



# BioSpring: From start-up to global market leader – the success story of an academic spin-off

Moving the elements of life.

Dr. Kerstin Stangier | Frankfurt | 29.08.2024

6. ForTra Translatorik-Workshop: „Financing and manufacturing – important things to consider to propel your project from lab to clinic“



**BIOSPRING**  
THE NUCLEIC ACID COMPANY

# AGENDA

1. Who we are
2. The Evolution to Industrial Leadership
3. Tracing the Journey

# Who we are

# World-leading CDMO (Contract Development & Manufacturing Organization) for nucleic acid manufacturing and analysis

## Founded in 1997

- > 650 employees
- > 40 nationalities
- Privately owned & independent

Early discovery to commercial  
cGMP therapeutic &  
diagnostic manufacturing

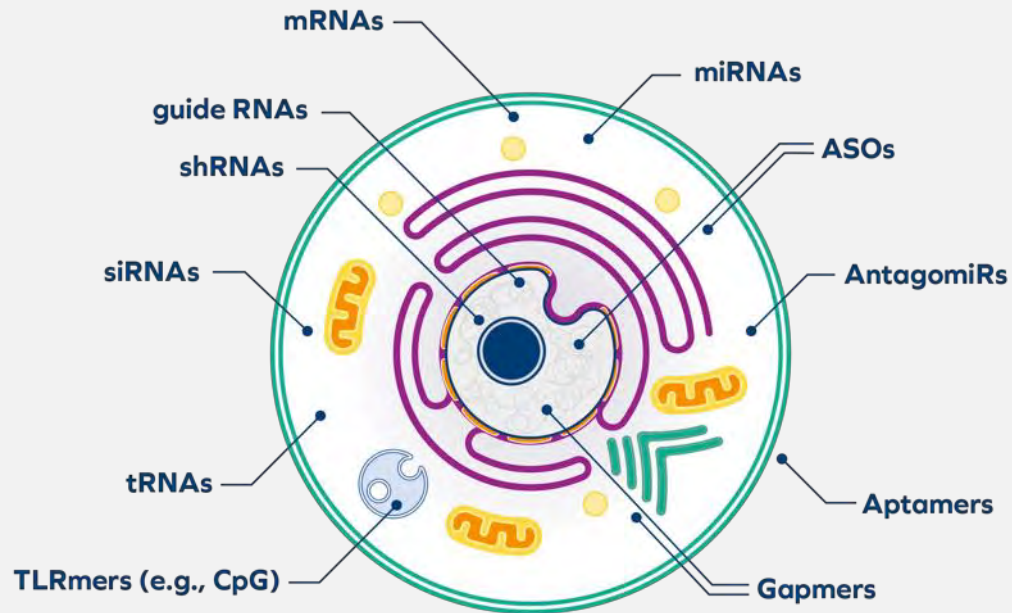
Multiple hundred kg annual  
manufacturing capacity

- **Expansion to metric ton capacities**

- **GMP-certified** since 2007
- **FDA-inspected** (US Food and Drug Administration)
- **PMDA** registered (Japan Pharmaceuticals and Medical Devices Agency)



# Product Portfolio



>100,000 oligonucleotides made in the past 10 years

## Sugar modifications

### 2' modifications

- 2'OMe, 2'F, 2'-O-MOE
- Amino, Allyloxy
- FANA

### Constrained nucleotides

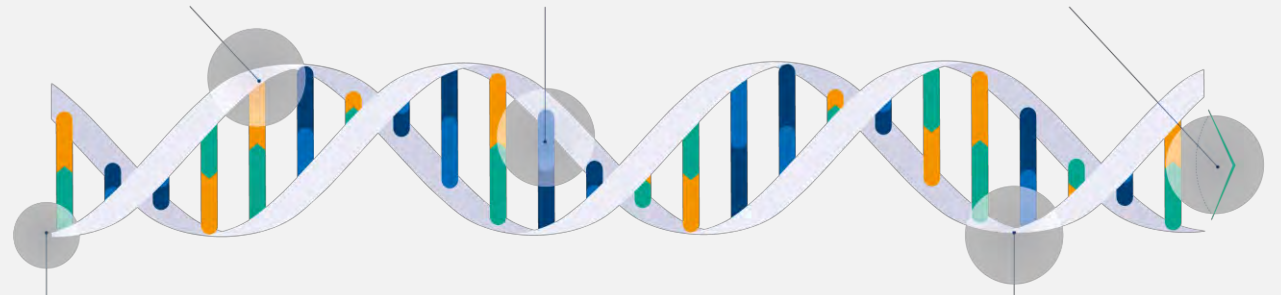
- LNA, AmNA, scpBNA, cEt, ENA
- PNA, pRNA

