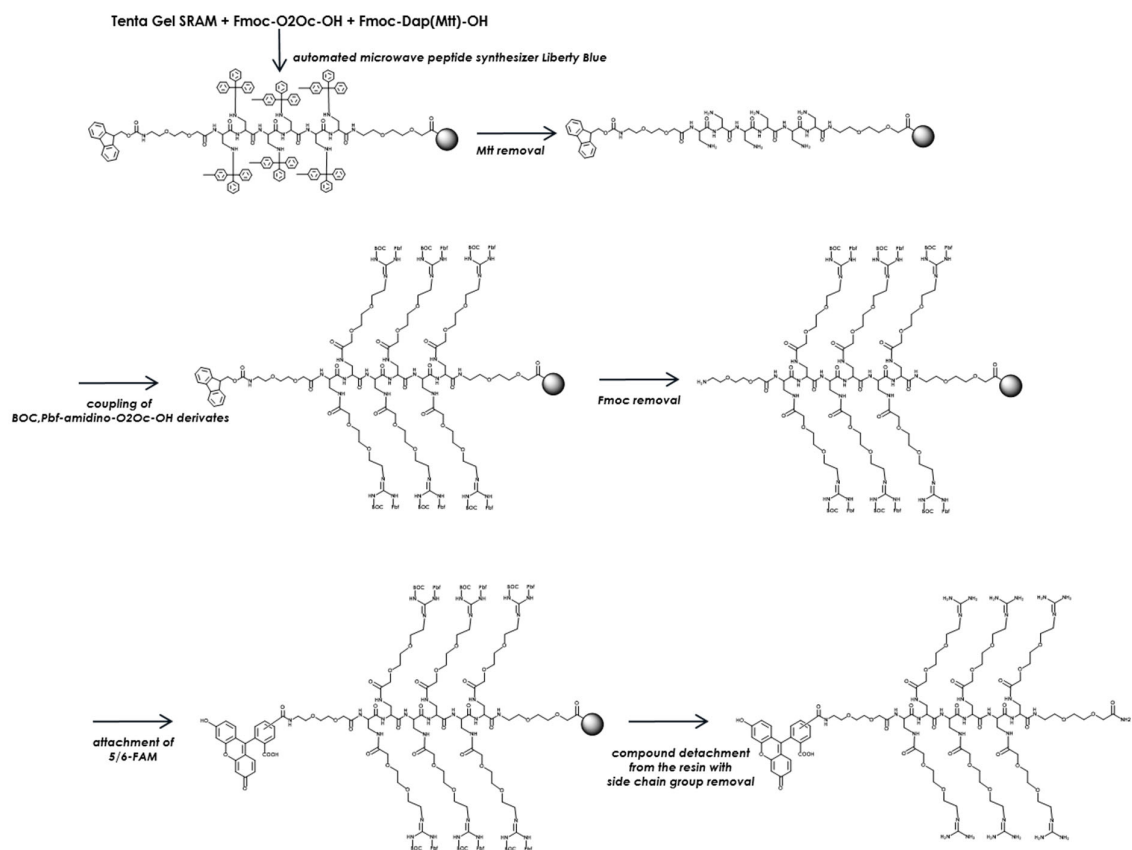
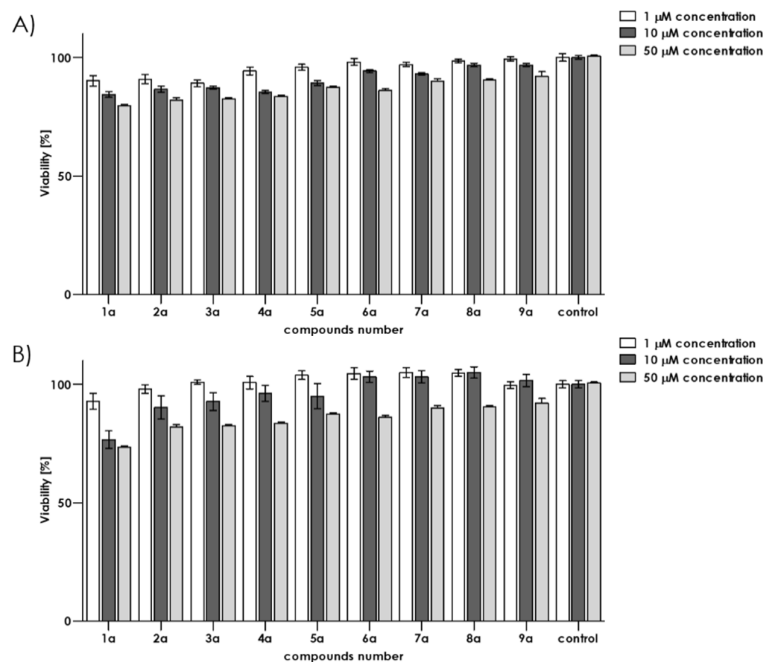


