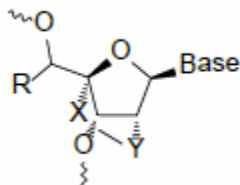


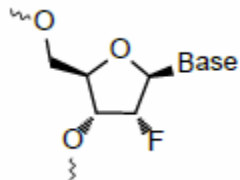
Novel Bicyclic Nucleic Acid (“BNA”) Overview



Key Features of novel BNAs

- Enhanced physiochemical properties
 - o $T_m \sim +5^\circ\text{C}$ per nucleotide substitution relative to DNA (similar to LNA)
 - o Nuclease resistance $> \text{LNA} \gg \text{DNA}$

2'-Fluororibose (“2'-F”) Overview

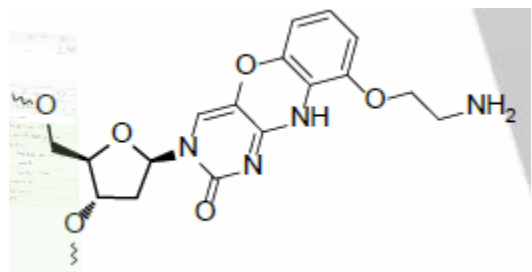


Key Features of 2'-F

- 2'-F retains characteristics and sterics of RNA with a modest stability enhancement
 - o 2'-F enhances hybridization by $\sim 2^\circ\text{C}$ per nucleotide substitution relative to DNA
 - o 2'-F is a substrate for kinases and most polymerases, thus it can easily substitute for RNA and/or DNA in enzymatic syntheses

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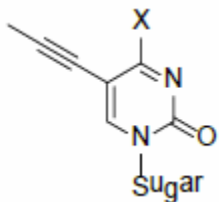
G-Clamp Overview



Key Features of G-Clamp

- G-clamp substitutes for cytosine and enhances hybridization by $\sim 7.5^{\circ}\text{C}$ per nucleotide substitution
- Phosphoramidite monomers are currently available for evaluation at gram scale from Glen Research Corporation
- G-Clamp enhances binding affinity while maintaining specificity and is useful in designing high affinity molecular probes
- G-Clamp is also a fluorescent nucleoside and is useful in DNA structural research

5-Propynyl Pyrimidines (“Propynes”) Overview



Key Features of Propynes

- Propyne substitutions are an effective strategy to enhance the binding of oligonucleotides
- o Propyne modifications enhances hybridization by $\sim 2.8^{\circ}\text{C}$ per 5-propynyl-cytosine substitution and $\sim 1.7^{\circ}\text{C}$ per 5-propynyl-uracil substitution