## Base modifications

- 2-thio-T
- 5-Me-C
- 2,6-Diaminopurine
- 7-deaza-G

## Mirror-image

- L-DNA
- L-RNA



## Conjugates

- Sugar (e.g., GalNAc)
- Cholesteryl
- PEG
- Peptide
- Lipid (e.g., PUFA)
- Dyes
- Linkers
- Vinyl phosphonate

## Backbone modifications

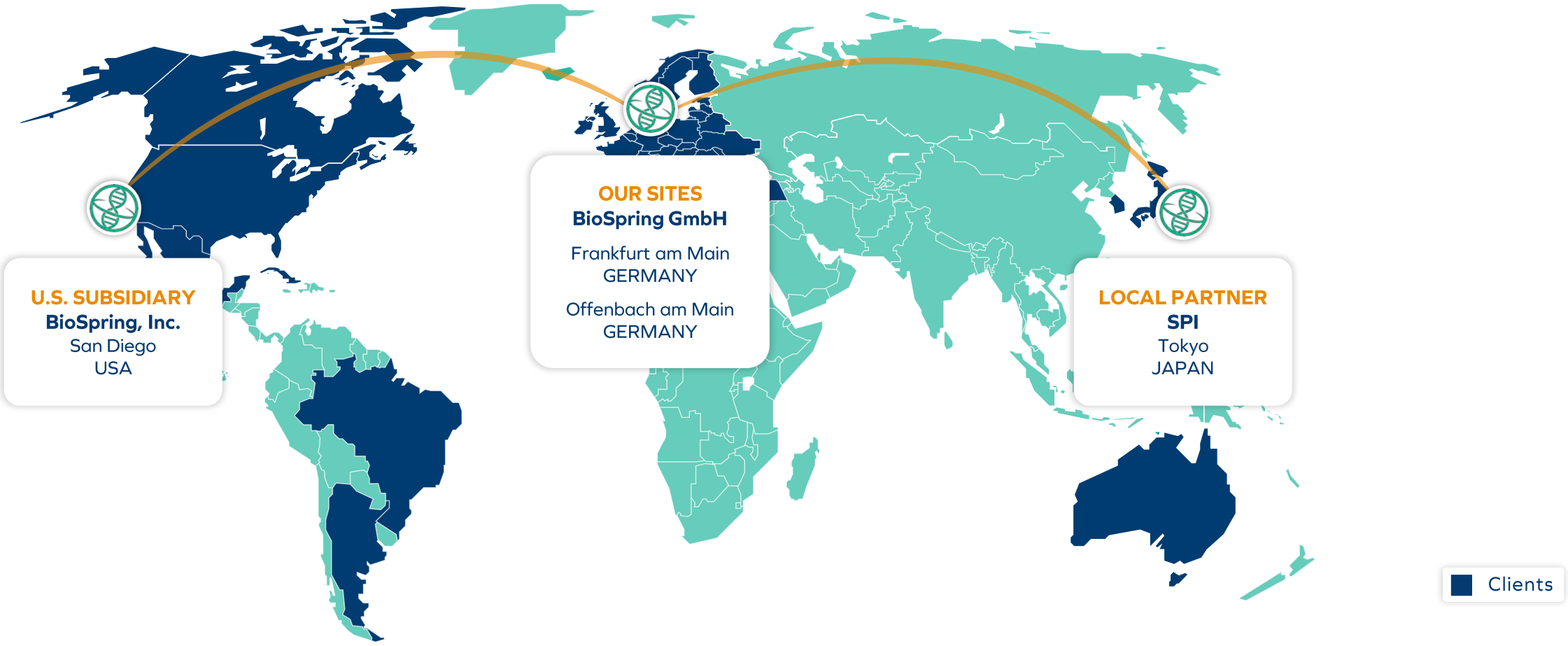
- Thioate (PS)
- Dithioates (PS2)
- Amidate
- Triester
- PACE
- P-N-backbone

