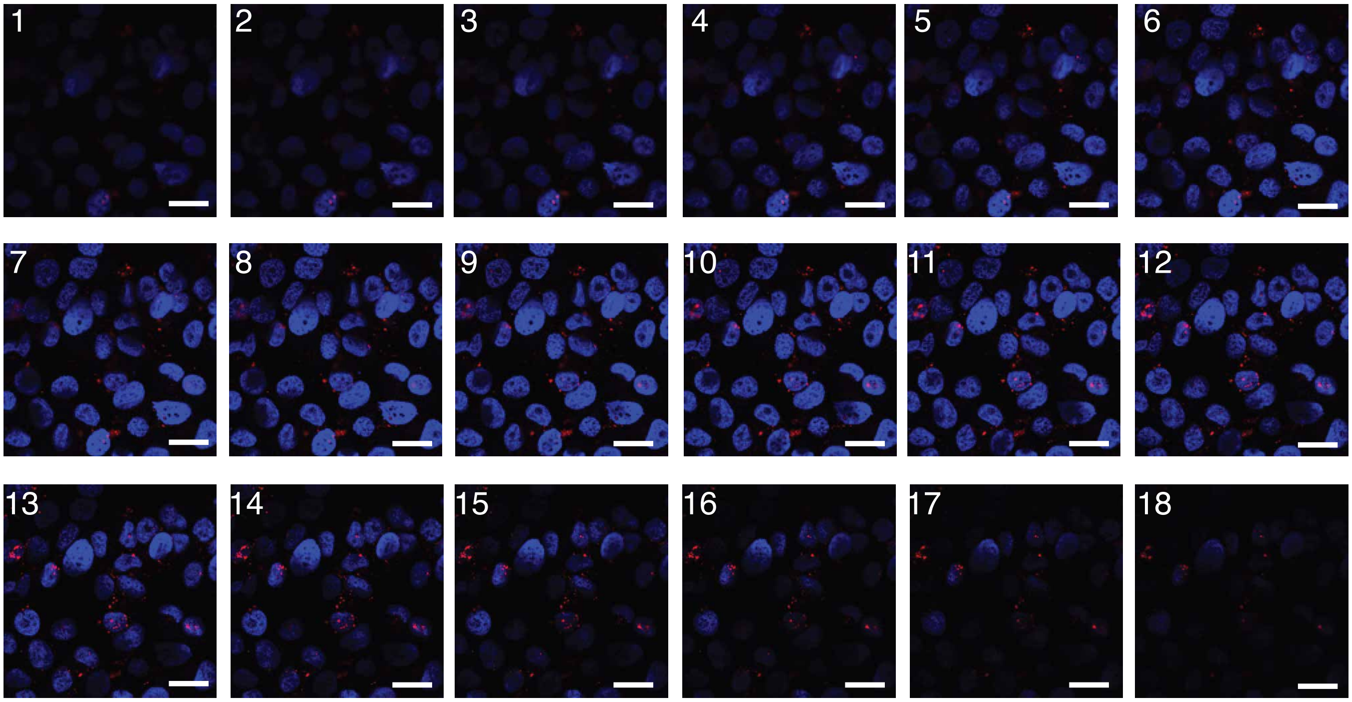


Figure S16. Continuous z-sections of confocal images of ST-Cy5 in H1299 cells with 8 hours of incubation. Blue: DAPI, red: Cy5. Scale bars: 25 μm.

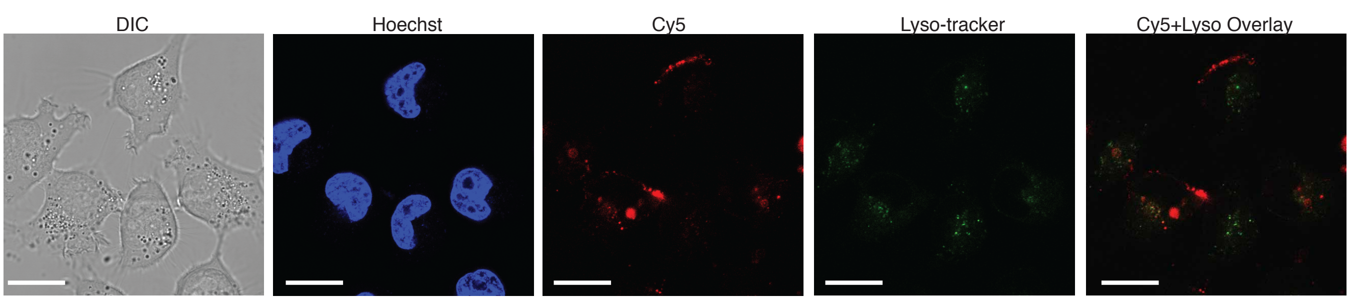
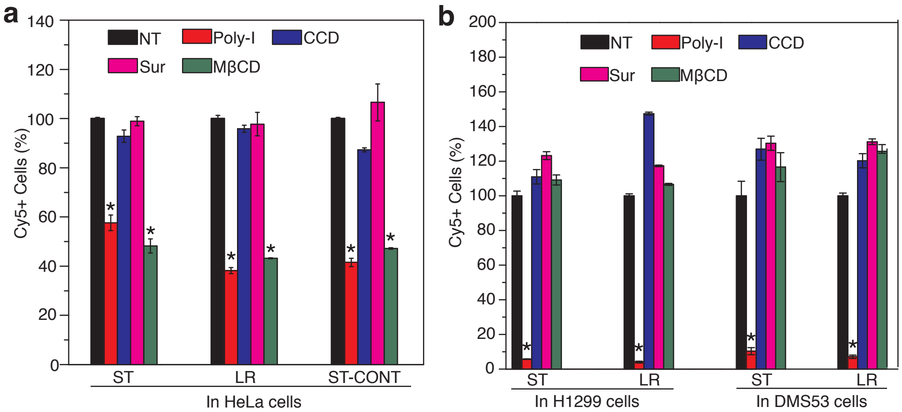


Figure S17. Intracellular co-localization study of SR-Cy5 with lysosome in H1299 cells. Cy5 fluorescence partially co-localize with lysosome. Scale bars: 25 μm.



c

Conditions for pharmacological inhibition studies

	H1299 DMS53	HeLa	Literature	Pathway blocked
Poly-I	40 µg/mL	40 µg/mL	50 µg/mL	Scavenger receptors
CCD	0.25 µM	4 µM	4 µM	Phagocytosis
Sur	100 mM	450 mM	450 mM	Clathrin pathway
MβCD	625 nM	1 mM	10 mM	Caveolin pathway

Figure S18. Pharmacological inhibition study of DONs-Cy5 in cancer cells. **a**. Pathway study of ST, LR, and ST-CONT in HeLa cells. **b**. Pathway study of ST, LR, and ST-CONT in H1299 and DMS53 cells. **c**. Conditions used for pharmacological inhibition study. All columns represent mean±standard deviation from three independent experiments. *$P<0.05$ compared with NT. Noted that percentage of Cy5+ cells was normalized based on NT which was set at 100%.

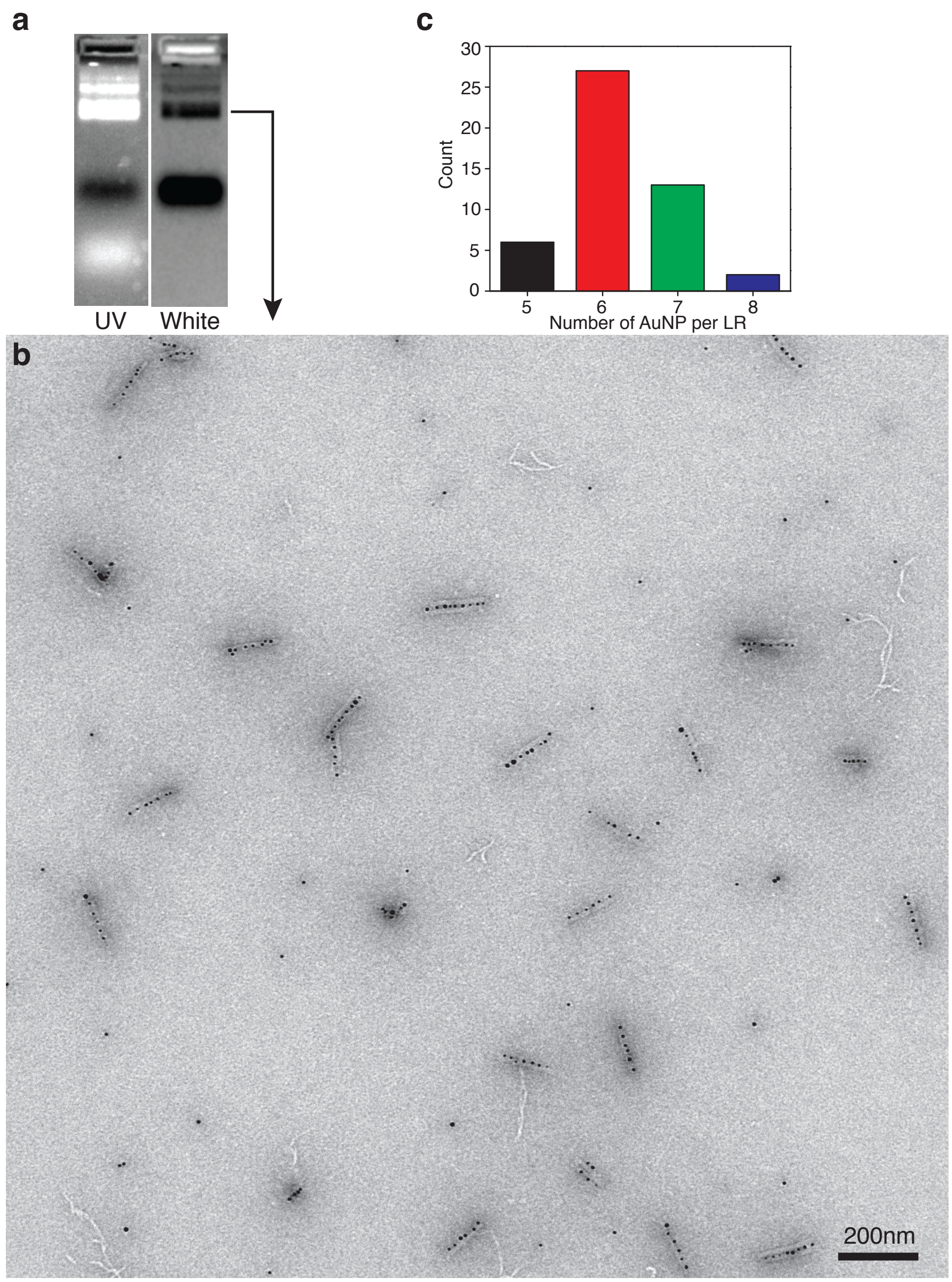


Figure S19. Barcoding AuNPs onto LR. **a**. Native agarose gel electrophoresis. **b**. Low-magnification TEM image of LRs barcoded with AuNPs. **c**. Statistical distribution of AuNP numbers tagged onto LR.

