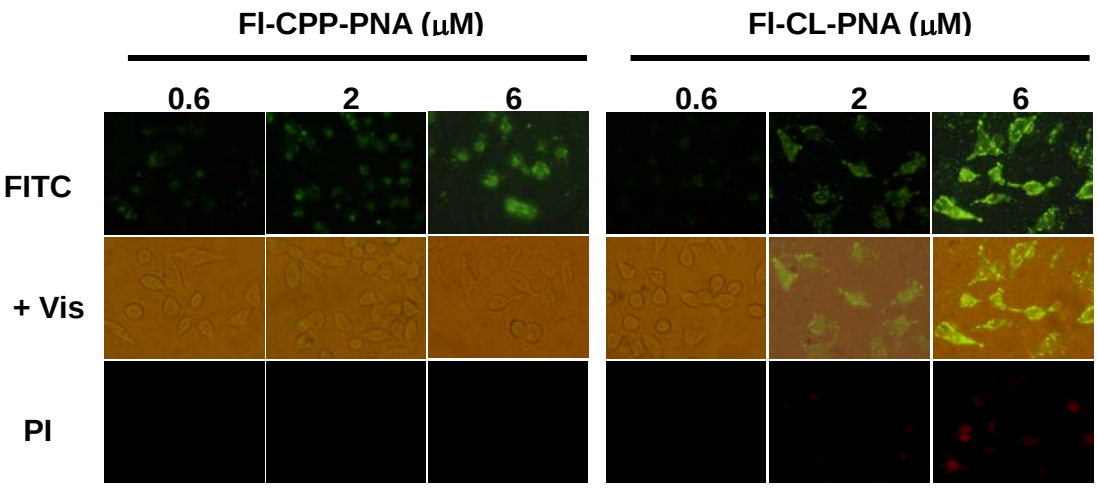
Supporting Information

PNA cellular uptake studies with propidium iodide (PI) counter staining. For uptake analysis, exponentially growing HeLa pLuc705 cells were plated in 4-well chamber slides (Nunc) the day before treatment. The cells were treated with the fluorescein-labeled PNA (Fl-CPP-PNA(3266), Fl-CL-PNA(3265)) by incubating with the PNAs (0.6, 2 and 6 μM) in OPTI-MEM medium (serum free) for 4 h and further 20 h after adding the equal volume of growth medium (including 20% FBS) without removing the PNA solutions. After 24 h the cells were counter stained with 1 μg/ml PI for 10 min at 37 ^{o}C before subjected to microscopy. Living cells (without fixation) were visualized using a fluorescence microscope (DIALUX 22EB, LEITZ WETZLAR (Germany)) at 500x magnification with appropriate filter blocks (I2/3 and N2 respectively for PI and FITC).



PNA CatLip Conjugates. Sequences, names and HPLC & MALDI-TOF mass spectrometry characterization

PNA no.	Name	Sequence[a]	Mass: found(calcd)	Purity (%)[b]
2395	Tat-PNA	H-GRKKRRQRRRPPQ-eg1-CCTCTTACCTCAGTTACA-NH_2	6611 (6612)	95
2456	Deca-PNA	Deca-eg1-CCTCTTACCTCAGTTACA-NH_2	5064 (5065)	98
2534	Tat-Deca-PNA	H-GRKKRRQRRRPPQ-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6808 (6808)	98
2821	Deca-Tat-Deca-PNA	H-Lys(Deca)GR KKR RQR RRP PQ-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	7086 (7088)	90
2785	(D-Arg)7-PNA	H-(D-Arg)$_7$-Gly-CCTCTTACCTCAGTTACA-NH_2	5913 (5916)	90
2801	(D-Arg)7-Deca-PNA	H-(D-Arg)$_7$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6194 (6198)	98
2786	Deca-(D-Arg)7-PNA	Deca-(D-Arg)$_7$-Gly-CCTCTTACCTCAGTTACA-NH_2	6075 (6070)	90
2787	(D-Arg)8-PNA	H-(D-Arg)$_8$-Gly-CCTCTTACCTCAGTTACA-NH_2	6068 (6072)	90
2802	(D-Arg)8-Deca-PNA	H-(D-Arg)$_8$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6357 (6354)	95
2788	Deca-(D-Arg)8-PNA	Deca-(D-Arg)$_8$-Gly-CCTCTTACCTCAGTTACA-NH_2	6226 (6226)	90
2752	Mismatch 2534	H-GRKKRRQRRRPPQ-Lys(Deca)-Gly-CCTCT**G**ACCTCA**T**TTACA-NH_2	6808 (6808)	98
2591	(Arg)6-Deca-PNA	H-(Arg)$_6$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6043 (6042)	90
3100	(Arg)7-Deca-PNA	H-(L-Arg)$_7$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6202 (6199)	95
3101	(Arg)8-Deca-PNA	H-(L-Arg)$_8$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6358 (6355)	95
2592	(Arg)9-Deca-PNA	H-(Arg)$_9$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6508 (6510)	95
2739	(D-Arg)6-Deca-PNA	H-(D-Arg)$_6$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6055 (6042)	95
2740	(D-Arg)9-Deca-PNA	H-(D-Arg)$_9$-Lys(Deca)-Gly-CCTCTTACCTCAGTTACA-NH_2	6502 (6511)	98
2646	(Arg)6-Octa-PNA	H-(Arg)$_6$-Lys(Octa)-CCTCTTACCTCAGTTACA-NH_2	5960 (5958)	#
2647	(Arg)6-Dodeca-PNA	H-(Arg)$_6$-Lys(Dodeca)-CCTCTTACCTCAGTTACA-NH_2	6017 (6014)	90
2648	(Arg)6-Hexadeca-PNA	H-(Arg)$_6$-Lys(Hexadeca)-CCTCTTACCTCAGTTACA-NH_2	6077 (6070)	95
2822	(RK)3-PNA	H-(D-Arg-D-Lys)$_3$-Gly-CCTCTTACCTCAGTTACA-NH_2	5675 (5676)	90

