



Product Specifications

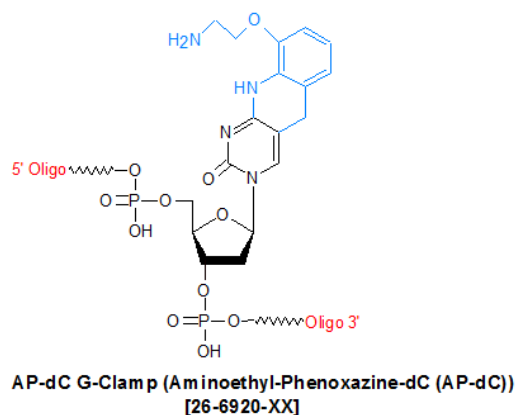
Custom Oligo Synthesis, antisense oligos, RNA oligos, chimeric oligos, Fluorescent dyes, Affinity Ligands, Spacers & Linkers, Duplex Stabilizers, Minor bases, labeled oligos, Molecular Beacons, siRNA, phosphonates Locked Nucleic Acids (LNA); 2'-5' linked Oligos

Oligo Modifications

For research use only. Not for use in diagnostic procedures for clinical purposes.

AP-dC

| | |
|--------------------------|------------------|
| Category | Duplex Stability |
| Modification Code | AP-dC |
| Reference Catalog Number | 26-6920 |
| 5 Prime | Y |
| 3 Prime | Y |
| Internal | Y |
| Molecular Weight(mw) | 438.33 |



Aminoethyl-Phenoxazine-deoxycytosine (AP-dC), sometimes referred to as "G-clamp", pairs with dG, and when substituted for dC in an oligonucleotide, is able to form both Watson-Crick and Hoogsteen hydrogen bonds with the guanine base. A total of four hydrogen bonds form between AP-dC and dG: the usual three Watson-Crick hydrogen bonds and a Hoogsteen hydrogen bond between the protonated amine of AP-dC's aminoethyl side-chain and the O6 position of the dG. As a result, an AP-dC:dG base pair significantly increases the stability of the resulting duplex relative to the comparable unmodified form. The increase in stability can be quite dramatic; in one study, a single incorporation of AP-dC in a 10-mer polypyrimidine oligonucleotide raised the T_m of the corresponding duplex by 18 degC over a control duplex containing 5-Me-dC at the same position (1). Moreover, the additional, specific presence of the Hoogsteen hydrogen bond leads to high specificity of AP-dC for dG over the other three bases (1). Thus, AP-dC may be useful in any application in which the ability to discriminate dG in a target is necessary.

Flanagan and co-workers tested AP-dC for its utility in anti-sense oligos. Based on studies of AP-dC-modified anti-sense oligos for sequence-context dependence, activity mismatch, sensitivity, RNase-H cleavage, and hybridization kinetics, they concluded that AP-dC is a very potent, mis-match sensitive analog for dC, with high potential for improving the potency of anti-sense oligonucleotides (2). In another study, oligos containing one AP-dC at the 3'-end confer resistance to 3'-exonuclease digestion (3).

AP-dC is an excellent choice of modification whenever a large increase in duplex stability and/or specificity for dG in a target is required. **References**

1. Lin, K.Y.; Matteucci, M.D. A cytosine analogue capable of clamp-like binding to a guanine in helical nucleic acids. *J. Am. Chem. Soc.* (1998), **120**: 8531-8532.
2. Flanagan, W.M.; Wolf, J.J.; Olson, P.; Grant, D.; Kuei-Ying, L.; Wagner, R.W.; Matteucci, M.D. A cytosine analog that confers enhanced potency to antisense oligonucleotides. *Proc. Natl. Acad. Sci. (USA)* (1999), **96**: 3513-3518.
3. Maier, M.A.; Leeds, J.M.; Balow, G.; Springer, R.H.; Bharadwaj, R.; Manoharan, M. Nuclease resistance of oligonucleotides containing the tricyclic cytosine analogues phenoxazine and 9-(2-aminoethoxy)-phenoxazine ("G-clamp") and origins of their nuclease resistance properties.

Biochem. (2002), **41**: 1323-1327.