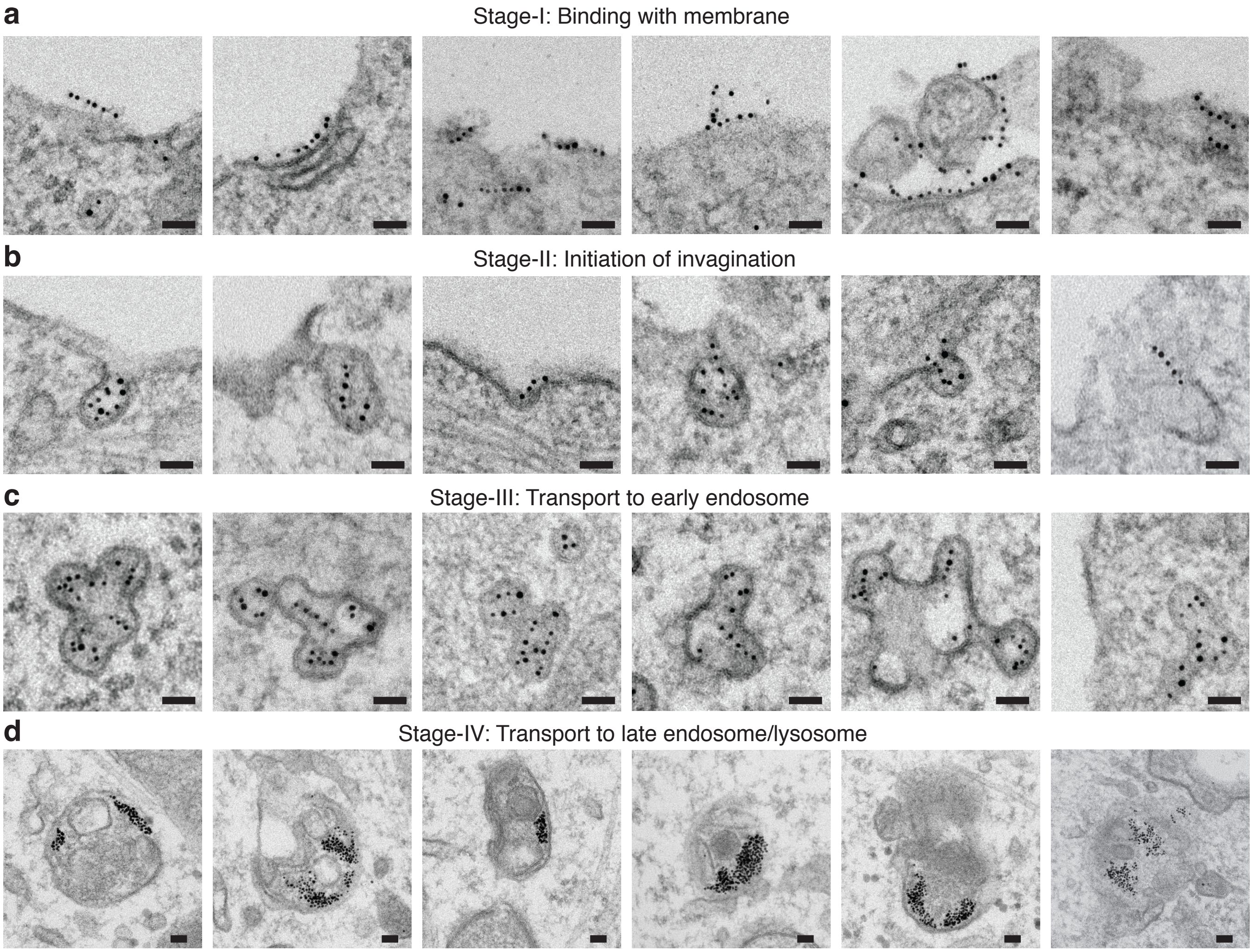


Figure S20. Additional representative TEM images of each internalization stage of LRs in H1299 cells. Scale bars: 50 nm.

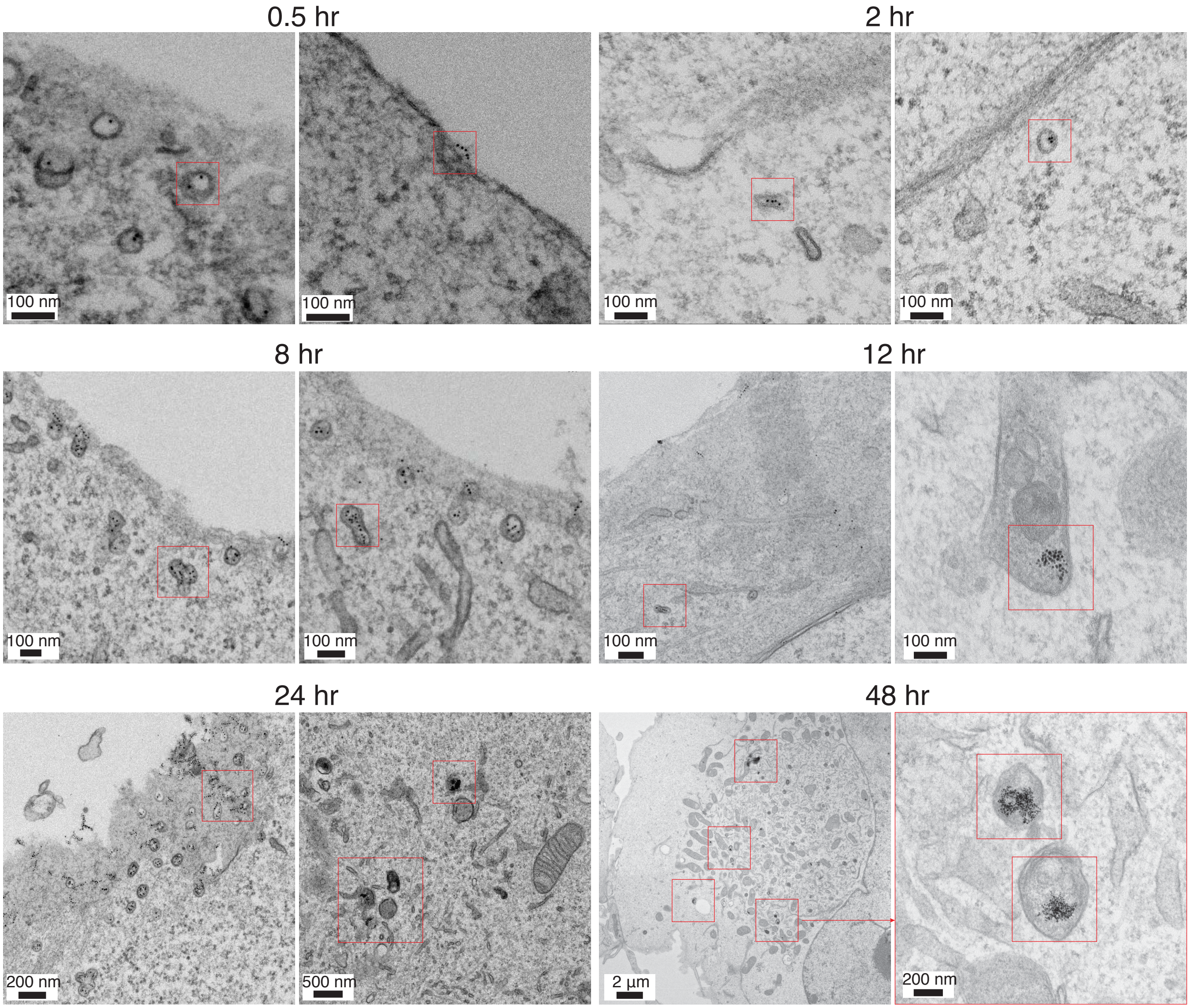


Figure S21. Representative TEM images of barcoded LRs in H1299 cells at varied time points.

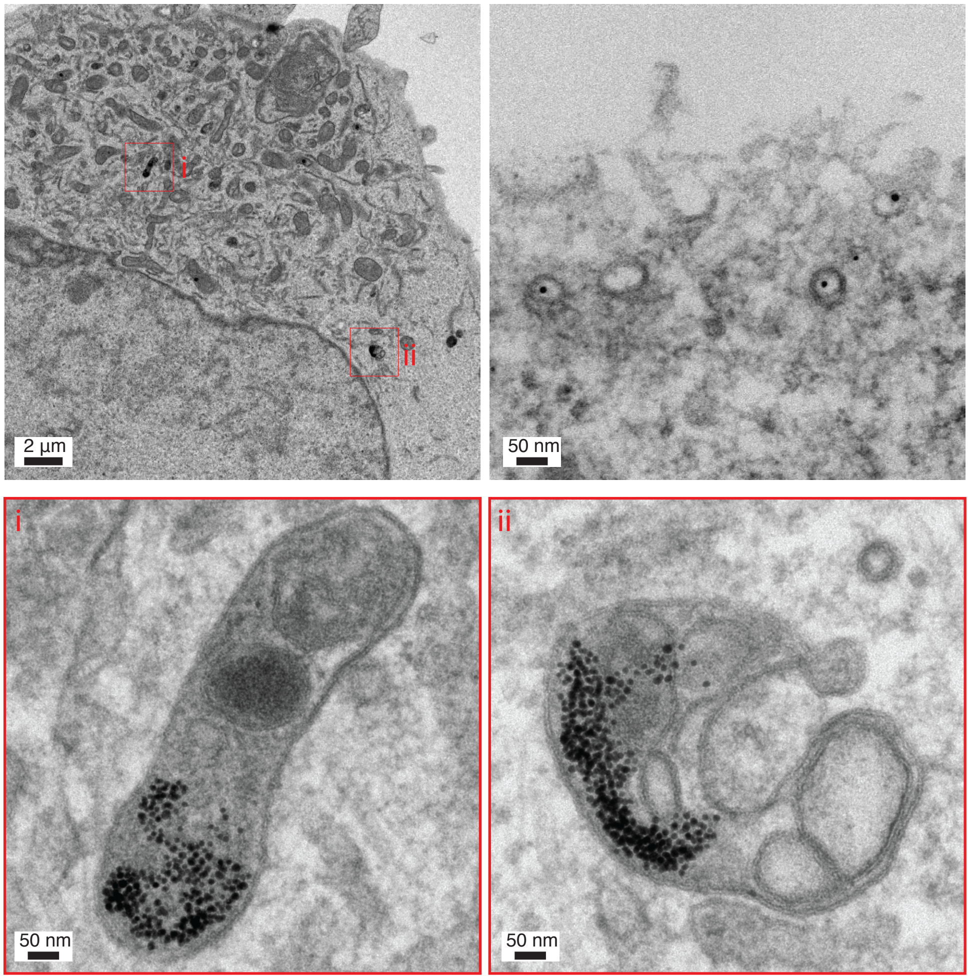


Figure S22. TEM study of free AuNP's internalization in H1299 cells.

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2. Wang, P.; Gaitanaros, S.; Lee, S.; Bathe, M.; Shih, W. M.; Ke, Y. *J Am Chem Soc* **2016,** *138* (24), 7733-7740.
3. Okholm, A. H.; Nielsen, J. S.; Vinther, M.; Sorensen, R. S.; Schaffert, D.; Kjems, J. *Methods* **2014,** *67* (2), 193-197.

Section 3. DNA Strands Sequences

p7560:
AGCTTGGCACTGGCCGTCGTTTTACAACGTCGTGACTGGGAAAACCCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTGG
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TCTTATCAAAAGGAGCAATTAAAGGTACTCTCTAATCCTGACCTGTTGGAGTTTGCTTCCGGTCTGGTTCGCTTTGAAGCTCGAATTAAAACGCGATATTTG
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TTTCTGAACTGTTTAAAGCATTTGAGGGGGATTCAATGAATATTTATGACGATTCCGCAGTATTGGACGCTATCCAGTCTAAACATTTTACTATTACCCCCTC
TGGCAAAACTTCTTTTGCAAAAGCCTCTCGCTATTTTGGTTTTTATCGTCGTCTGGTAAACGAGGGTTATGATAGTGTTGCTCTTACTATGCCTCGTAATTC
CTTTTGGCGTTATGTATCTGCATTAGTTGAATGTGGTATTCCTAAATCTCAACTGATGAATCTTTCTACCTGTAATAATGTTGTTCCGTTAGTTCGTTTTATTAA
CGTAGATTTTTCTTCCCAACGTCCTGACTGGTATAATGAGCCAGTTCTTAAAATCGCATAAGGTAATTCACAATGATTAAAGTTGAAATTAAACCATCTCAAG
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GACCGTCTGCGCCTCGTTCCGGCTAAGTAACATGGAGCAGGTCGCGGATTTCGACACAATTTATCAGGCGATGATACAAATCTCCGTTGTACTTTGTTTC
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GACGATCCCGCAAAAGCGGCCTTTAACTCCCTGCAAGCCTCAGCGACCGAATATATCGGTTATGCGTGGGCGATGGTTGTTGTCATTGTCGGCGCAACT
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GAAAAAATTATTATTCGCAATTCCTTTAGTTGTTCCTTTCTATTCTCACTCCGCTGAAACTGTTGAAAGTTGTTTAGCAAAATCCCATACAGAAAATTCATTTA
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CGGGCACTGTTACTCAAGGCACTGACCCCGTTAAAACTTATTACCAGTACACTCCTGTATCATCAAAAGCCATGTATGACGCTTACTGGAACGGTAAATTC
AGAGACTGCGCTTTCCATTCTGGCTTTAATGAGGATTTATTTGTTTGTGAATATCAAGGCCAATCGTCTGACCTGCCTCAACCTCCTGTCAATGCTGGCGG
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GAGGTAACAAGCACCACGTAGCTTAAGCCCTGTTTACTCATTACACCAACCAGGAGGTCAGAGTTCGGAGAAATGATTTATGTGAAATGCGTCAGCCGAT
TCAAGGCCCCTATATTCGTGCCCACCGACGAGTTGCTTACAGATGGCAGGGCCGCACTGTCGGTATCATAGAGTCACTCCAGGGCGAGCGTAAATAGAT
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p425:
GTATTCTTACGCTTTCAGGTCAGAAGGGTTCTATCTCTGTTGGCCAGAATGTCCCTTTTATTACTGGTCGTGTGACTGGTGAATCTGCCAATGTAAA
TAATCCATTTCAGACGATTGAGCGTCAAAATGTAGGTATTTCCATGAGCGTTTTTCCTGTTGCAATGGCTGGCGGTAATATTGTTCTGGATATTACCA
GCAAGGCCGATAGTTTGAGTTCTTCTACTCAGGCAAGTGATGTTATTACTAATCAAAGAAGTATTGCTACAACGGTTAATTTGCGTGATGGACAGAC
TCTTTTACTCGGTGGCCTCACTGATTATAAAAACACTTCTCAGGATTCTGGCGTACCGTTCCTGTCTAAAATCCCTTTAATCGGCCTCCTGTTTAGC
TCCCGCTCTGATTCTAACGAGGAAAGCACGTTATAC