**Go-to partner**

for highly complex & conjugated oligonucleotides

# About Us

## Proven Partner for Pharma, Biotech and Academia Worldwide



# The Evolution to Industrial Leadership

# BioSpring founder and owner

## Dr. Sylvia Wojczewski & Dr. Hüseyin Aygün



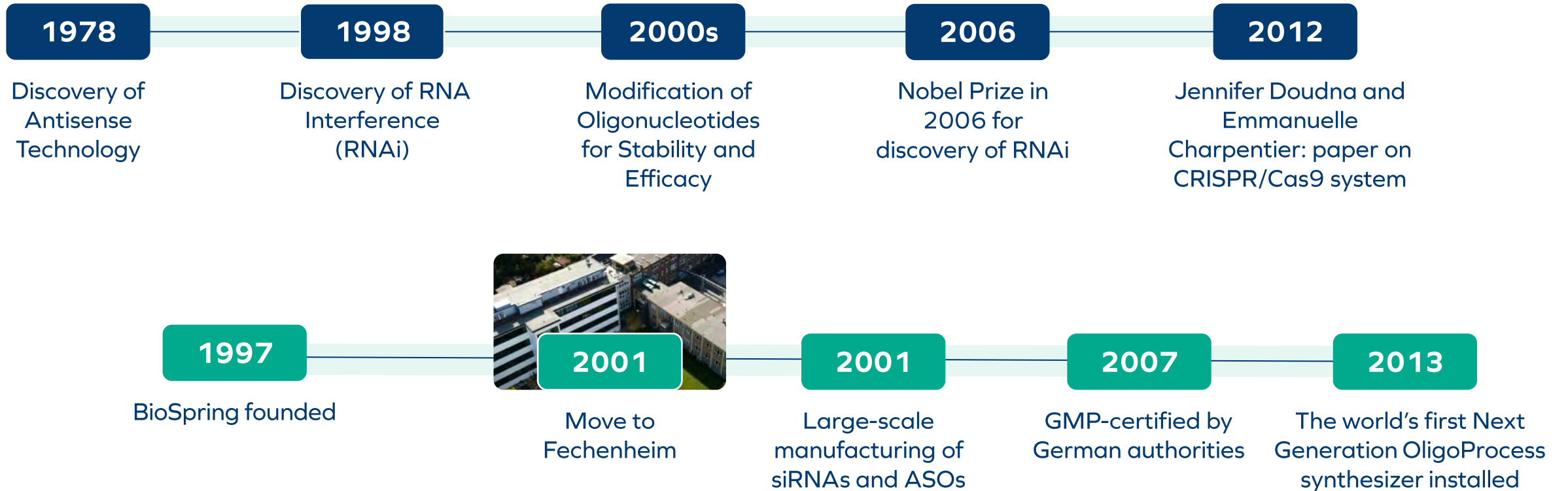
Dr. Sylvia Wojczewski  
CEO



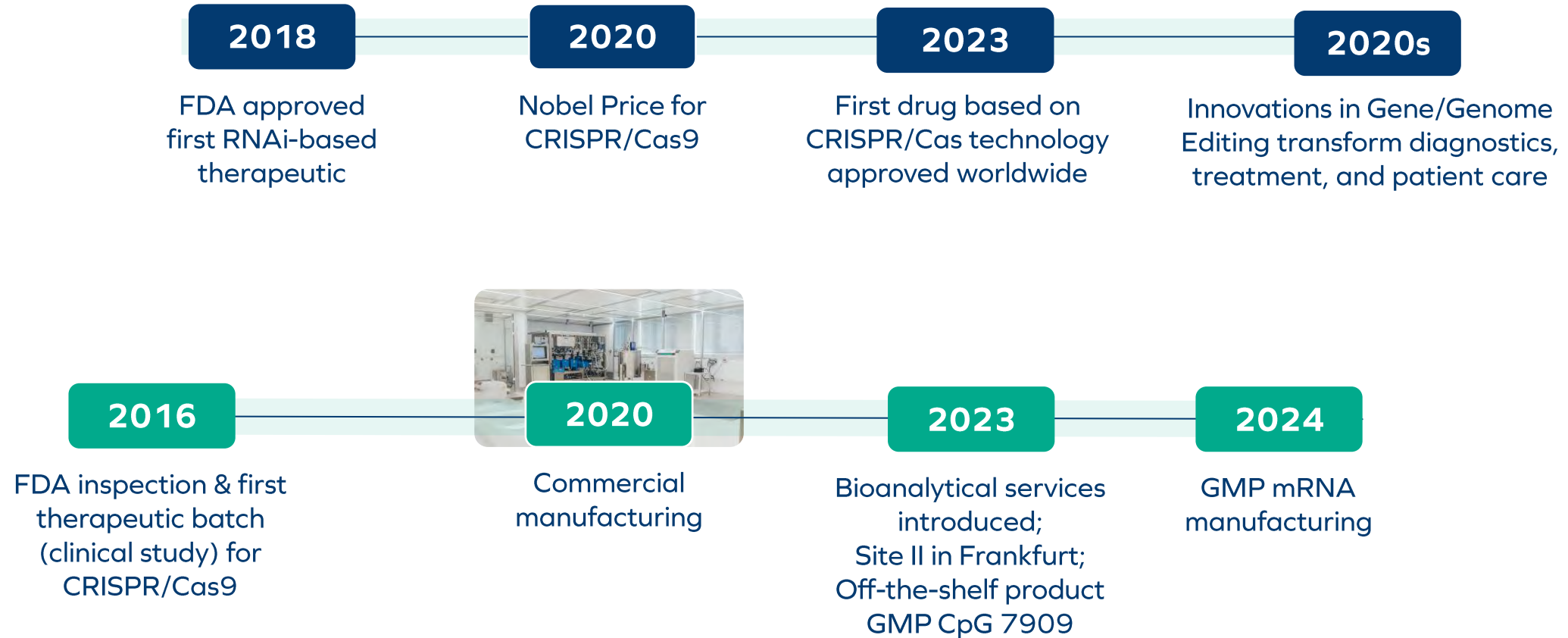
Dr. Hüseyin Aygün  
CSO

- founded BioSpring back in 1997 while completing their doctoral studies at Goethe University in Frankfurt
- Diploma and PhD in the group of Prof. Dr. J.W. Engels (Organic Chemistry)
- Prof. Dr. J.W. Engels: research interest in nucleotide chemistry, in particular the synthesis of modified oligonucleotides and their analysis and potential therapeutic applications

