LNA™ tools for long non-coding RNA

Use Exiqon's LNA™-enhanced oligonucleotides for improved sensitivity and specificity in hybridization-based techniques including qPCR, *in situ* hybridization as well as target inhibition.

At a glance

- Excellent sensitivity - significantly increased affinity compared to DNA and RNA
- Increased specificity - detection of single nucleotide mismatches
- Reduced off-target effects - and superior potency
- Efficient detection and inhibition of nuclear RNAs
- Uniform detection - robust detection of all targets, regardless of GC-content
- Widely applicable - can be used for a range of samples including biofluids and FFPE
- Easy to order using online design tools based on advanced algorithms

LNA™ antisense oligonucleotides for non-coding RNA

Our LNA™ longRNA GapmerRs are highly suited for inhibition of long non-coding RNA. The superior affinity of Locked Nucleic Acids to their complementary sequences combined with the high specificity of short LNA™ oligonucleotides makes them the ideal choice for *in vitro* and *in vivo* RNA inhibition.

The RNase H activating LNA™ gapmers can effectively target nucelar RNA species. Single stranded LNA/DNA mixmers (12-16 nt length) have superior pharmacodynamic and pharmacokinetic properties compared to large double stranded siRNAs as well as fewer and different off target effects.

Incorporation of LNA™ into oligonucleotides also increases resistance to endo- and exonucleases which leads to high stability. These properties combined with low levels of toxicity means that LNA™ antisense oligonucleotides can be highly effective and potent *in vivo*.

Exiqon's advanced GapmeR design tool ensures that all LNA™ longRNA GapmeRs have the optimal combination of length, sequence and LNA™ content, resulting in high-affinity binding and minimal self-annealing. In addition, the algorithm takes target sequence accessibility into account to ensure high success rates. Thorough database searches reduce non-specific targets to a minimum and any remaining potential off-targets can be reviewed in the design tool.

For more information visit **www.exiqon.com/gapmer**

Figure 1. Overview of Exiqon's products for non-coding RNA research. Exiqon offers several innovative online tools for the design of LNA™ oligonucleotides for a variety of applications. We have many years of experience and use advanced algorithms in our design tools. If an online tool does not exist for your specific application please contact us and an expert will assist you with your oligo design.

LONG NON-CODING RNA	
Antisense inhibition	Use Exiqon's online GapmeR design software at www.exiqon.com/gapmer for a sophisticated lncRNA antisense oligonucleotide (for targets > 80nt)
In-situ hybridization	Use Exiqon's online design software at www.exiqon.com/mRNA-probes, optimized for mRNA as well as long non-coding RNA
qPCR profiling	Use Exiqon's Custom LNA™ qPCR Assay Design Tool at www.exiqon.com/custom-LNA-qPCR optimized for any RNA > 50nt

LNA™

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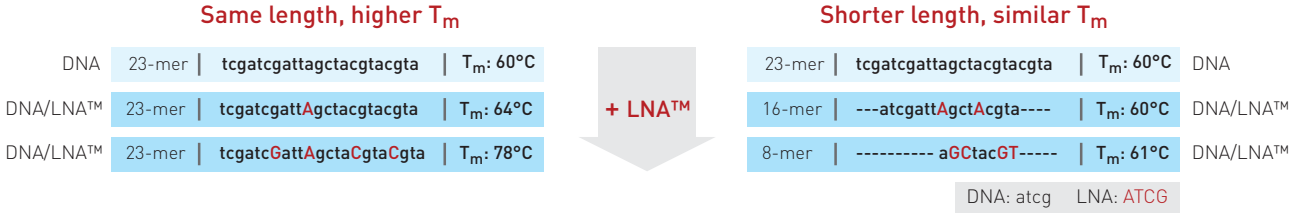
Figure 2. Adding LNA™ confers flexibility to your oligo design. On the left, progressive substitution of DNA nucleotides with LNA™ increases the melting temperature of the oligonucleotide while maintaining the recognition sequence and specificity of the probe. On the right, LNA™ substitutions allow shortening of the probe while maintaining the same T_m.



LNA™ enhanced qPCR for non-coding RNA

Get fast and easy access to sensitive and specific SYBR® Green-based qPCR assays using our advanced online design tool. Take advantage of the power of LNA™ to increase flexibility and decrease the need for optimization. The design algorithm is based on Exiqon's vast knowledge of LNA™ oligonucleotide design and wet-lab tested primer sets. The tool includes sequence database searches to identify potential off-target hits ensuring high levels of specificity.

Due to the possibility to regulate T_m very tightly with LNA™, all primer sets will work under the same PCR conditions when used with Exiqon's PCR master mix. It is also possible to quantitate long RNA and miRNA using the same conditions.

In situ detection of non-coding RNA using LNA™

An LNA™ oligonucleotide offers substantially increased affinity for its complementary strand, compared to traditional DNA or RNA oligonucleotides. This results in unprecedented sensitivity and specificity and makes LNA™ oligonucleotides ideal for the detection of your favorite target.

Design LNA™ enhanced detection probes in minutes for any ncRNA target using our advanced online design software. In less than a minute, the software evaluates more than 5,000 probe designs based on more than 20 design criteria. This process ensures that high-quality probes can be designed for any sequence. A variety of labels are available.

Selected Publications

Baker M, 2011. Nature Methods 8: 379–383
Sheridan C, 2012. Nature Biotechnology 30: 909
Sarma *et al*, 2010. Proc. Natl. Acad. Sci. USA 107: 22196–22201

Exiqon is the home of LNA™

With more than 10 years of experience in working with LNA™ applications, we can provide you with an excellent solution for your research needs. Learn more about LNA™ at **www.exiqon.com/lna-technology**

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