**Supplementary Material**

**Metal-Mediated Base Pairing within the Simplified Nucleic Acid GNA**

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**Content:**

1.) Proton NMR data of compounds

2.) GNA oligonucleotide synthesis and purification
1.) Proton NMR data of compounds
Compound 5 (CDCl₃)
Compound 7 (DMSO-$d_6$)

ODPC

DMTrO

OH
Compound 1 (CDCl₃)
Compound 13 (CDCl₃)
Compound 14 (CDCl₃)

DMTrO

OH

N

N

N

N
Compound 2 (CDCl$_3$)
2.) GNA oligonucleotide synthesis and purification

GNA oligonucleotides were prepared on an ABI 394 DNA/RNA Synthesizer on a one micromole scale. GNA phosphoramidites (A, T, G, C, 1, 2) were used at a concentration of 100 mM with a standard protocol for 2-cyanoethyl phosphoramidites, except that the coupling was extended to 3 minutes (A, T, G, C), or 8 minutes (1, 2). After the trityl-on synthesis, the resin was incubated with concentrated aqueous ammonia at 55-60 °C for 12 hours and then evaporated. The tritylated oligonucleotides were purified by C_{18}-reversed-phase HPLC (Varian Dynamax 250 × 10 mm, Microsorb 300–10, C_{18}) with aqueous triethylammonium acetate (50 mM TEAA) and acetonitrile as the eluent. The oligonucleotides were then detritylated with 80% acetic acid for 20 min and precipitated with iPrOH after the addition of 3 M sodium acetate. All oligonucleotides were finally purified at 55-60 °C using a Waters XTerra column (MS C18, 4.6 × 50 mm, 2.5 μm) with aqueous TEAA (50 mM) and acetonitrile as the eluent. Purities were confirmed by HPLC as demonstrated with a representative trace in Figure S1. All identities were confirmed by MALDI-TOF MS (Table S1).
**Figure S1.** HPLC trace of the GNA sequence 3’-AAT ATT ATT ATT TTA-2’. The oligo was eluted with a linear gradient from 3-13% acetonitrile (97-87% TEAA) in 30 minutes. All GNA oligos were determined to be 98-100% pure by HPLC.

**Table S1.** Extinction coefficients and MALDI-TOF measured masses for all GNA oligonucleotides

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<th>Mass (measured)</th>
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