# Milestones



# Milestones



# BioSpring Site I

## 14,400 m<sup>2</sup>

- 6 separate high-class cGMP manufacturing trains, plus dedicated areas for synthesis and lyophilization
- Next Generation OligoProcess & OP400 synthesizer platforms
- Dedicated commercial manufacturing trains
- Additional, dedicated manufacturing areas for:
  - Preclinical, large-scale manufacturing
  - Process Development
  - Process Characterization
- R&D and Diagnostics manufacturing
- 9 analytical laboratories (650 m<sup>2</sup> / 7,000 ft<sup>2</sup>)



# BioSpring Site II

## 900 m<sup>2</sup>

Additional manufacturing capacity expansion: 3 independent cleanrooms support a unit-operation driven simultaneous production

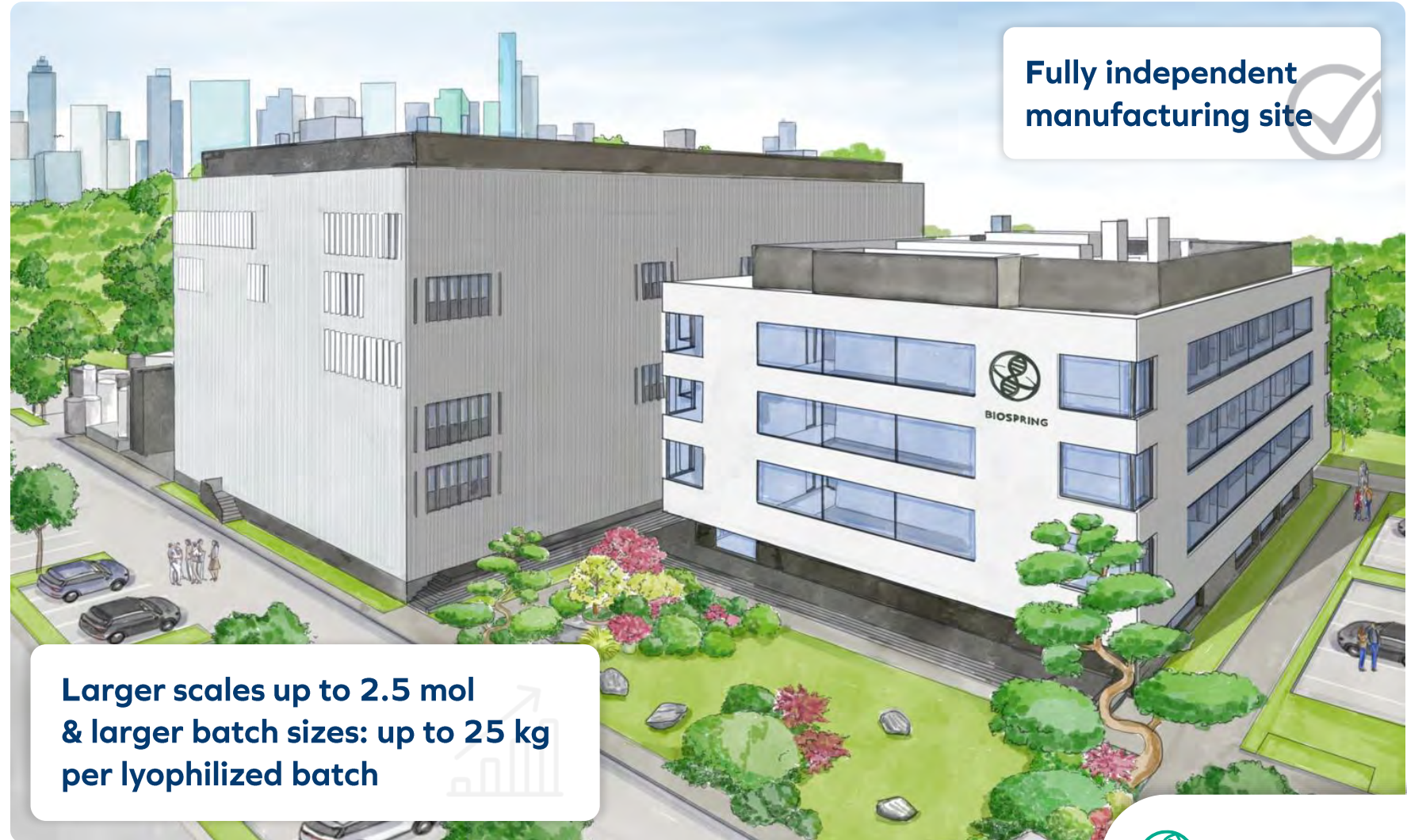
Dedicated train for GMP mRNA manufacturing



