Microsynth

2'-MOE Antisense Oligonucleotides

The most advanced class of antisense oligonucleotides (ASOs)
Suitable for R&D and drug discovery
Available from nmol to mg quantities

Background Information

Microsynth aims to provide a diversified assortment of oligonucleotides and their analogues. In recent years, antisense oligo(ribo)nucleotides (ASOs) have received increasing attention in the development of drugs or as tools to study gene functions due to the presence of the genome sequences available for many model organisms and their ease in designing and handling [1]. A very widely used analog is 2'-O-(2-Methoxyethyl)-oligoribonucleotides (2'-MOE) (see ***Figure 1***) which complement the ASO portfolio of Microsynth. As other ASOs, 2'-MOE-modified oligonucleotides are used as antisense agents and their potential use as therapeutic agents is illustrated by different clinical trials at present. Most often MOE-oligonucleotides are used in combination with phosphorothioate linkages between the nucleosides. Also, MOE/RNA or MOE/DNA-hybrid oligonucleotides are described [2]. All these variations are now available from Microsynth and can be ordered from our online shop.

2'-MOE Characteristics

- Nuclease resistant
- Efficient and verified antisense oligonucleotides
- Superior target binding and pharmacokinetics compared to DNA
- Reduced unspecific protein binding compared to other ASO
- Superior half-life in tissues
- PTO-2'-MOE are less toxic than PTO-oligonucleotides
- Slightly enhanced affinity towards their complementary RNA

Synthesis Scales

Microsynth provides a broad range of synthesis scales for 2'-MOE oligonucleotides, from nmol to µmol scales. Notably, our customers are able to order from screening scale up to 50 mg of 2' MOE or any other antisense oligonucleotides including HPLC purification and dialysis.

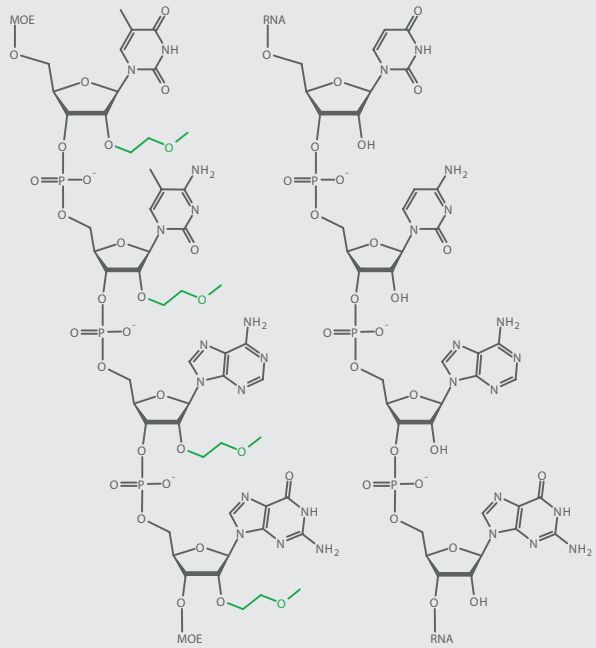

Figure 1. *Chemical structure of 2'-MOE oligonucleotide in comparison with RNA. The methoxyethyl residue (green) is attached at the 2'-O-position, thereby protecting the oligo from nuclease degradation. The fine-tuned balance between steric demand, hydrophobicity and solubility is responsible for the superior characteristics of MOE modified antisense oligonucleotides.*

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2'-MOE Gapmers

RNase H cleavage is the most desirable mechanism in antisense oligonucleotide treatment. Now that only naturally occuring nucleic acid duplexes are substrates for RNase H, no chemical modifications are allowed at the cleavage site. The two conflicting requirements, nuclease resistance by introduction of 2'-alkyl groups and the need of unmodified ASO to achieve RNase H cleavage, are usually addressed by the use of hybrid ASO called gapmers. Gapmers contain a central part of deoxynucleotides that allows the induction of RNase H cleavage. The central part is flanked by blocks of 2'-O-alkyl modified ribonucleotides that protect the internal part from nuclease degradation. Today many gapmers containing 2'-MOE modifications have proven to be valuable candidates in antisense applications.

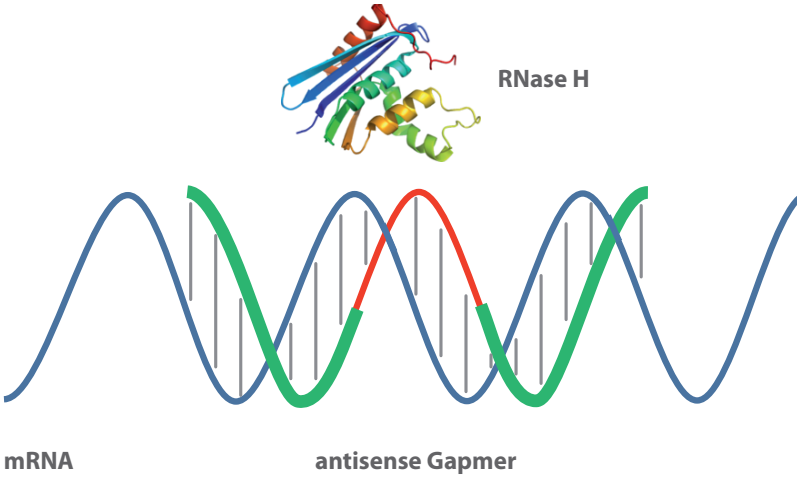

Figure 2. *MOE gapmers are often used as RNase H active antisense oligonucleotides. MOE nucleosides are incorporated at both ends of the oligo (green), whereas the middle part consists of DNA nucleosides (red). Once the gapmer is bound to the target sequence the mRNA (blue) is inactivated by RNase H cleavage.*

Related Topics

- siRNA synthesis
- Micro RNA sequencing
- Genome-wide expression profiling

References and Further Reading

[1] Singh, J., Kaur, H., Kaushik, A., & Peer, S (2011). A Review of Antisense Therapeutic Interventions for Molecular Biological Targets in Various Diseases. International Journal Of Pharmacology, 7(3), 294-315.

[2] Gleave, M. E., & Monia, B. P (2005). Antisense therapy for cancer. Nature Reviews. Cancer, 5(6), 468-79. http://doi.org/10.1038/nrc1631.

Evers, M. M., Toonen, L. J., & van Roon-Mom, W. M (2015). Antisense oligonucleotides in therapy for neurodegenerative disorders Advanced Drug Delivery Reviews, 87, 90-103. http://doi.org/10.1016/j.addr.2015.03.008.

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Burel, S. A., Machemer, T., Ragone, F. L., Kato, H., Cauntay, P., Greenlee, S., u. a (2012). Unique O-Methoxyethyl Ribose-DNA Chimeric Oligonucleotide Induces an Atypical Melanoma Differentiation-Associated Gene 5-Dependent Induction of Type I Interferon Response. Journal Of Pharmacology And Experimental Therapeutics, 342(1), 150-162.

Available Synthesis Scales
0.04 µmol scale up to mg quantities
How to Order
Login to our webshop at www.microsynth.com
Select "2'-MOE" in the blue "DNA/RNA Synthesis" area
Need More Information?
Call us at +41 71 722 83 33 or email us at oligo.support@microsynth.ch

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