Helper strands for p425 preparation
Helper_p425-1 GTAAGAATACGTGGCACAGA
Helper_p425-2 TGACGAGCACGTATAACGTG

Cy5-DNA: ACACACACACACA-Cy5
Alexa488-DNA: ACACACACACACA-Alexa488

DNA Strands of Small Tetrahedron (ST)

Name	Sequence	Note
ST-Fluo-1	TGTGTGTGTGTGT GTCTGAAATGGATTATTAATATCCAGAACAAT TGTGTGTGTGTGT	Fluo handle
ST-Fluo-2	TGTGTGTGTGTGT TCATGGAAATACCTACATTTTGAGATAGAACCCTTCTGACCT TGTGTGTGTGTGT	Fluo handle
ST-Fluo-3	TGTGTGTGTGTGT TCTGGCCAACAGACGCTCAATC TGTGTGTGTGTGT	Fluo handle
ST-Fluo-4	TGTGTGTGTGTGT ATTACCGCCAGTTGATTAGTAA TGTGTGTGTGTGT	Fluo handle
ST-Fluo-5	TGTGTGTGTGTGT AACCGTTGTAGCAATACTTCTCCATTGCAACAGGAAAAACGCTGTGTGTGTGTGT	Fluo handle
ST-Fluo-6	TGTGTGTGTGTGT CTATCGGCCTTGCTGGTTACATTGGCAGATTC TGTGTGTGTGTGT	Fluo handle
ST-Fluo-7	TGTGTGTGTGTGT CCTGAGAAGTGTTTTTAGTAGAAGAACTCAAA TGTGTGTGTGTGT	Fluo handle
ST-Fluo-8	TGTGTGTGTGTGT ACCAGTCACACGACCAAACGGTACGCCAGAAT TGTGTGTGTGTGT	Fluo handle
ST-Fluo-9	TGTGTGTGTGTGT AGGGATTTTAGACAGGGTAATAAAAGGGACAT TGTGTGTGTGTGT	Fluo handle
ST-Fluo-10	TGTGTGTGTGTGT CCGAGTAAAAGAGTCTGTCCAAATACACAGGAGGCCGATTAA TGTGTGTGTGTGT	Fluo handle
ST-Fluo-11	TGTGTGTGTGTGT GAAAGCGTAAGTCACGCAAATT TGTGTGTGTGTGT	Fluo handle
ST-Fluo-12	TGTGTGTGTGTGT TAACATCACTTGCCTGATAATCAGTGAGGCCA TGTGTGTGTGTGT	Fluo handle

DNA Strands of Small Tetrahedron Control (ST-CONT)

Name	Sequence	Note
ST-CONT-Fluo-1	TGTGTGTGTGTGT ACATTCCTAAGTCTGAAACATTACAGCTTGCTACACGAGAAGAGCCGCCATAGTA	Fluo handle
ST-CONT-Fluo-2	TGTGTGTGTGTGT ATCACCAGGCAGTTGACAGTGTAGCAAGCTGTAATAGATGCGAGGGTCCA ATAC	Fluo handle
ST-CONT-Fluo-3	TGTGTGTGTGTGT TCAACTGCCTGGTGATAAAACGACACTACGTGGGAATCTACTATGGCGGCTCTTC	Fluo handle
ST-CONT-Fluo-4	TGTGTGTGTGTGT TTCAGACTTAGGAATGTGCTTCCCACGTAGTGTCGTTTGTATTGGACCCTCGCAT	Fluo handle

DNA Strands of Small Rod (SR)

Name	Sequence	Note
SR-Fluo-1	TGTGTGTGTGTGT ACTTGCCTTTGCTGGTGACCTGAAAGCGTAAG TGTGTGTGTGTGT	Fluo handle
SR-Fluo-2	TGTGTGTGTGTGT GTAGCAATAGCCATTGGACATTCTGGCCAACA TGTGTGTGTGTGT	Fluo handle
SR-Fluo-3	TGTGTGTGTGTGT AAAGAGTCTACCTACAGATTCACCAGTCACAC TGTGTGTGTGTGT	Fluo handle
SR-Fluo-4	TGTGTGTGTGTGT TACGCCAGAATCCTGACATTGGCATTTTGACGCTCAATCG TGTGTGTGTGTGT	Fluo handle
SR-Fluo-5	TGTGTGTGTGTGT CCTCGTTAGAATCAGAACCCTTCTAATATCCA TGTGTGTGTGTGT	Fluo handle
SR-Fluo-6	TGTGTGTGTGTGT AGGCCGATTAAAGGGAATAAAAGGCAACAGGA TGTGTGTGTGTGT	Fluo handle
SR-Fluo-7	TGTGTGTGTGTGT GTGAGGCCACCGAGTA TGTGTGTGTGTGT	Fluo handle
SR-Fluo-8	TGTGTGTGTGTGT TATCGGCCGAGTAGAA TGTGTGTGTGTGT	Fluo handle
SR-Fluo-9	TGTGTGTGTGTGT GAGATAGAGCGGGAGCGATTAGTAATAACATC TGTGTGTGTGTGT	Fluo handle
SR-Fluo-10	TGTGTGTGTGTGT GACCAGTATTTTAGACACGCAAATTAACCGTT TGTGTGTGTGTGT	Fluo handle
SR-Fluo-11	TGTGTGTGTGTGT AAAACGCTCATGGAAATGTCCATCAGGAACGG TGTGTGTGTGTGT	Fluo handle
SR-Fluo-12	TGTGTGTGTGTGT ATTATTTAGAAGTGTT TGTGTGTGTGTGT	Fluo handle
SR-Fluo-13	TGTGTGTGTGTGT CGTGCTTT TGTGTGTGTGTGT	Fluo handle
SR-Fluo-14	TGTGTGTGTGTGT GAACAATATTACCGCCACTTCTTTTAAACAGG TGTGTGTGTGTGT	Fluo handle

DNA Strands of Large Rod (LR)

Name	Sequence	Note
LR-Fluo-1	CCAGACGAGGAATCATGCTGTCTTAAGAGCAA	core
LR-Fluo-2	CGACAAAACATCGGGAGACGCTGAGAAGAGTC	core
LR-Fluo-3	GCGCATACTATTTGCATATACAGTTCTTACCG	core
LR-Fluo-4	TTATGAATTGCTTATGATCCTTGAAAACATAG	core
LR-Fluo-5	ATTAGTCTCGTGTATTGGTCAAGAAGATAGCC	core
LR-Fluo-6	CACAGACACGCCATTAGTTGTAGCAATACTTC	core
LR-Fluo-7	ATACGTGGCTGAGAGCACCACCAGGAGGAAAC	core

LR-Fluo-8	ACGCGCGGGTTGCGCTGTAAAAGAGTCTGTCC	core
LR-Fluo-9	ATCGGCCAGTGTGAAAAGCCTGGGGAACTGGC	core
LR-Fluo-10	GATTCGTGACCTGTCTACGTCAAAGGGCGAAA	core
LR-Fluo-11	ACCCGTCGCAAATCGGACAGTCATGTATGTTA	core
LR-Fluo-12	AACATTAACCGTAATGAGTCAAATCACCATCA	core
LR-Fluo-13	CTTTCATCAGCTTTCCAACCGTGCAAGGTGGC	core
LR-Fluo-14	CGCGTCTGTTCGAGCTAAAGATTCAAAAGGGT	core
LR-Fluo-15	ATATAATTCCCTCAAAGACTTCAAACCACGGA	core
LR-Fluo-16	GATGGCTTAACTCCAATTTTAAATGCAATGCC	core
LR-Fluo-17	TTTTTGCGGAATGACCTTGCATCATAGAAAAT	core
LR-Fluo-18	AGCGCTCCTAATTGATGCAAGGATAAAAATTT	core
LR-Fluo-19	TGACCCCCCCTTACTTCATGTGACACAAAAGG	core
LR-Fluo-20	AGAATACAAACGGAGACTTAAACAGCTTGATA	core
LR-Fluo-21	GAGGCAAAAATCATAATGATAAATGGAAGGTA	core
LR-Fluo-22	GATAAGTGTGCCCCCTTCGGTTTATCAGCTTG	core
LR-Fluo-23	ACCAGGCGTCATTAAAGGGGTCAGAAGGTGAA	core
LR-Fluo-24	AGGATTAGGAAACATGAAAAAAGGCTCCAAAA	core
LR-Fluo-25	AGGCTTATCTACAATTTCTTACCAACGCTAAC	core
LR-Fluo-26	GATATAGAGTAATAAGCAATTTAGGCCTGAAT	core
LR-Fluo-27	TTAGAACCAATATAATCGGAATTATCATCATA	core
LR-Fluo-28	TGGAAGGGCATTTCAAAAAAGAAGGAATTACC	core
LR-Fluo-29	TATCAAACTATCTGGTTAGGAGCACTAACAAC	core
LR-Fluo-30	ACCTCAAAAGAGATAGATTCACCAACATTTTG	core
LR-Fluo-31	AAATCTAAGGACTGGTACCTCATTGAGGAAGG	core
LR-Fluo-32	TGGTCGAACGTATTGGAGTTGCAGACGCTGGT	core
LR-Fluo-33	GTACCGAGAAGCTACGGCATTTCACATAAATC	core
LR-Fluo-34	ATCCCCGGCCAGTGAGGCTGATTGTTTGATGG	core
LR-Fluo-35	GAAGGGCGGCCTCTTCCACGACGTTGTAAAAC	core
LR-Fluo-36	ACTGTTGGTTTTTGTTATATTTAATGTCAATC	core
LR-Fluo-37	GCCATTCGGGGATGTGATTAAGTTGGGTAACG	core
LR-Fluo-38	GGCAAAGCAGGAACGCAAACCCCAAAAAGTGG	core
LR-Fluo-39	GTCATAAAACCAGACGGGAATTACGAGGCATA	core
LR-Fluo-40	GCGGAATCACATGTTTTAGATTTATCATTTGG	core
LR-Fluo-41	TTAGACTGGGCTTTTGCATTCAACTAATGCAG	core
LR-Fluo-42	TAAAATGTTCTGGAAGTATAACAGAATTCTAC	core
LR-Fluo-43	CAGACCAGTGGCTGACAACAAAGCTGCTCATT	core
LR-Fluo-44	ACGGTGTAAATGCCACAAAGACTTCAGCATCG	core
LR-Fluo-45	CCAACTTTGAAGAACCCACCGCCGGATATTCA	core
LR-Fluo-46	TCACATGAGATATAAGCCCAATAGACCGTAAC	core
LR-Fluo-47	AGGTCAGAAGAACCGCTTCATAATCAAAATCA	core
LR-Fluo-48	GTTGAGGCCGTACTCAGAGCCACCCTACAACG	core
LR-Fluo-49	TGTGTGTGTGTGT AATAGTGACAAGACAAAATTCTGTTCGAGCCA	Face-1 Fluo handle
LR-Fluo-50	TGTGTGTGTGTGT CGATAGCTATCGTCGCACAAAATCGAATTATT	Face-1 Fluo handle
LR-Fluo-51	TGTGTGTGTGTGT TTTGATTACACTTGCCGAATGGCTTGGCCAAC	Face-1 Fluo handle
LR-Fluo-52	TGTGTGTGTGTGT ATCACGCAGCCTTGCTGGTTAAGAAAGCGTTG	Face-1 Fluo handle
LR-Fluo-53	TGTGTGTGTGTGT AACCGTCTAGAGTCCAATTAATGATCTTTTCA	Face-1 Fluo handle
LR-Fluo-54	TGTGTGTGTGTGT ATATGATACTAGCTGAGAGTAACAGCATTAAA	Face-1 Fluo handle
LR-Fluo-55	TGTGTGTGTGTGT GAGAAAGGTATTTTTGGTAGCCAGTAACCAAT	Face-1 Fluo handle
LR-Fluo-56	TGTGTGTGTGTGT TGAGTAATTCGGTTGTATTGCTGAGTAGCTCA	Face-1 Fluo handle
LR-Fluo-57	TGTGTGTGTGTGT TTAGAACCTACTTTTGAGAGGTCAGTACGGTG	Face-1 Fluo handle
LR-Fluo-58	TGTGTGTGTGTGT CCGATAGTATGACAACCTCATCTTAAATACGT	Face-1 Fluo handle
LR-Fluo-59	TGTGTGTGTGTGT CTTTCGAGATATTCGGAGGCGAAATAAAAGTT	Face-1 Fluo handle
LR-Fluo-60	TGTGTGTGTGTGT GGAGCCTTAGCGGAGTTGCTCAGTTGTATCAC	Face-1 Fluo handle
LR-Fluo-61	TGTGTGTGTGTGT TCCAATCGATTTATCAAATTTACG	Face-1 Fluo handle
LR-Fluo-62	TGTGTGTGTGTGT TTCTGTAATAGATTAAGAAACAAT	Face-1 Fluo handle
LR-Fluo-63	TGTGTGTGTGTGT CTTAACATGTAATAGACGCGAACT	Face-1 Fluo handle
LR-Fluo-64	TGTGTGTGTGTGT AACTATCGAATTAACCAAAATACC	Face-1 Fluo handle
LR-Fluo-65	TGTGTGTGTGTGT TTGGAACAATCACCGACACTGCCC	Face-1 Fluo handle
LR-Fluo-66	TGTGTGTGTGTGT ACTCCGTTTTCAACCACCGTGGGA	Face-1 Fluo handle
LR-Fluo-67	TGTGTGTGTGTGT AGGGTAGCCCGGAGACGGATAGGT	Face-1 Fluo handle
LR-Fluo-68	TGTGTGTGTGTGT AAGCTAAAGTGTAGGTTCAAAGCG	Face-1 Fluo handle
LR-Fluo-69	TGTGTGTGTGTGT CCCTGTAACTCATATACAGGTCAG	Face-1 Fluo handle
LR-Fluo-70	TGTGTGTGTGTGT TTCCGACATGCGCAACTATACCAA	Face-1 Fluo handle
LR-Fluo-71	TGTGTGTGTGTGT TAACCGATGTGAATTTTTTGTATC	Face-1 Fluo handle