# BioSpring Site III

## 15,800 m<sup>2</sup>

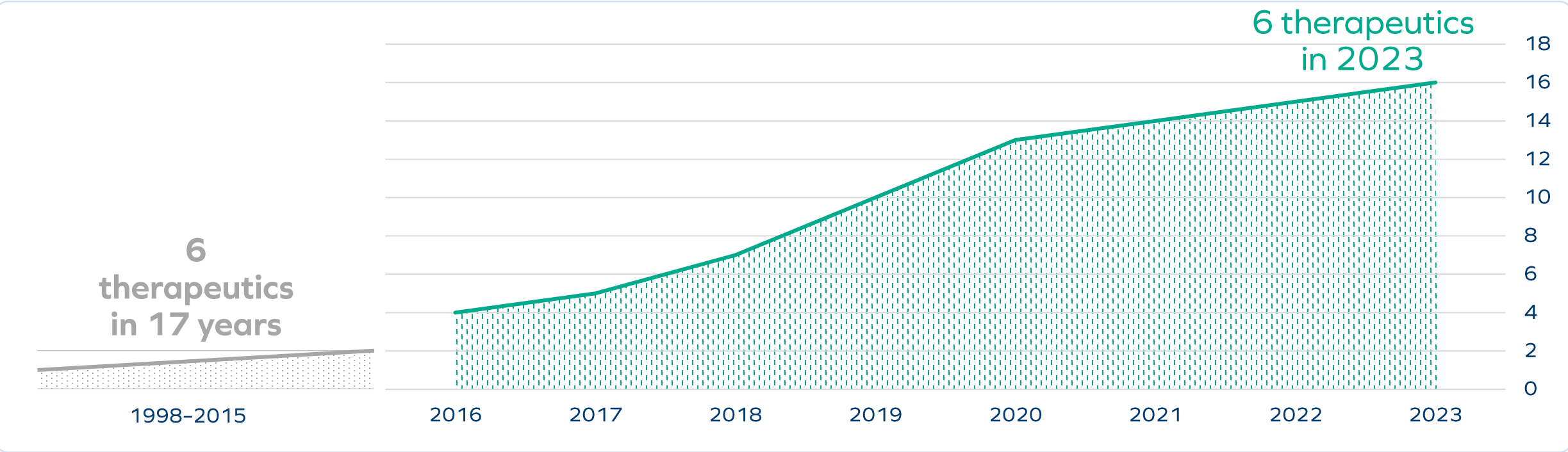
- New infrastructure
- New warehouse
- New high volume tank farm
- Continuous manufacturing
- Increased throughput – seamless manufacturing of multiple batches
- On demand fast access to additional capacities
- Sterile fill & finish



