

# 2'-MOE Antisense Oligonucleotides

The most advanced class of antisense oligonucleotides (ASOs)

Suitable for R&D or for animal experiments

Available from nmol to gram quantities

## Background Information

Microsynth aims to provide a most 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].

We are glad to announce the introduction of 2'-O-(2-Methoxyethyl)-oligonucleotides (2'-MOE) (see **Figure 1**) which complement the ASO portfolio of Microsynth including 2'-O-Methyl-RNA. 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

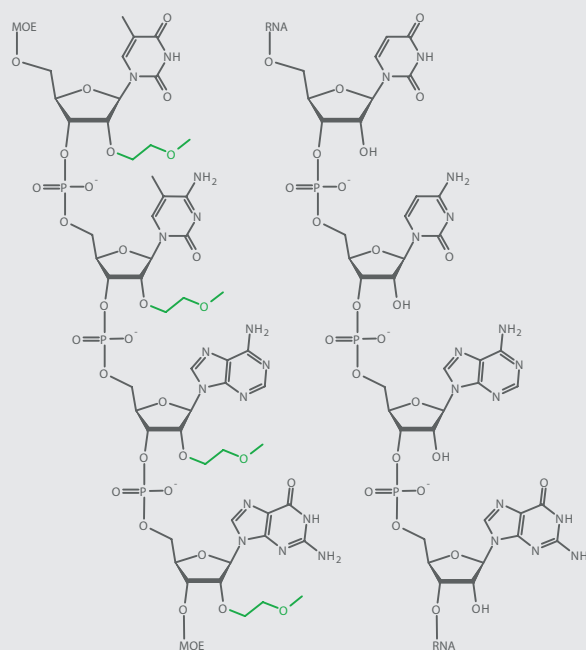
MOE-oligonucleotides are used in combination with phosphorothioate linkages between the nucleosides. Also, MOE/RNA or MOE/DNA-hybrid oligonucleotides are described [2]. All these variations are now available from Microsynth and can be ordered from our online shop.

## 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

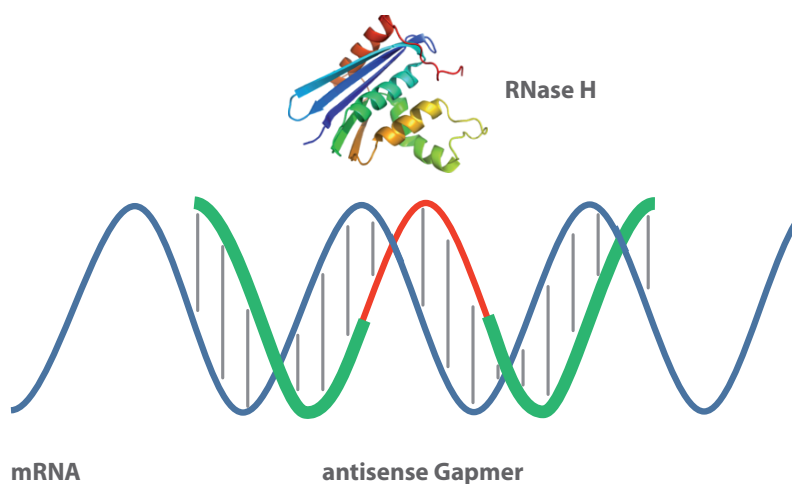
Microsynth provides a broad range of synthesis scales for 2'-MOE oligonucleotides, from nmol to gram scales. Notably, our customers are able to order up to 5 gram of 2' MOE or any other antisense oligonucleotides including HPLC purification and dialysis.



**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.

## 2'-MOE Gappers

RNase H cleavage is the most desirable mechanism in antisense oligonucleotide treatment. Now that only naturally occurring 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 gappers. Gappers 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 gappers containing 2'-MOE modifications have proven to be valuable candidates in antisense applications.



**Figure 2.** MOE gappers 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 gapper 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>.

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### Available Synthesis Scales

0.04 µmol up to large scale synthesis (gram amounts)

### How to Order

Login to our webshop at [www.microsynth.ch](http://www.microsynth.ch)

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](mailto:oligo.support@microsynth.ch)