LR-Fluo-72	TGTGTGTGTGTGT ACAGTTTCTAATTGTAGCCTATTT	Face-1 Fluo handle
LR-Fluo-73	TGTGTGTGTGTGT TATTTTAGTAGAAAAATATCATAT	Face-1 Fluo handle
LR-Fluo-74	TGTGTGTGTGTGT ATATGTGATTTCATTTATGATGAA	Face-1 Fluo handle
LR-Fluo-75	TGTGTGTGTGTGT CAGGAAAAAAATACCTGTCACACG	Face-1 Fluo handle
LR-Fluo-76	TGTGTGTGTGTGT ATCCAGAAAATGGTCCCAAGCGGA	Face-1 Fluo handle
LR-Fluo-77	TGTGTGTGTGTGT ATCAAAAGAAATCCTGCCCTTCAC	Face-1 Fluo handle
LR-Fluo-78	TGTGTGTGTGTGT GATGAACGAACTAGCAATTGTAAA	Face-1 Fluo handle
LR-Fluo-79	TGTGTGTGTGTGT TTGCCTGAATAATCAGAAAACAGG	Face-1 Fluo handle
LR-Fluo-80	TGTGTGTGTGTGT AGCAATAACTATATTTGTTTGACC	Face-1 Fluo handle
LR-Fluo-81	TGTGTGTGTGTGT CATACAGGGTGGCATCTTGATTCC	Face-1 Fluo handle
LR-Fluo-82	TGTGTGTGTGTGT GGATCGTCGCGAAAGATTTCATGA	Face-1 Fluo handle
LR-Fluo-83	TGTGTGTGTGTGT AGGCTTGCGGCCATGTGAACCTAC	Face-1 Fluo handle
LR-Fluo-84	TGTGTGTGTGTGT GTAAATGAAGTACAAAACCCTCAT	Face-1 Fluo handle
LR-Fluo-85	CCGGAATCATAATTACTTAATTTCAGGCATTT	Face-2 core
LR-Fluo-86	TAATTACATTTAACAAGTGAATAAAAGGAGGC	Face-2 core
LR-Fluo-87	TTTTTTAATGGCATGGACGCTAAAGGACATTC	Face-2 core
LR-Fluo-88	ACGCTCAATCGTCTGACAATATTATGACCTGA	Face-2 core
LR-Fluo-89	TTGCCCCAGCAGGCGAAATAGCCCGTGGTTTT	Face-2 core
LR-Fluo-90	TGGTTCCGAAACGTAAGTAATTCGTAAAATTC	Face-2 core
LR-Fluo-91	ATATGTACCCCGGTTGGAGTCTGGTCATTTTT	Face-2 core
LR-Fluo-92	TCAATAACCTGTTTAGAGCCTCAGATAATGCT	Face-2 core
LR-Fluo-93	GGCGCGAGCTGAAAAGCAAGGCAACAACTAAA	Face-2 core
LR-Fluo-94	TAATAGTAGTACAGCAACCCTGCAAACGGGTA	Face-2 core
LR-Fluo-95	GAACGAGGGTAGCAACAGGGAGTTCACCAACC	Face-2 core
LR-Fluo-96	ACTGAGTTTCGTCACCATTTTCTGGGAATAGG	Face-2 core
LR-Fluo-97	GCGTTATAGCACCCAGCCGGTATTCGTCAAAAGACGGGAG	Face-2 core
LR-Fluo-98	ACAAACATAATTCATCTACCATATAGACATTAAGTAAATA	Face-2 core
LR-Fluo-99	ACCAGTAAATAATCAACCTCACTTATTAGAGCTTTGCCCG	Face-2 core
LR-Fluo-100	TTATTTACAGTTGAAAAGCATCACATTTAGAATTACAAAC	Face-2 core
LR-Fluo-101	CGCCTGGCCAGGGCTTCTCGAATTCTCGTCGGAGTGACTC	Face-2 core
LR-Fluo-102	CGTTAATAGATTGCGGATCGGAAACAGTGCCACCCCGCTT	Face-2 core
LR-Fluo-103	AAGATTGTGCGAAAGGCCATTCAGGGATGTTCGTCAACCT	Face-2 core
LR-Fluo-104	ATTAGATACCTCGTTTTATTCATTGCATAATATACGTCGA	Face-2 core
LR-Fluo-105	CAATTCTGTAGCGAGAGATAGCGTTTACAGGTTTATACCA	Face-2 core
LR-Fluo-106	GGAAGTTTAGATAGGCGCGCAGGGATAAGGCTAATTACCT	Face-2 core
LR-Fluo-107	AGAGGCTTCTTGACAAGAAAGAGGGAGTAGTAGAGATGGT	Face-2 core
LR-Fluo-108	TTTCAGGGCCACCCTCCGATTGGCGAATCAAGGTCACCAA	Face-2 core
LR-Fluo-109	ATGATGGCCAAGAAAAAGAATATACCTACTTTAGAAATGC	Face-2 core
LR-Fluo-110	TTTGGATTTAATGAGCTTACCAAGCAGTACATAATTTTCC	Face-2 core
LR-Fluo-111	AAATCAACATTGGCAGAACCCTTCCCGCCAGCAGAACTCA	Face-2 core
LR-Fluo-112	TGAGTAAACCTGAGAGGCGCCAGGGAGATAGGGTTCCAGT	Face-2 core
LR-Fluo-113	GTTACCTCTTTCAACAACGGGTGTGCAAAATCGAACGTGG	Face-2 core
LR-Fluo-114	GCCAGCTGATAAGCAAAATCAGCAGCAAACATGCCGGAG	Face-2 core
LR-Fluo-115	ATCATAACCATTTCGCCATCAAAAAGCGGCTAACAAAATA	Face-2 core
LR-Fluo-116	AACCAAAACGAACGAGTAAATATGAGAATTAGCATTATGA	Face-2 core
LR-Fluo-117	GTTTTGCCCCATTCCATTTCATTATTAACATCGCCTTTAT	Face-2 core
LR-Fluo-118	AGAGTAATTGAGGACTTACGAAGGAAAGGCCGCCCACGCA	Face-2 core
LR-Fluo-119	CAGAGCCGATAGCAAGTATAGCCCTATGGGATAACTTTCA	Face-2 core
LR-Fluo-120	GAGCCACCCACCCTCAGGAGGTTTGTCTTTCCAAAGGAAC	Face-2 core
LR-Fluo-121	GAGCGTCTTTGTTTAACTAAGAACTCATCGTA	Face-3 core
LR-Fluo-122	TTCCTGATTTACAGAGCAAAATCAAAGCAAAT	Face-3 core
LR-Fluo-123	TAACCACCAGAAATAGCTGAATAAAGAAATTG	Face-3 core
LR-Fluo-124	TTATCTAAATTTGAGGCTTGCTGAGTGCCACG	Face-3 core
LR-Fluo-125	ATTTCTCCGTAAGCAACGTAATCATGTTTCCT	Face-3 core
LR-Fluo-126	GACTGAATGGCCTGGCGACGGAGGATTCCACA	Face-3 core
LR-Fluo-127	CCAGGGTTGCCAGGGTGCTGCGCACTCCAGCC	Face-3 core
LR-Fluo-128	GTAAGAGCATTCATGCGAAAACCACCGGATCC	Face-3 core
LR-Fluo-129	ATACATAACAACATTACCAATACTGAAAACGA	Face-3 core
LR-Fluo-130	CAGTTTAGTGAGATGAGGTAATAGGTCTTTAC	Face-3 core
LR-Fluo-131	TTACCCAAACCAGAACACAGATGAAGACGGTC	Face-3 core
LR-Fluo-132	CCGGAACCTAGCGACACTTGATATATAAATCC	Face-3 core
LR-Fluo-133	AGCAGCCTTATCTGAATTATCCAG	Face-3 core
LR-Fluo-134	CGGAACAAAGAAGGAGCCTGATTG	Face-3 core