# Tracing the Journey

# Therapeutic Oligonucleotides

Cumulative number of approved oligonucleotides // 22 approved oligonucleotide-based therapeutics by end of 2023



**SPINRAZA**  
BIOGEN/IONIS

**HEPLISAV**  
DYNAVAX

**TEGSEDI**  
AKCEA/IONIS

**WAYLIVRA**  
AKCEA/IONIS

**OXLUMO**  
ALNYLAM

**AMONDYS 45**  
SAREPTA

**AMVUTRA**  
ALNYLAM

**CASGEVY**

**ONPATTRO**  
ALNYLAM

**LEQVIO**  
NOVARTIS/MED COMP  
ALNYLAM

### Oligo types

- ASO
- siRNA
- CpG
- Gene Editing
- ASO/PMO



# The areas of application are diverse!

Vaccines

Heart diseases

Metabolic  
diseases

Rare diseases

Neurological  
diseases

Cancer

Oligonucleotides studied worldwide in clinical trials for  
treatment of numerous diseases

HIV

Diabetes

Hepatitis B

Allergic asthma

Alzheimer

...and much  
more!

# Enormous potential

## Also for the treatment of rare diseases

### Rare Diseases

EU: Diseases that affect fewer than 5 in 10,000 people

Uto 484 million people are affected worldwide

In total, around 8,000 different rare diseases

Around 80 % of rare diseases have a genetic origin

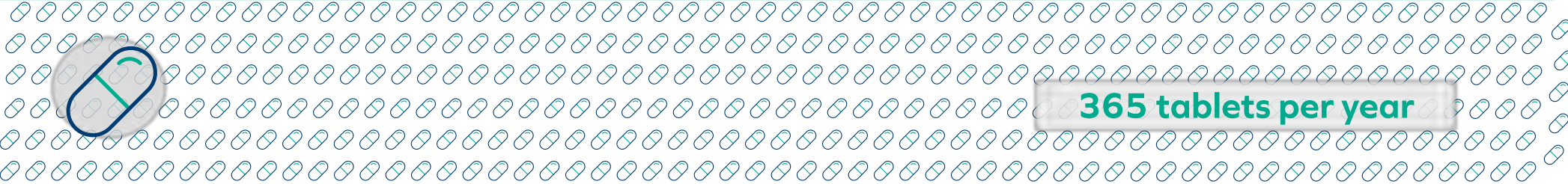
**Oligonucleotides:**  
hope for previously incurable diseases

Only 2% of these diseases are currently treatable!  
("orphan drugs")

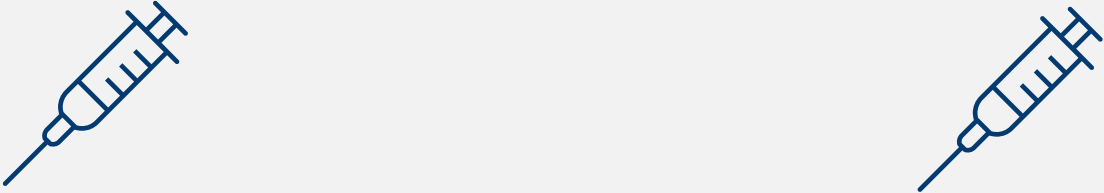
Quellen:  
ZIPSE. Was sind seltene Erkrankungen?, aufgerufen am 21.06.2023, <https://www.portal-se.de/was-sind-seltene-erkrankungen>  
VFA, Seltene Erkrankungen, aufgerufen am 21.06.2023, <https://www.vfa.de/de/arzneimittel-forschung/seltene-erkrankungen>  
orpha.net, Über seltene Krankheiten, aufgerufen am 21.06.2023, <http://www.orpha.net/national/DE-DE/index/%C3%BCber-seltene-krankheiten/>

# Comparing different treatment approaches

Conventional treatment:  
1 tablet per day



Treatment with siRNA active ingredient: 1 injection/6 months



2 injections per year

CRISPR/Cas (Gene Editing) Treatment



One treatment in a lifetime



# Genome editing revolutionizes medicine

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- Disruptive technology: genome editing opens up completely new ways of therapy and will completely change medicine and the biotech/pharma industry
- 400 million people worldwide are affected by diseases caused by mutations on individual genes and can be treated highly effectively for the first time using genome editing
- Even common diseases can be treated or even cured (many advanced clinical studies)



**Thank you!**

**[www.biospring.de](http://www.biospring.de)**



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