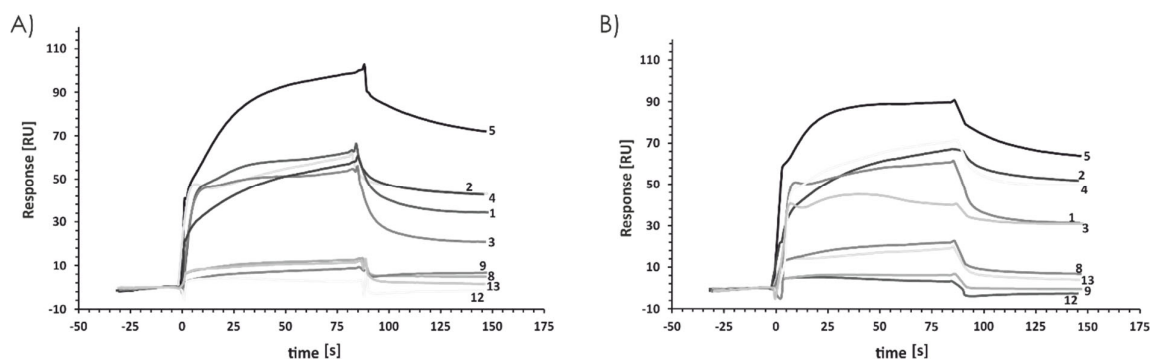
## Supplementary Materials



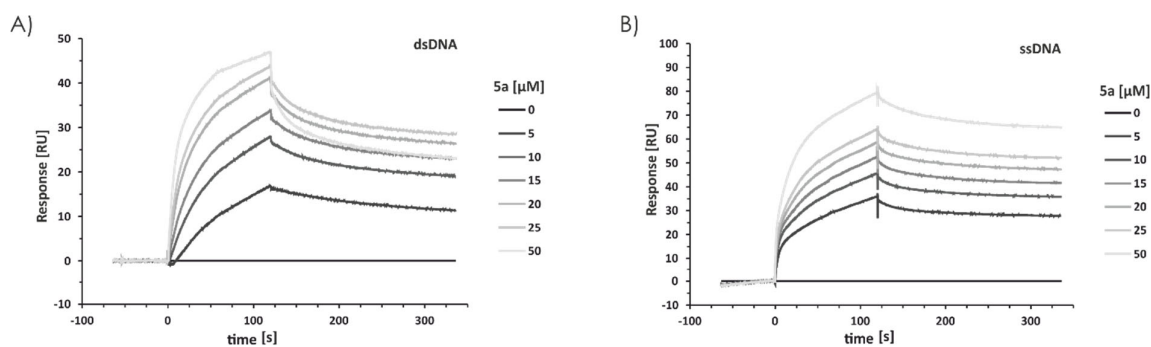
**Figure 1S.** Scheme of synthesis of compound 5a



**Figure 2S.** Cytotoxicity of compounds 1a–9a as assessed by the MTT assay. Two different cell lines were used: A) HB-2 and B) MDA-MB-231.



**Figure 3S. Surface plasmon resonance SPR analysis of double-stranded DNA (dsDNA) binding by various peptidomimetics.** The SPR analysis of dsDNA binding was performed using: A) 50  $\mu\text{M}$  and B) 100  $\mu\text{M}$  of the indicated compounds, flowed over the SA sensor chip surface with immobilized 76 bp biotinylated DNA fragment containing the sequence of beta-actin (*Homo sapiens*). Injections were performed in HBS-EP buffer. HBS-EP was also used as the running buffer.