LR-Fluo-135	GATAATACAATATCTTCAGTTGGC	Face-3 core
LR-Fluo-136	TGCCATCTGAACTCTGTGGTGTAA	Face-3 core
LR-Fluo-137	AATATAGGCGGCTGACTGGTGCTT	Face-3 core
LR-Fluo-138	CAGGAGAATTCCCAGTGCTATTAC	Face-3 core
LR-Fluo-139	GGTTGTGAAACAGGCGCTGCAACT	Face-3 core
LR-Fluo-140	TAACGGAACGCCAAAAACGATAAA	Face-3 core
LR-Fluo-141	TCATCAGTGAATACCACAAAAGAA	Face-3 core
LR-Fluo-142	CGAGAAACATCAACGTCTTCATCA	Face-3 core
LR-Fluo-143	GTAATCAGAGAGCCACGCCTCCCT	Face-3 core
LR-Fluo-144	TAGCGTCAGCCATCTTCACCCTCA	Face-3 core
LR-Fluo-145	AATTAACTCCAATAATTCCTTATC	Face-3 core
LR-Fluo-146	ACATAAAAAATAGCTAAACAGTAC	Face-3 core
LR-Fluo-147	AACGTTATAAGTAAGCTTTTCAGG	Face-3 core
LR-Fluo-148	AATTCGACAGGAAACCCAGAAGAT	Face-3 core
LR-Fluo-149	TATGATACACCCAAAAGTGCCTAA	Face-3 core
LR-Fluo-150	CTAATCTAATTACGCAACGAGCCG	Face-3 core
LR-Fluo-151	TATGACAACATACATAATCTGCCA	Face-3 core
LR-Fluo-152	CTTAAGTGGCAAAGACATATCGCG	Face-3 core
LR-Fluo-153	GTCAGGACACAATCAAAAAAGATT	Face-3 core
LR-Fluo-154	TATGCGATCGCCAAAGTATTATAG	Face-3 core
LR-Fluo-155	TTAATTTCTGAGGGAGTGTGTCGA	Face-3 core
LR-Fluo-156	TGAAACCAATTCATTATGCCTTGA	Face-3 core
LR-Fluo-157	AGCATGTAAATAATCGTACCGCGCGCGCATTAATGAAAAT	Face-4 core
LR-Fluo-158	AACGGATTCAGATGAACGTAAAACAAAGTTTGTCATTTTG	Face-4 core
LR-Fluo-159	GATAGCCCGGTGAGGCAACACCGCTTAAATCCCGTCAATA	Face-4 core
LR-Fluo-160	GAATCACACTAACCGACAGCAGCACGGAGACTGTATTCCC	Face-4 core
LR-Fluo-161	GCTTTCCAAAGTGTAATTGTTATCCGCCCTGGTGGGCACG	Face-4 core
LR-Fluo-162	ACAAACGGGGACGACGCCTCAGGACAAAATAAAGCTTTCT	Face-4 core
LR-Fluo-163	CACGTTGGCGCATCGTGGCACCGCGCTGAATTTTCTAAGT	Face-4 core
LR-Fluo-164	AACCAGACGCCCGAAATGCTTTAAGAAAAATCAAACGAAC	Face-4 core
LR-Fluo-165	GATTAGAGAAAGCGGAATAAATCACTGGCTCAAGAAAGAT	Face-4 core
LR-Fluo-166	GCGCGAAAACCTGCTCAGCCGGAATCATTGTGTGCCCTGA	Face-4 core
LR-Fluo-167	ATCTATAAGCCCGGCCGGGAACCGAGCGGCTTAATTGACC	Face-4 core
LR-Fluo-168	CGGAACCTGTTTTAACGCCAGAATCCGGAAACTTTGCCTT	Face-4 core
LR-Fluo-169	CTTCAATCGAAACTTAGGTAAAGTAGAACGCGTTCAAATA	Face-4 core
LR-Fluo-170	TTTAACGTCGCCTGATACCAAGTTTATTAATTAAATCAAT	Face-4 core
LR-Fluo-171	AAAACAGATAAAACATATATTTTTTGAGTAGACATTGCAA	Face-4 core
LR-Fluo-172	TGAGTGAGTTAATTGCGGAGAGGCGGTGTGTTGTTGAAAT	Face-4 core
LR-Fluo-173	GAAGCATAGTCGGGAACCAGCTGCCTATTAAACCTTATAA	Face-4 core
LR-Fluo-174	GTTTGAGGCGGATTGAATGTGAGCTAAATTAAAGAGAATC	Face-4 core
LR-Fluo-175	TTTATGGGTGTAGTAAGCCTTCCTAGAGATCTTCAGGTCA	Face-4 core
LR-Fluo-176	AAGAGGAACGGAAGCAAGAGCTTAACCAAAAACAAAATTA	Face-4 core
LR-Fluo-177	TCAGAAGCAGTACCTTTTTTGATACGGGAGAACAATAAAT	Face-4 core
LR-Fluo-178	AATCCGCGCAAAGTACCTAAAACAAACCATCGCTTTTGCG	Face-4 core
LR-Fluo-179	GTAACAGTACAGTTAACCGTCGAGTCGTAAACTTTGCCTG	Face-4 core
LR-Fluo-180	GGTAATAAATTATTCTCGGGGTTTGAGAATAGAGACGTTA	Face-4 core
LR-Fluo-181	GAAACAATGAAATAGCACAGGGAACCAATAGC	Face-4 core
LR-Fluo-182	AAGCCCTTTTTAAGAATAATTTTAAGAAATAA	Face-4 core
LR-Fluo-183	GAACAAAGTTACCAGAAACTCGTACTGCAACA	Face-4 core
LR-Fluo-184	GCAATAATAACGGAATCGACAGTGAATATAGC	Face-4 core
LR-Fluo-185	ATGATTAAGACTCCTTTTTACGCTCGCTCACA	Face-4 core
LR-Fluo-186	GCAAACGTAGAAAATATGTCCCGCAGATCGCA	Face-4 core
LR-Fluo-187	AACATATAAAAGAAACTCCTTAGTTTCTGGTG	Face-4 core
LR-Fluo-188	ATAAGTTTATTTTGTCGTTGGGAAACAGTTCA	Face-4 core
LR-Fluo-189	TCATATGGTTTACCAGTTTAAGAAAAAATCAG	Face-4 core
LR-Fluo-190	GCGACATTCAACCGATAACTTTAACGAGGCGC	Face-4 core
LR-Fluo-191	AATATTGACGGAAATTTCGATAGCAACAACAA	Face-4 core
LR-Fluo-192	TTATCACCGTCACCGATAGCAAGGGGAAAGCGCAGTCTCT	Face-4 core

DNA Strands of Large Rod (LR) for AuNP Cellular Internalization Study

Name	Sequence	Note
LR-Au-1	CCAGACGAGGAATCATGCTGTCTTAAGAGCAA	core
LR-Au-2	CGACAAAACATCGGGAGACGCTGAGAAGAGTC	core

LR-Au-3	GCGCATACTATTTGCATATACAGTTCTTACCG	core
LR-Au-4	TTATGAATTGCTTATGATCCTTGAAAACATAG	core
LR-Au-5	ATTAGTCTCGTGTATTGGTCAAGAAGATAGCC	core
LR-Au-6	CACAGACACGCCATTAGTTGTAGCAATACTTC	core
LR-Au-7	ATACGTGGCTGAGAGCACCACCAGGAGGAAAC	core
LR-Au-8	ACGCGCGGGTTGCGCTGTAAAAGAGTCTGTCC	core
LR-Au-9	ATCGGCCAGTGTGAAAAGCCTGGGGAACTGGC	core
LR-Au-10	GATTCGTGACCTGTCTACGTCAAAGGGCGAAA	core
LR-Au-11	ACCCGTCGCAAATCGGACAGTCATGTATGTTA	core
LR-Au-12	AACATTAACCGTAATGAGTCAAATCACCATCA	core
LR-Au-13	CTTTCATCAGCTTTCCAACCGTGCAAGGTGGC	core
LR-Au-14	CGCGTCTGTTCGAGCTAAAGATTCAAAAGGGT	core
LR-Au-15	ATATAATTCCCTCAAAGACTTCAAACCACGGA	core
LR-Au-16	GATGGCTTAACTCCAATTTTAAATGCAATGCC	core
LR-Au-17	TTTTTGCGGAATGACCTTGCATCATAGAAAAT	core
LR-Au-18	AGCGCTCCTAATTGATGCAAGGATAAAAATTT	core
LR-Au-19	TGACCCCCCCTTACTTCATGTGACACAAAAGG	core
LR-Au-20	AGAATACAAACGGAGACTTAAACAGCTTGATA	core
LR-Au-21	GAGGCAAAAATCATAATGATAAATGGAAGGTA	core
LR-Au-22	GATAAGTGTGCCCCCTTCGGTTTATCAGCTTG	core
LR-Au-23	ACCAGGCGTCATTAAAGGGGTCAGAAGGTGAA	core
LR-Au-24	AGGATTAGGAAACATGAAAAAAGGCTCCAAAA	core
LR-Au-25	AGGCTTATCTACAATTTCTTACCAACGCTAAC	core
LR-Au-26	GATATAGAGTAATAAGCAATTTAGGCCTGAAT	core
LR-Au-27	TTAGAACCAATATAATCGGAATTATCATCATA	core
LR-Au-28	TGGAAGGGCATTTCAAAAAAGAAGGAATTACC	core
LR-Au-29	TATCAAACTATCTGGTTAGGAGCACTAACAAC	core
LR-Au-30	ACCTCAAAAGAGATAGATTCACCAACATTTTG	core
LR-Au-31	AAATCTAAGGACTGGTACCTCATTGAGGAAGG	core
LR-Au-32	TGGTCGAACGTATTGGAGTTGCAGACGCTGGT	core
LR-Au-33	GTACCGAGAAGCTACGGCATTTCACATAAATC	core
LR-Au-34	ATCCCCGGCCAGTGAGGCTGATTGTTTGATGG	core
LR-Au-35	GAAGGGCGGCCTCTTCCACGACGTTGTAAAAC	core
LR-Au-36	ACTGTTGGTTTTTGTTATATTTAATGTCAATC	core
LR-Au-37	GCCATTCGGGGATGTGATTAAGTTGGGTAACG	core
LR-Au-38	GGCAAAGCAGGAACGCAAACCCCAAAAAGTGG	core
LR-Au-39	GTCATAAAACCAGACGGGAATTACGAGGCATA	core
LR-Au-40	GCGGAATCACATGTTTTAGATTTATCATTTGG	core
LR-Au-41	TTAGACTGGGCTTTTGCATTCAACTAATGCAG	core
LR-Au-42	TAAAATGTTCTGGAAGTATAACAGAATTCTAC	core
LR-Au-43	CAGACCAGTGGCTGACAACAAAGCTGCTCATT	core
LR-Au-44	ACGGTGTAAATGCCACAAAGACTTCAGCATCG	core
LR-Au-45	CCAACTTTGAAGAACCCACCGCCGGATATTCA	core
LR-Au-46	TCACATGAGATATAAGCCCAATAGACCGTAAC	core
LR-Au-47	AGGTCAGAAGAACCGCTTCATAATCAAAATCA	core
LR-Au-48	GTTGAGGCCGTACTCAGAGCCACCCTACAACG	core
LR-Au-49	AAAAAAAAAAAAAAAAAAAA AATAGTGACAAGACAAAATTCTGTTCGAGCCA	Face-1 AuNP handle
LR-Au-50	AAAAAAAAAAAAAAAAAAAA CGATAGCTATCGTCGCACAAAATCGAATTATT	Face-1 AuNP handle
LR-Au-51	AAAAAAAAAAAAAAAAAAAA TTTGATTACACTTGCCGAATGGCTTGGCCAAC	Face-1 AuNP handle
LR-Au-52	AAAAAAAAAAAAAAAAAAAA ATCACGCAGCCTTGCTGGTTAAGAAAGCGTTG	Face-1 AuNP handle
LR-Au-53	AAAAAAAAAAAAAAAAAAAA AACCGTCTAGAGTCCAATTAATGATCTTTTCA	Face-1 AuNP handle
LR-Au-54	AAAAAAAAAAAAAAAAAAAA ATATGATACTAGCTGAGAGTAACAGCATTAAA	Face-1 AuNP handle
LR-Au-55	AAAAAAAAAAAAAAAAAAAA GAGAAAGGTATTTTTGGTAGCCAGTAACCAAT	Face-1 AuNP handle
LR-Au-56	AAAAAAAAAAAAAAAAAAAA TGAGTAATTCGGTTGTATTGCTGAGTAGCTCA	Face-1 AuNP handle
LR-Au-57	AAAAAAAAAAAAAAAAAAAA TTAGAACCTACTTTTGAGAGGTCAGTACGGTG	Face-1 AuNP handle
LR-Au-58	AAAAAAAAAAAAAAAAAAAA CCGATAGTATGACAACCTCATCTTAAATACGT	Face-1 AuNP handle
LR-Au-59	AAAAAAAAAAAAAAAAAAAA CTTTCGAGATATTCGGAGGCGAAATAAAAGTT	Face-1 AuNP handle
LR-Au-60	AAAAAAAAAAAAAAAAAAAA GGAGCCTTAGCGGAGTTGCTCAGTTGTATCAC	Face-1 AuNP handle
LR-Au-61	AAAAAAAAAAAAAAAAAAAA TCCAATCGATTTATCAAATTTACG	Face-1 AuNP handle
LR-Au-62	AAAAAAAAAAAAAAAAAAAA TTCTGTAATAGATTAAGAAACAAT	Face-1 AuNP handle
LR-Au-63	AAAAAAAAAAAAAAAAAAAA CTTAACATGTAATAGACGCGAACT	Face-1 AuNP handle
LR-Au-64	AAAAAAAAAAAAAAAAAAAA AACTATCGAATTAACCAAAATACC	Face-1 AuNP handle
LR-Au-65	AAAAAAAAAAAAAAAAAAAA TTGGAACAATCACCGACACTGCCC	Face-1 AuNP handle
LR-Au-66	AAAAAAAAAAAAAAAAAAAA ACTCCGTTTTCAACCACCGTGGGA	Face-1 AuNP handle

