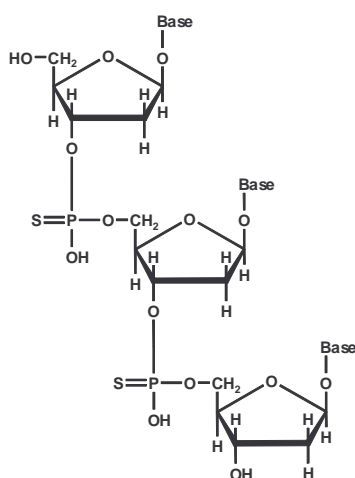


# Phosphothioate Oligonucleotide (PTO)

## Description

Oligonucleotides with one sulfur atom replacing oxygen in the internucleotidic linkage



PTOs contain one sulfur atom in place of an oxygen atom in the internucleotide linkage of DNA or RNA. They are extremely useful as **antisense** molecules inhibiting gene expression, because they are more resistant to nuclease degradation than natural DNA or RNA and still bind to complementary nucleic acid sequences. The more PTO linkages present in an oligonucleotide, the higher its stability. Phosphothioate oligonucleotides can be ordered as full PTOs (whole oligonucleotide containing PTO linkages), as “thio-cap” oligonucleotides, (with only a few – normally 1 to 3 - PTO linkages at the respective 3'- and/or 5'- ends) or as chimeras with several stretches of PTOs interspersed in the oligonucleotide.

Full PTOs are more stable than “thio-cap” oligonucleotides, but due to their extreme stability and their hydrophobic character they can also have toxic effects on living cells. If cell toxicity is a problem in your assay, we recommend that you use “thio-cap” oligonucleotides instead. “Thio-caps” can even further stabilize 2'-O-Me-RNA.

The phosphorous atoms within PTO backbones are optically active. If you wish, Thermo Electron's biopolymer specialists can even separate and purify the different stereoisomers of molecules with **one** PTO linkage.

The sulfur atoms within PTO backbones are chemically reactive (but less reactive than “normal” thiol groups). Thus, they offer another possibility of modifying your oligonucleotide even further.

We can also couple modifications to oligonucleotides either via the standard phosphodiester bond or via the phosphothioate linkage. In general, modifications are stable against enzymatic digestion, but in some cases, PTO linkage of modifications to oligonucleotides can stabilize them. Please indicate the desired linkage type when ordering.

PTOs are one of the least expensive ways to stabilize oligonucleotides.

## Advantages

- stable (resistant to nucleases)
- hybridization to complementary sequences as standard DNA

## Applications

- *in-vivo* application of oligonucleotides
- stabilizing of oligonucleotides towards nuclease degradation
- antisense experiments
- modification of oligos via the sulfur atom (not as reactive as standard thiol groups)

## Product offering

PTOs are available at the scales 0,02  $\mu\text{mol}$ , 0,04  $\mu\text{mol}$ , 0,2  $\mu\text{mol}$ , 1,0  $\mu\text{mol}$ , 10,0  $\mu\text{mol}$ .

Easily order via the web:

[www.thermo.com/oligos](http://www.thermo.com/oligos)

or via email:

[sales.oligos@thermo.com](mailto:sales.oligos@thermo.com)

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