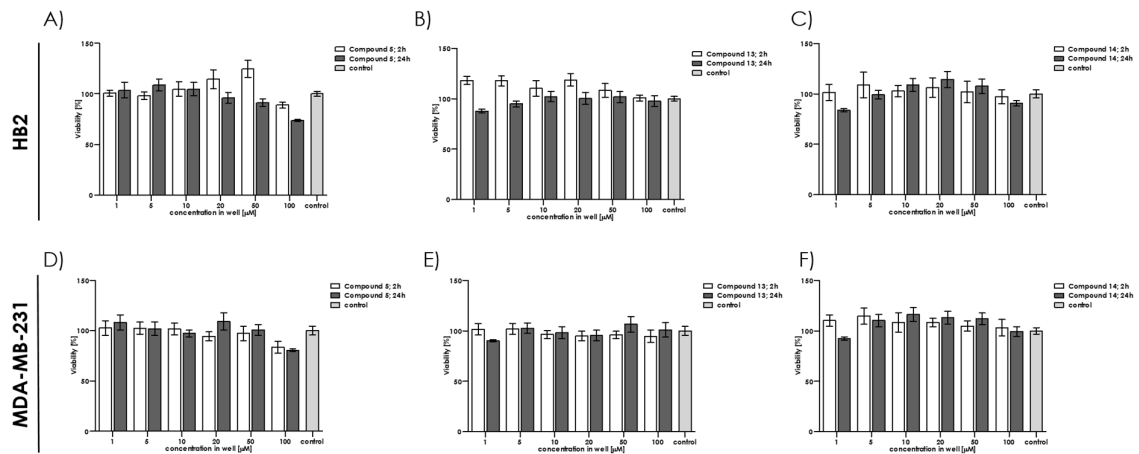
C)

|       | $k_a$   | SD      | $k_d$    | SD       | KD       | SD       |
|-------|---------|---------|----------|----------|----------|----------|
| dsDNA | 4.58e02 | 1.77e02 | 8.01e-04 | 2.38e-04 | 1.81e-06 | 2.63e-07 |
| ssDNA | 6.23e02 | 2.81e02 | 1.69e-03 | 1.42e-03 | 2.78e-06 | 2.14e-06 |

**Figure 4S.** SPR analysis of DNA binding by compound 5a. The SPR analysis of double-stranded DNA (dsDNA; A) and single-stranded DNA (ssDNA; B) binding by compound 5a was performed using SA sensor chip surface with immobilized 76 bp or 76 nt biotinylated DNA fragment containing the sequence of beta-actin (*Homo sapiens*). An increasing concentration of compound 5a was used, as indicated above. Injections were performed in HBS-EP buffer. HBS-EP was also used as the running buffer. (C) Kinetic constants calculated from at least three experiments using Biacore T200 Evaluation Software

**Table 1S.** Minimal charge to ratio (N/P) of each compound for efficient complexation with DNA. \*minimal N/P ratio resulting in effective complex formation based on EMSA. \*\*ND - no determined

| No | Sequence                                               | Minimal N/P ratio* |
|----|--------------------------------------------------------|--------------------|
| 1  | O2Oc(Arg) <sub>6</sub> -O2Oc-NH <sub>2</sub>           | 1.5:1              |
| 2  | O2Oc(D-arg) <sub>6</sub> -O2Oc-NH <sub>2</sub>         | 1.5:1              |
| 3  | O2Oc-(Har) <sub>6</sub> -O2Oc-NH <sub>2</sub>          | 1.5:1              |
| 4  | O2Oc-[Dap(GO1)] <sub>6</sub> -O2Oc-NH <sub>2</sub>     | 0.2:1              |
| 5  | O2Oc-Dap(GO2) <sub>6</sub> -O2Oc-NH <sub>2</sub>       | 0.2:1              |
| 6  | O2Oc-[Dap(O2(GO1))] <sub>6</sub> -O2Oc-NH <sub>2</sub> | 1.5:1              |
| 7  | O2Oc-[Dap(O2(GO2))] <sub>6</sub> -O2Oc-NH <sub>2</sub> | 1.5:1              |
| 8  | O2Oc-[Dap(O2)] <sub>6</sub> -O2Oc-NH <sub>2</sub>      | 1.5:1              |
| 9  | O2Oc-[Dap(HO2)] <sub>6</sub> -O2Oc-NH <sub>2</sub>     | No binding         |
| 12 | O2Oc-[Dap(GO2)] <sub>2</sub> -O2Oc-NH <sub>2</sub>     | ND**               |
| 13 | O2Oc-[Dap(GO2)] <sub>4</sub> -O2Oc-NH <sub>2</sub>     | 1.5:1              |
| 14 | O2Oc-[Dap(GO2)] <sub>8</sub> -O2Oc-NH <sub>2</sub>     | 0.2:1              |



**Figure 5S.** CCK8 cytotoxicity assay performed for three compounds (5, 13, and 14). Two different cell lines were used: A) HB-2 and B) MDA-MB-231