LR-Au-67	AAAAAAAAAAAAAAAAAAAA AGGGTAGCCCGGAGACGGATAGGT	Face-1 AuNP handle
LR-Au-68	AAAAAAAAAAAAAAAAAAAA AAGCTAAAGTGTAGGTTCAAAGCG	Face-1 AuNP handle
LR-Au-69	AAAAAAAAAAAAAAAAAAAA CCCTGTAACTCATATACAGGTCAG	Face-1 AuNP handle
LR-Au-70	AAAAAAAAAAAAAAAAAAAA TTCCGACATGCGCAACTATACCAA	Face-1 AuNP handle
LR-Au-71	AAAAAAAAAAAAAAAAAAAA TAACCGATGTGAATTTTTTGTATC	Face-1 AuNP handle
LR-Au-72	AAAAAAAAAAAAAAAAAAAA ACAGTTTCTAATTGTAGCCTATTT	Face-1 AuNP handle
LR-Au-73	AAAAAAAAAAAAAAAAAAAA TATTTTAGTAGAAAAATATCATAT	Face-1 AuNP handle
LR-Au-74	AAAAAAAAAAAAAAAAAAAA ATATGTGATTTCATTTATGATGAA	Face-1 AuNP handle
LR-Au-75	AAAAAAAAAAAAAAAAAAAA CAGGAAAAAAATACCTGTCACACG	Face-1 AuNP handle
LR-Au-76	AAAAAAAAAAAAAAAAAAAA ATCCAGAAAATGGTCCCAAGCGGA	Face-1 AuNP handle
LR-Au-77	AAAAAAAAAAAAAAAAAAAA ATCAAAAGAAATCCTGCCCTTCAC	Face-1 AuNP handle
LR-Au-78	AAAAAAAAAAAAAAAAAAAA GATGAACGAACTAGCAATTGTAAA	Face-1 AuNP handle
LR-Au-79	AAAAAAAAAAAAAAAAAAAA TTGCCTGAATAATCAGAAAACAGG	Face-1 AuNP handle
LR-Au-80	AAAAAAAAAAAAAAAAAAAA AGCAATAACTATATTTGTTTGACC	Face-1 AuNP handle
LR-Au-81	AAAAAAAAAAAAAAAAAAAA CATACAGGGTGGCATCTTGATTCC	Face-1 AuNP handle
LR-Au-82	AAAAAAAAAAAAAAAAAAAA GGATCGTCGCGAAAGATTTCATGA	Face-1 AuNP handle
LR-Au-83	AAAAAAAAAAAAAAAAAAAA AGGCTTGCGGCCATGTGAACCTAC	Face-1 AuNP handle
LR-Au-84	AAAAAAAAAAAAAAAAAAAA GTAAATGAAGTACAAAACCCTCAT	Face-1 AuNP handle
LR-Au-85	CCGGAATCATAATTACTTAATTTCAGGCATTT	Face-2 core
LR-Au-86	TAATTACATTTAACAAGTGAATAAAAGGAGGC	Face-2 core
LR-Au-87	TTTTTAATGGCATGGACGCTAAAGGACATTC	Face-2 core
LR-Au-88	ACGCTCAATCGTCTGACAATATTATGACCTGA	Face-2 core
LR-Au-89	TTGCCCCAGCAGGCGAAATAGCCCGTGGTTTT	Face-2 core
LR-Au-90	TGGTTCCGAAACGTAAGTAATTCGTAAAATTC	Face-2 core
LR-Au-91	ATATGTACCCCGGTTGGAGTCTGGTCATTTTT	Face-2 core
LR-Au-92	TCAATAACCTGTTTAGAGCCTCAGATAATGCT	Face-2 core
LR-Au-93	GGCGCGAGCTGAAAAGCAAGGCAACAACTAAA	Face-2 core
LR-Au-94	TAATAGTAGTACAGCAACCCTGCAAACGGGTA	Face-2 core
LR-Au-95	GAACGAGGGTAGCAACAGGGAGTTCACCAACC	Face-2 core
LR-Au-96	ACTGAGTTTCGTCACCATTTTCTGGGAATAGG	Face-2 core
LR-Au-97	GCGTTATAGCACCCAGCCGGTATTCGTCAAAAGACGGGAG	Face-2 core
LR-Au-98	ACAAACATAATTCATCTACCATATAGACATTAAGTAAATA	Face-2 core
LR-Au-99	ACCAGTAAATAATCAACCTCACTTATTAGAGCTTTGCCCG	Face-2 core
LR-Au-100	TTATTTACAGTTGAAAAGCATCACATTTAGAATTACAAAC	Face-2 core
LR-Au-101	CGCCTGGCCAGGGCTTCTCGAATTCTCGTCGGAGTGACTC	Face-2 core
LR-Au-102	CGTTAATAGATTGCGGATCGGAAACAGTGCCACCCCGCTT	Face-2 core
LR-Au-103	AAGATTGTGCGAAAGGCCATTCAGGGATGTTCGTCAACCT	Face-2 core
LR-Au-104	ATTAGATACCTCGTTTTATTCATTGCATAATATACGTCGA	Face-2 core
LR-Au-105	CAATTCTGTAGCGAGAGATAGCGTTTACAGGTTTATACCA	Face-2 core
LR-Au-106	GGAAGTTTAGATAGGCGCGCAGGGATAAGGCTAATTACCT	Face-2 core
LR-Au-107	AGAGGCTTCTTGACAAGAAAGAGGGAGTAGTAGAGATGGT	Face-2 core
LR-Au-108	TTTCAGGGCCACCCTCCGATTGGCGAATCAAGGTCACCAA	Face-2 core
LR-Au-109	ATGATGGCCAAGAAAAAGAATATACCTACTTTAGAAATGC	Face-2 core
LR-Au-110	TTTGGATTTAATGAGCTTACCAAGCAGTACATAATTTTCC	Face-2 core
LR-Au-111	AAATCAACATTGGCAGAACCCTTCCCGCCAGCAGAACTCA	Face-2 core
LR-Au-112	TGAGTAAACCTGAGAGGCGCCAGGGAGATAGGGTTCCAGT	Face-2 core
LR-Au-113	GTTACCTCTTTCAACAACGGGTGTGCAAAATCGAACGTGG	Face-2 core
LR-Au-114	GCCAGCTGATAAGCAAAAATCAGCAGCAAACATGCCGGAG	Face-2 core
LR-Au-115	ATCATAACCATTTCGCCATCAAAAAGCGGCTAACAAAATA	Face-2 core
LR-Au-116	AACCAAAACGAACGAGTAAATATGAGAATTAGCATTATGA	Face-2 core
LR-Au-117	GTTTTGCCCCATTCCATTTCATTATTAACATCGCCTTTAT	Face-2 core
LR-Au-118	AGAGTAATTGAGGACTTACGAAGGAAAGGCCGCCCACGCA	Face-2 core
LR-Au-119	CAGAGCCGATAGCAAGTATAGCCCTATGGGATAACTTTCA	Face-2 core
LR-Au-120	GAGCCACCCACCCTCAGGAGGTTTGTCTTTCCAAAGGAAC	Face-2 core
LR-Au-121	GAGCGTCTTTGTTTAACTAAGAACTCATCGTA	Face-3 core
LR-Au-122	TTCCTGATTTACAGAGCAAAATCAAAGCAAAT	Face-3 core
LR-Au-123	TAACCACCAGAAATAGCTGAATAAAGAAATTG	Face-3 core
LR-Au-124	TTATCTAAATTTGAGGCTTGCTGAGTGCCACG	Face-3 core
LR-Au-125	ATTTCTCCGTAAGCAACGTAATCATGTTTCCT	Face-3 core
LR-Au-126	GACTGAATGGCCTGGCGACGGAGGATTCCACA	Face-3 core
LR-Au-127	CCAGGGTTGCCAGGGTGCTGCGCACTCCAGCC	Face-3 core
LR-Au-128	GTAAGAGCATTCATGCGAAAACCACCGGATCC	Face-3 core
LR-Au-129	ATACATAACAACATTACCAATACTGAAAACGA	Face-3 core

