

Therapeutic Oligonucleotides

 From R&D to **GMP grade** manufacturing, from Research to Clinics

- Lead Discovery
- Lead Optimization
- Preclinical Development
- Clinical Trials

 **Support and Services include**

- Design of Experiment (DOE)
- Process Characterization
- Process Development
- Process Validation
- IND & NDA Filing support

 Scale-up & Process Transfer

 Portfolio covering most prevalent types of therapeutic oligonucleotides

- CpG oligonucleotides - excipients/adjuvants
- Antisense oligonucleotides (ASOs)
- siRNA
- Gappers/RNA-DNA Chimera
- miRNA
- sgRNA for CRISPR/Cas technology
- Aptamers
- Oligonucleotide-peptide/lipid/sugar conjugates for tissue specific API delivery

 Exhaustive panel of QC Analytical methods and services

 Custom formulation, Fill & Finish support and services.

We have been focused on custom oligonucleotides for more than 25 years – still are ...

metabion evolved into the one-stop-shop for your oligo requirements from

- R&D
- Diagnostic to
- **Therapeutic** applications.

A globally renowned “**oligo boutique**” and **best-in-class** provider of custom **high-quality oligos**.

In this together ...



metabion

metabion international AG | Semmelweisstrasse 3
82152 Planegg/Steinkirchen | Germany

Custom Synthesis
of High Quality Oligos

Spotlight on

Therapeutic
Oligonucleotides



From R&D to GMP grade manufacturing, support and services, scale-up & Process transfer from Research to Clinics

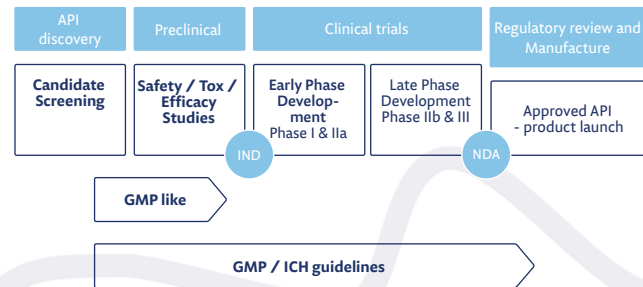


Lead Discovery
(small scale production)

Pre-clinical development

Lead Optimization

Phase I & II clinical trials

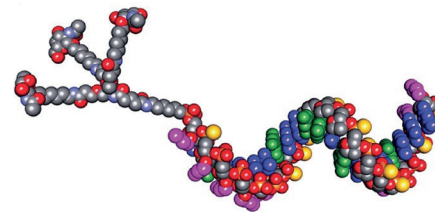


Portfolio covering most prevalent types of therapeutic oligonucleotides

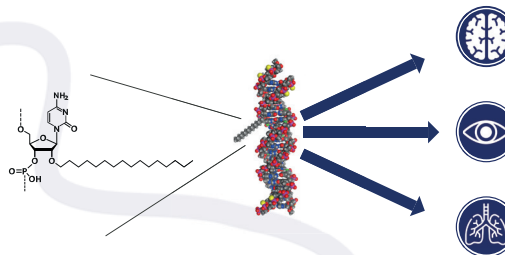
- Antisense oligonucleotides (ASOs)
 - siRNA
 - miRNA
 - Gapmers/RNA-DNA Chimera
 - Aptamers
- Oligonucleotide-peptide/lipid/sugar conjugates for tissue specific API delivery
- sgRNA for CRISPR/Cas technology
- Immunostimulant ONs/CpG oligonucleotides (ISOs)

Modifications covering

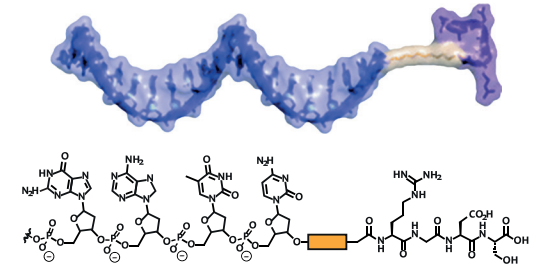
- Sugar modifications, i. e. LNA, 2'-F, 2'-OMe, 2'-MOE, ...
- Backbone modifications, i. e. Thiolation (PTO) ...
- 5' and internal modifications, i. e. 5mC, 5-hydroxyC, 8-bromoG, 8-aminoC, 2-thioT, GalNac, Cholesterol, PEG, Peptide, ...
- 3' modifications, i. e. GalNac, Cholesterol, PEG, Peptide, ...



N-acetylgalactosamine molecule (in gray) conjugated ON to increase delivery to the hepatocytes of the liver



Lipophilic-siRNA conjugate for delivery to extrahepatic tissues.



Peptide oligonucleotide conjugate (POC)

Exhaustive panel of QC Analytical methods and services

- Purity by UPLC/HPLC
- Identity by Mass Spectrometry (ESI)
- Appearance, pH, Osmolality
- Bioburden, Endotoxin level
- Phosphorothioate - Phosphate content
- Residual solvents, Residual heavy metals, Water content, Sodium content
- Stability studies

Fill & Finish support and services

Extensive downstream processing equipment and capabilities

- Chromatography systems
- Ultrafiltration equipment
- Lyophilization services
- Liquid or powder filling