2823	Deca-(RK)3-PNA	H-Lys(Deca)-(D-Arg-D-Lys)$_3$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	5957 (5958)	75
2824	(RK)4-PNA	H-(D-Arg D-Lys)$_4$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	5959 (5960)	90
2825	Deca-(RK)4-PNA	H-Lys(Deca)-(D-Arg D-Lys)$_4$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	6242 (6243)	75
2826	(RRK)3-PNA	H-(D-Arg D-Arg-Ala)$_3$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	5971 (5973)	90
2827	Deca-(RRK)3-PNA	H-Lys(Deca)-(D-Arg-D-Arg Ala)$_3$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	6253 (6255)	75
2828	(RRK)4-PNA	H-(D-Arg D-Arg Ala)$_4$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	6349 (6352)	90
2829	Deca-(RRK)4-PNA	H-Lys(Deca)-(D-Arg-D-Arg Ala)$_4$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	6637 (6639)	75
2830	R4K4-PNA	H-(D-Arg)4(D-Lys)4-Gly-CCTCTTACCTCAGTTACA-NH$_2$	5960 (5960)	75
2831	Deca-R4K4-PNA	H-Lys(Deca)-(D-Arg)4(D-Lys)$_4$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	6242 (6243)	75
2832	K2R4K2-PNA	H-(D-Lys)$_2$(D-Arg)$_4$(D-Lys)$_2$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	5962 (5960)	75
2833	Deca-K2R4K2-PNA	H-Lys(Deca)-(D-Lys)$_2$(D-Arg)4(D-Lys)$_2$-CCTCTTACCTCAGTTACA-NH$_2$	6242 (6243)	90
2738	(D-Arg)9-PNA	H-(D-Arg)$_9$-Gly-CCTCTTACCTCAGTTACA-NH$_2$	6235 (6228)	90
3016	Chol-(Arg)7-PNA	Cholesteryl hemisuccinate-(Arg)$_7$-eg1-CCTCTTACCTCAGTTACA-NH$_2$	6474 (6472)	98
3266	Fl-(Arg)8-PNA	H-Flk-(D-Arg)$_8$-AATCTCACCTGATAG T-NH$_2$[c]	6100 (6107)	98
3265	Fl-(Arg)8-Deca-PNA	Deca-Flk-(D-Arg)$_8$-AATCTCACCTGATAGT-NH$_2$	6255 (6261)	98

[a)]The sequences of cell-penetrating peptides are written using the standard one-letter amino acid symbols. The sequences of PNA conjugates are written from N-terminal-end to C-terminal –end. eg1 (8-amino-3,6-dioxaoctanoic acid) is an ethylene glycol linker. [b)]98 corresponds to single peak; 95 corresponds to single peak with slight foot; 90 corresponds to single peak with slight foot and/or shoulder peak; 75 corresponds to single peak with significant foot and/or shoulder/satellite peaks; # the HPLC analysis showed a close, sharp double peak, whereas the MALDI analysis showed only one signal of the expected mass. [c)] Flk is a monomer with fluorescein (Fl) attached to the ε-amino group of a lysine residue (Lohse J, Nielsen PE, Harrit N, Dahl O *Bioconjugate Chemistry* 1997, 8: 503-509.).