LR-Au-130	CAGTTTAGTGAGATGAGGTAATAGGTCTTTAC	Face-3 core
LR-Au-131	TTACCCAAACCAGAACACAGATGAAGACGGTC	Face-3 core
LR-Au-132	CCGGAACCTAGCGACACTTGATATATAAATCC	Face-3 core
LR-Au-133	AGCAGCCTTATCTGAATTATCCAG	Face-3 core
LR-Au-134	CGGAACAAAGAAGGAGCCTGATTG	Face-3 core
LR-Au-135	GATAATACAATATCTTCAGTTGGC	Face-3 core
LR-Au-136	TGCCATCTGAACTCTGTGGTGTAA	Face-3 core
LR-Au-137	AATATAGGCGGCTGACTGGTGCTT	Face-3 core
LR-Au-138	CAGGAGAATTCCCAGTGCTATTAC	Face-3 core
LR-Au-139	GGTTGTGAAACAGGCGCTGCAACT	Face-3 core
LR-Au-140	TAACGGAACGCCAAAAACGATAAA	Face-3 core
LR-Au-141	TCATCAGTGAATACCACAAAAGAA	Face-3 core
LR-Au-142	CGAGAAACATCAACGTCTTCATCA	Face-3 core
LR-Au-143	GTAATCAGAGAGCCACGCCTCCCT	Face-3 core
LR-Au-144	TAGCGTCAGCCATCTTCACCCTCA	Face-3 core
LR-Au-145	AATTAACTCCAATAATTCCTTATC	Face-3 core
LR-Au-146	ACATAAAAAATAGCTAAACAGTAC	Face-3 core
LR-Au-147	AACGTTATAAGTAAGCTTTTCAGG	Face-3 core
LR-Au-148	AATTCGACAGGAAACCCAGAAGAT	Face-3 core
LR-Au-149	TATGATACACCCAAAAGTGCCTAA	Face-3 core
LR-Au-150	CTAATCTAATTACGCAACGAGCCG	Face-3 core
LR-Au-151	TATGACAACATACATAATCTGCCA	Face-3 core
LR-Au-152	CTTAAGTGGCAAAGACATATCGCG	Face-3 core
LR-Au-153	GTCAGGACACAATCAAAAAAGATT	Face-3 core
LR-Au-154	TATGCGATCGCCAAAGTATTATAG	Face-3 core
LR-Au-155	TTAATTTCTGAGGGAGTGTGTCGA	Face-3 core
LR-Au-156	TGAAACCAATTCATTATGCCTTGA	Face-3 core
LR-Au-157	AGCATGTAAATAATCGTACCGCGCGCGCATTAATGAAAAT	Face-4 core
LR-Au-158	AACGGATTCAGATGAACGTAAAACAAAGTTTGTCATTTTG	Face-4 core
LR-Au-159	GATAGCCCGGTGAGGCAACACCGCTTAAATCCCGTCAATA	Face-4 core
LR-Au-160	GAATCACACTAACCGACAGCAGCACGGAGACTGTATTCCC	Face-4 core
LR-Au-161	GCTTTCCAAAGTGTAATTGTTATCCGCCCTGGTGGGCACG	Face-4 core
LR-Au-162	ACAAACGGGGACGACGCCTCAGGACAAAATAAAGCTTTCT	Face-4 core
LR-Au-163	CACGTTGGCGCATCGTGGCACCGCGCTGAATTTTCTAAGT	Face-4 core
LR-Au-164	AACCAGACGCCCGAAATGCTTTAAGAAAAATCAAACGAAC	Face-4 core
LR-Au-165	GATTAGAGAAAGCGGAATAAATCACTGGCTCAAGAAAGAT	Face-4 core
LR-Au-166	GCGCGAAAACCTGCTCAGCCGGAATCATTGTGTGCCCTGA	Face-4 core
LR-Au-167	ATCTATAAGCCCGGCCGGGAACCGAGCGGCTTAATTGACC	Face-4 core
LR-Au-168	CGGAACCTGTTTTAACGCCAGAATCCGGAAACTTTGCCTT	Face-4 core
LR-Au-169	CTTCAATCGAAACTTAGGTAAAGTAGAACGCGTTCAAATA	Face-4 core
LR-Au-170	TTTAACGTCGCCTGATACCAAGTTTATTAATTAAATCAAT	Face-4 core
LR-Au-171	AAAACAGATAAAACATATATTTTTTGAGTAGACATTGCAA	Face-4 core
LR-Au-172	TGAGTGAGTTAATTGCGGAGAGGCGGTGTGTTGTTGAAAT	Face-4 core
LR-Au-173	GAAGCATAGTCGGGAACCAGCTGCCTATTAAACCTTATAA	Face-4 core
LR-Au-174	GTTTGAGGCGGATTGAATGTGAGCTAAATTAAAGAGAATC	Face-4 core
LR-Au-175	TTTATGGGTGTAGTAAGCCTTCCTAGAGATCTTCAGGTCA	Face-4 core
LR-Au-176	AAGAGGAACGGAAGCAAGAGCTTAACCAAAAACAAAATTA	Face-4 core
LR-Au-177	TCAGAAGCAGTACCTTTTTTGATACGGGAGAACAATAAAT	Face-4 core
LR-Au-178	AATCCGCGCAAAGTACCTAAAACAAACCATCGCTTTTGCG	Face-4 core
LR-Au-179	GTAACAGTACAGTTAACCGTCGAGTCGTAAACTTTGCCTG	Face-4 core
LR-Au-180	GGTAATAAATTATTCTCGGGGTTTGAGAATAGAGACGTTA	Face-4 core
LR-Au-181	GAAACAATGAAATAGCACAGGGAACCAATAGC	Face-4 core
LR-Au-182	AAGCCCTTTTTAAGAATAATTTTAAGAAATAA	Face-4 core
LR-Au-183	GAACAAAGTTACCAGAAACTCGTACTGCAACA	Face-4 core
LR-Au-184	GCAATAATAACGGAATCGACAGTGAATATAGC	Face-4 core
LR-Au-185	ATGATTAAGACTCCTTTTTACGCTCGCTCACA	Face-4 core
LR-Au-186	GCAAACGTAGAAAATATGTCCCGCAGATCGCA	Face-4 core
LR-Au-187	AACATATAAAAGAAACTCCTTAGTTTCTGGTG	Face-4 core
LR-Au-188	ATAAGTTTATTTTGTCGTTGGGAAACAGTTCA	Face-4 core
LR-Au-189	TCATATGGTTTACCAGTTTAAGAAAAAATCAG	Face-4 core
LR-Au-190	GCGACATTCAACCGATAACTTTAACGAGGCGC	Face-4 core
LR-Au-191	AATATTGACGGAAATTTCGATAGCAACAACAA	Face-4 core
LR-Au-192	TTATCACCGTCACCGATAGCAAGGGGAAAGCGCAGTCTCT	Face-4 core

DNA Strands of Large Tetrahedron (LT)

Name	Sequence	Note
LT-Fluo-1	GCAAGAGTCTGGAGCAATAATGCCGCCTACAAATACCC	Core
LT-Fluo-2	GCGAAGAATACGTGGCATGGCCAAACGACCACTTGCTG	Core
LT-Fluo-3	GATGTGCTTTCCTCGTTGATTAAATTGCCTG	Core
LT-Fluo-4	ATAGCTTTGACGAGCACGAACGGTTTTGATTAGTAATACCAG	Core
LT-Fluo-5	AACAGGTGAGAAAGGCCCAACCGTCGTCTGAAACAGGA	Core
LT-Fluo-6	ACAGTCAAATCAACCTGAAAGCGTCGAACTGATAGCCCCACCAGTTGCCCCAGTGCTTG	Core
LT-Fluo-7	TCAGCTTCTAATCTATTCACATAAAAGATCGGGACGACGAGA	Core
LT-Fluo-8	CGGAAGCATAAAGTGTAGGGAGAGGCGGTCAAGGCGATTCGC	Core
LT-Fluo-9	CTGCGCTCACAATTCCAAATGAGTTGGTGGTGCTCAATTCTA	Core
LT-Fluo-10	CTATTCCTGTGTGAAATCTACGTGGCAGGCGTATTTACATCA	Core
LT-Fluo-11	GAAATTAAATGTGAGCGAGTAAAATGTTTGGATTATACCGGTGCGGCCAGCTCGGCTGA	Core
LT-Fluo-12	GAGGCTGATTATCAGATGATGTGCTCGGCAACTCCTGG	Core
LT-Fluo-13	CTGATTCATCAATATAATACGCCACCTCAGGATCATTT	Core
LT-Fluo-14	AGTGCCCTGGAGTGACTCTTGAATTTCCGGCCGTGCATTTCT	Core
LT-Fluo-15	TTCTAAGTGGTTGTGAACCGACAGTGCGGCCC	Core
LT-Fluo-16	TTCCCATTAGTAATCATACCCAAACTGACCTTCATCAACTTA	Core
LT-Fluo-17	CGTTCGTAACACCGCTTTTGGGAAGGCCAGTGCCAAGCTTTCTCAGG	Core
LT-Fluo-18	CAATTTGAGGCACTCCAGGCCTCTGTCACGACGTTGTACTTA	Core
LT-Fluo-19	ACAGTTCAAACTCCAACAGCCCTCGTTTCTCAAATTAAA	Core
LT-Fluo-20	AAATTGAGGCAGCCGCCAAAGCTAAATCGGTATTCATTTGTGAATCACTACG	Core
LT-Fluo-21	CTAGGCATCAATTCTGATCGCAAAAGTACGG	Core
LT-Fluo-22	AGCGGAATTACGAGGCAACTAACGTAGG	Core
LT-Fluo-23	GGGTGGGAACCATCAACTAATGGAAGGGTTAGAACCTA	Core
LT-Fluo-24	TCAACCAACCCGTCGGACTGCCAGGAGTCCA	Core
LT-Fluo-25	GTAGTTTCAGGCATTCCAACGTTAGTCCAAAAAAAAGGCTCCAAAAGG	Core
LT-Fluo-26	ATTGGAGACATCGCCATTAAAAATCGCCAGGTGTTTGAAAACAGG	Core
LT-Fluo-27	GCTTACAGGGCGCGTACAGAAGTGTAACCGTTGTAGCACCAT	Core
LT-Fluo-28	CTAACACCAGTCAGGACAAACAAAGCTTTAA	Core
LT-Fluo-29	TCTCGCTGCGCGTAACCGGAACCCTCGAGGTGCCGTAAGGTT	Core
LT-Fluo-30	TTCGAACGAGTGCGATTTGCAAGAACCGGATTGTA	Core
LT-Fluo-31	CCGCGCTGGCAAGTGTAGATTTAGCCCAAATCAAGTTTGGAA	Core
LT-Fluo-32	CTGTAGCCAGCTTTAAACGGCGGATTGACC	Core
LT-Fluo-33	GGTGTAGATGGGCGCAGGACTCCAACGTCAAA	Core
LT-Fluo-34	TAATGGTCAAGAGATGGCTGCTCACAGACCAGGCGCATACGG	Core
LT-Fluo-35	TATTCCTGATAGGCTATCAGGTCATTTTTGAGACAGTATGTTGTT	Core
LT-Fluo-36	ATCGGAACGCCCTCATAG	Core
LT-Fluo-37	TCAGGCTGCGCAACTGCTGGTGCACGAATA	Core
LT-Fluo-38	ATGGTCAGATAAAGGGTCCACCAGTCACCAGA	Core
LT-Fluo-39	TTTTCACCAGCCATGTAAGCCAGATTCATTGAATCCCCACCA	Core
LT-Fluo-40	GACAATCCCTTATAAGGGCTGGCGGGTAACGCCAGGGTATTG	Core
LT-Fluo-41	TCGGTGGGCCGGAAACCA	Core
LT-Fluo-42	AACGATTCACGCTGGTTGAGACGGCGTGCCAGCTGCATTGAG	Core
LT-Fluo-43	TGCAATGGATAAAATCCGTGGTTTTCGGCCAACGCGCGAAGC	Core
LT-Fluo-44	CAAGCGCAAAGAATTGGGCTTTAACCTGAAAA	Core
LT-Fluo-45	ATTATTGCTTTCAAACTAAAGGAATTGCGCGCCGAATATATTCGGTCGCAGAC	Core
LT-Fluo-46	TTTGTCGTCTTTCCAGCAGACAGAGGGTAG	Core
LT-Fluo-47	GAGCCACCACCCTCATAAAGATTCATCAGTTG	Core
LT-Fluo-48	AGCGAAAGGAGCGGGCAGCCGGCGGCCCACTACGTGAAGAA	Core
LT-Fluo-49	AACTACAAACGTATGGGAATTTTTTCACGTTAACA	Core
LT-Fluo-50	TTTACGATTGGAGAATGACCATAAAAAGCGAGCTCCTTTTGATAAAAGT	Core
LT-Fluo-51	TCCGAATTTAGTTAAATCAGCTCATAAACAAAGTTTCGTTCATGA	Core
LT-Fluo-52	TGAGTCATACAAAAATTCGCATTAAGCGGAGTTAAGAAAACGGGT	Core
LT-Fluo-53	AGGATCAGGTCTTTACCTCGCGTTTTTTTGCGGATGGCCAAC	Core
LT-Fluo-54	GGTTTATAGTCAGAAGCAAGCCCGTTAATTG	Core
LT-Fluo-55	AGAGGGTTGATATACCCTCAGAACCGCCAC	Core
LT-Fluo-56	TAGAATAATTCGCGTCTGGCCTTC	Core
LT-Fluo-57	AAACCCGGAATAGGTGTATCACGGACCAATAGGAACGCATTTTCTTACAACGGCTTTGA	Core
LT-Fluo-58	TTTAAAAGCGCAGTCTCTTCATTAACCGTAACCGTTAAT	Core
LT-Fluo-59	TTTCCGTTCCAGTAAGCTATTCACGTTCTGCCCAATTG	Core
LT-Fluo-60	CCAAGAACCACCACCAGAGGTCAGAGTTTGAATTCCAT	Core
LT-Fluo-61	CATGCCAGCATTACTAATAGTAGTAGCAATAAAGCCTCAACAAAGTTTAATTAAACGAA	Core
LT-Fluo-62	TTAAGCATTAACATCCACGAGCTGTTTAGCTATGTTTT	Core

LT-Fluo-63	GGATTTTGACTCCGAAATGTTGCGTATTGGGACCG	Core
LT-Fluo-64	GAGTCATCAAAAGAATAGGAGAGGCCGCCGC	Core
LT-Fluo-65	TATCAGCTTGCTTTCGTTTGCGGGATCGTCAC	Core
LT-Fluo-66	GCTTGCAGGGAGTTAAATACAGAGCCTGTAGGATA	Core
LT-Fluo-67	CCTGCTCCATGTTAGAGTAATCTTGAAGAATAGAAATCGCGA	Core
LT-Fluo-68	GCCATCGCCTGATAAATGTAATGCTACCTTATAGA	Core
LT-Fluo-69	TCAAGTACAACGGAGATCAACCTATCAACTTATACATTCAGG	Core
LT-Fluo-70	GCTTAATGAGGCCACCGAGCACTAAATCACCACACGTAGCTATTGC	Core
LT-Fluo-71	CAGGGCGATGAACGTGGC	Core
LT-Fluo-72	AACAGAACCCTTCTGCCATTGGCAAATATTA	Core
LT-Fluo-73	GTTTAGACTGGATAGCAAAGAAGTGCAGATACATAACCAG	Core
LT-Fluo-74	ATAATCGTACTCAGGAGAGCCCAAGAACAAC	Core
LT-Fluo-75	TTCAACTAATTTTGCCAG	Core
LT-Fluo-76	AACAAAGTCAGAGGGTGCGCATTAATAAACAGCCATACTTA	Core
LT-Fluo-77	AACGAATTGCGTAGATTTTGAATAATTTTAT	Core
LT-Fluo-78	AAGAGCATGTTAGCAAACGCAA	Core
LT-Fluo-79	ACATTATCTATTAGACTAAAGTAT	Core
LT-Fluo-80	TCTGTTGAAATATCTGGATTTTCGGTCATAGGGGTATTAAGAACGCAGTATA	Core
LT-Fluo-81	AGAAAAACGTCACCAAAACCATTTGGGCGACA	Core
LT-Fluo-82	AACTCCCAATCCAAATAAGCTACACCAAGTTAATT	Core
LT-Fluo-83	AGCATTTTTTGTTTAACATTA	Core
LT-Fluo-84	AAATGATTAAGCCGCACTAAACATTTGTCCTCAA	Core
LT-Fluo-85	CAGTTACAAAGACGGGAG	Core
LT-Fluo-86	CCATTCGCCTTGATGAACCTTTTTAGACGCTGAGAAGAGTCAATAGT	Core
LT-Fluo-87	GACAGCAACACTATCATAAAT	Core
LT-Fluo-88	GCAGTTTAGTACTGCGGAATCGTCAAAT	Core
LT-Fluo-89	GTTAGAGGTTTTGAAGCTTTAGGACAATAAT	Core
LT-Fluo-90	CCATATCAAAATTACAGATGAATATACAGT	Core
LT-Fluo-91	GACCATTAAATTTTAGCTCCATTCCAAGAACCCCC	Core
LT-Fluo-92	CACCCAGGCGGATAAGTGCCGTCG	Core
LT-Fluo-93	GAGGTCACCGGTATTCTAAACCAAATCAATAATCGGCTAACA	Core
LT-Fluo-94	GCTGAAACCATCGACTGTAGCGCGTTTTACTCATCAGAAGGCCAGTAGG	Core
LT-Fluo-95	AAGGGAATTACAGATATGAGAACATTTACGAGCATGTAACGC	Core
LT-Fluo-96	GTAGTAAAACAGAAATAAAGAAGCTTAGCGGGGTTTTGAACAGTATGAGCAACACCGGA	Core
LT-Fluo-97	GTGATAAATTCAAGAAAA	Core
LT-Fluo-98	GAGAAGGTGTGAGTGAATTATAAAAAGC	Core
LT-Fluo-99	ACATACCGAAGCCCTTTCCCAAAAACACCACGGAATAAACAA	Core
LT-Fluo-100	TAGTCATTTCACAAAATTAGATTACCACAAGAATTGAGAAAT	Core
LT-Fluo-101	GCCAGTAATAAGAGAATCGCTCAATTATCCGACTTGAGATCA	Core
LT-Fluo-102	TGTACCGACAAAAGGTATTCTTACCGAGGCGGGTG	Core
LT-Fluo-103	TTGATATTTTAGTTAATGAATAAAAAGAAGAGATT	Core
LT-Fluo-104	TCTGAGAGACTACCTTTCTGACCTAAATTTAA	Core
LT-Fluo-105	GGCATTTTGAGAATAGCAAATGAGCCAGAGGC	Core
LT-Fluo-106	ACCCATAAATACATAGCGATAGCTTAGG	Core
LT-Fluo-107	GCGGGGCGAATAACTTTCCCTTAGAATCATGTAAACGCGAGAAAACTTTTTAC	Core
LT-Fluo-108	AATTTCATTTGAATTAACAAACAAAGGCGT	Core
LT-Fluo-109	GAGAAACAATAACGGAACGCTAACGAGCGTCT	Core
LT-Fluo-110	GCTTTCAGGTCGCTAATATCAGAGGAAT	Core
LT-Fluo-111	AATAGGAAGGATGAAATAGCAATAAAGACTCACATATAAAAGAAAGATT	Core
LT-Fluo-112	GTCTTTCCTTATGTCGCTATTCACCAGACGACGACAATAAAC	Core
LT-Fluo-113	CGGAAGTAAGCAGATAGAAACGCATTGTCAC	Core
LT-Fluo-114	GACAGGATTTAGAAGTAAAATATCCTTTATTGGAAATA	Core
LT-Fluo-115	TAAGAGGCTGTAAAGAACCTCATGCGTT	Core
LT-Fluo-116	GAAACCAGTACCGCCATCGGCTCAGTTG	Core
LT-Fluo-117	AGATAGCAGCACCGTAAATTAGCACAAAATCTACCAGC	Core
LT-Fluo-118	AAACAATATAATTAGGACGTCAATAGATAATCAACTAACGCGCAGGCTATTT	Core
LT-Fluo-119	CTTTAACCCTCAATCAAGGAATTGTATCACCGGAGGGA	Core
LT-Fluo-120	AAACATTATGACCCTGTAATATGTAAACGTTAATATTTTGTT	Core
LT-Fluo-121	ATCGATGAACGGTAATCGTAAGTGTAGGTAAAGATTCAAAAG	Core
LT-Fluo-122	CTTTTGCGGGAGAAGCCTTTATAAATGCAATGCCTGAGTAAT	Core
LT-Fluo-123	AACTAGCATGTCAATCATATGTGTATAAGCAAATATTTAAAT	Core
LT-Fluo-124	TTAGCGTTTGCCATCTTTTCAACCTATTATTCTGAAACATGA	Core
LT-Fluo-125	TGGCTTTTGATGATACAGGAGCCACCCTCAGAGCCGCCACCA	Core
LT-Fluo-126	TAATCAAAATCACCGGAACCAGAACCGCCACCCTCAGAGCCA	Core
LT-Fluo-127	TGTACTGGTAATAAGTTTTAAATGCCCCCTGCCTATTTCGGA	Core

LT-Fluo-128	AACCACCAGCAGAAGATAAAAAGCGGAATTATCATCATATTC	Core
LT-Fluo-129	TACAAACAATTCGACAACTCGCTTGCTGAACCTCAAATATCA	Core
LT-Fluo-130	CAGAGGTGAGGCGGTCAGTATATGAAAAATCTAAAGCATCAC	Core
LT-Fluo-131	TATTAAATCCTTTGCCCGAACAACAAAGAAACCACCAGAAGG	Core
LT-Fluo-132	TGTGTGTGTGTGT CCAGTTTTTTGGGGTAAAGGGAGCCCCCGCGG	Fluo handle
LT-Fluo-133	TGTGTGTGTGTGT TTACCTCTAGCTGTACTCACATTAATTGAACCTGTGCAACAGTAAT	Fluo handle
LT-Fluo-134	TGTGTGTGTGTGT CGCATTTTACGCTCGTCCTTAGTGCTGATTTCCCATCGC	Fluo handle
LT-Fluo-135	TGTGTGTGTGTGT TAGGGGCCTATGATATTCATGCGCACGAAAACGACGGGCGATTTCT	Fluo handle
LT-Fluo-136	TGTGTGTGTGTGT GTAATATACATCACGGGATTTTAGACAGGTAT	Fluo handle
LT-Fluo-137	TGTGTGTGTGTGT CCGCCAGATACTTCACGCCAGAATCCTGTATGGTTTGAT	Fluo handle
LT-Fluo-138	TGTGTGTGTGTGT GCTTAAGTGTTATCGGGTGCCTAATGAGTAATGAATTCTTTTTAAA	Fluo handle
LT-Fluo-139	TGTGTGTGTGTGT GAGATAGAGTAAAAGAGTCTGTCCATCATCAT	Fluo handle
LT-Fluo-140	TGTGTGTGTGTGT AAAACGCCGCAAATTTTTTATAATCAGTGCGCCGCGATAAATACAA	Fluo handle
LT-Fluo-141	TGTGTGTGTGTGT TTGGTGTCACAACATACGACCGCCAAAACTCT	Fluo handle
LT-Fluo-142	TGTGTGTGTGTGT CTCCGAATAACCCCACCTTATGACAATGTAAGTTGAAAGGGGGATG	Fluo handle
LT-Fluo-143	TGTGTGTGTGTGT CTATTAAACCATCAAGCTTGACGGGGAAGCTA	Fluo handle
LT-Fluo-144	TGTGTGTGTGTGT GGAAGTTATAACCGCAATGACAACAACCAGGAACACAGTTTCAATT	Fluo handle
LT-Fluo-145	TGTGTGTGTGTGT AAAACGATAGTAAGGACGATAAAAACCAATAA	Fluo handle
LT-Fluo-146	TGTGTGTGTGTGT AGAGGCAGAAACAAATCATAAGGGAACCCGGTGTATTCAGTGAAAA	Fluo handle
LT-Fluo-147	TGTGTGTGTGTGT ATTATTAGCCAAAAGAGAGGCTTTTGCAGTCCAATACCGCCAAGTA	Fluo handle
LT-Fluo-148	TGTGTGTGTGTGT AAGGCACTTGTATCGGAACGAGGCGCAGAGGCTGGTCAACGTAGAG	Fluo handle
LT-Fluo-149	TGTGTGTGTGTGT ATAACAGTTTAATTACCAGACCGGAAGCAGAAAACGCCT	Fluo handle
LT-Fluo-150	TGTGTGTGTGTGT AAAATACTGTGTCGAAATCCGCCCACGCTCCATTACTGGCTC	Fluo handle
LT-Fluo-151	TGTGTGTGTGTGT TGTCTGGGAGGTCATTAATTCGAGCTTCATCA	Fluo handle
LT-Fluo-152	TGTGTGTGTGTGT AAATATGTTAGAGCAAAGACTTCAAATACTGA	Fluo handle
LT-Fluo-153	TGTGTGTGTGTGT CAACGGCGGCCGCTAGGTGAATTTCTTAGAAAATCTAAATGACATC	Fluo handle
LT-Fluo-154	TGTGTGTGTGTGT GGAAGAAAAGTCAGGATTAGAGAGTACCTTGA	Fluo handle
LT-Fluo-155	TGTGTGTGTGTGT GGACTAATGAGGCTTGATACCGATAGTTGAATAATATTTTGCTTT	Fluo handle
LT-Fluo-156	TGTGTGTGTGTGT TGCACCCAGAAACGAGCCTTTACAGAGAAGAT	Fluo handle
LT-Fluo-157	TGTGTGTGTGTGT CCTGAATTTATTTAATAAAAACAGGGAAAATTGAGTTAACGTTTTG	Fluo handle
LT-Fluo-158	TGTGTGTGTGTGT AGGTAAAGGTGGCACTTATTACGCAGTAAGAA	Fluo handle
LT-Fluo-159	TGTGTGTGTGTGT TTCAACCCGCAAAGGAACTGGCATGATTGCTA	Fluo handle
LT-Fluo-160	TGTGTGTGTGTGT AATCAAGGTTAGAAAATACATACATAAATATT	Fluo handle
LT-Fluo-161	TGTGTGTGTGTGT TAAATAATTCATCTTTTAACCTCCGGCTTAGATTATAATGGACTCA	Fluo handle
LT-Fluo-162	TGTGTGTGTGTGT ATCATAATTCAAATGGTTATATAACTATCTTG	Fluo handle
LT-Fluo-163	TGTGTGTGTGTGT GCCAAAGGTTTATTATATAATAACGGAATATTA	Fluo handle
LT-Fluo-164	TGTGTGTGTGTGT GCTTAATTCGAGCCTGTTTATCAACAATATCCTAAAGCAAGCCGTC	Fluo handle
LT-Fluo-165	TGTGTGTGTGTGT AAGCCAAATAAAGTTCAGCTAATGCAGA	Fluo handle
LT-Fluo-166	TGTGTGTGTGTGT CTGTTTACAAAGAATGCTGATGCAAATCAATTAATCTTGCTTCTGA	Fluo handle
LT-Fluo-167	TGTGTGTGTGTGT ATACAAAAAGTAATTCTGTATCGCAAGAGTATCATCCGACTT	Fluo handle