VIRAL VECTORS TO SUPPORT CELL & GENE THERAPIES FROM EARLY STAGES

Dr. Cristina I. Ureche

SIRION BIOTECH

8th June 2021

Any Gene to Any Cell

PROPRIETARY VIRAL VECTOR PLATFORM FOR INNOVATIVE THERAPEUTIC APPLICATIONS & DISCOVERY

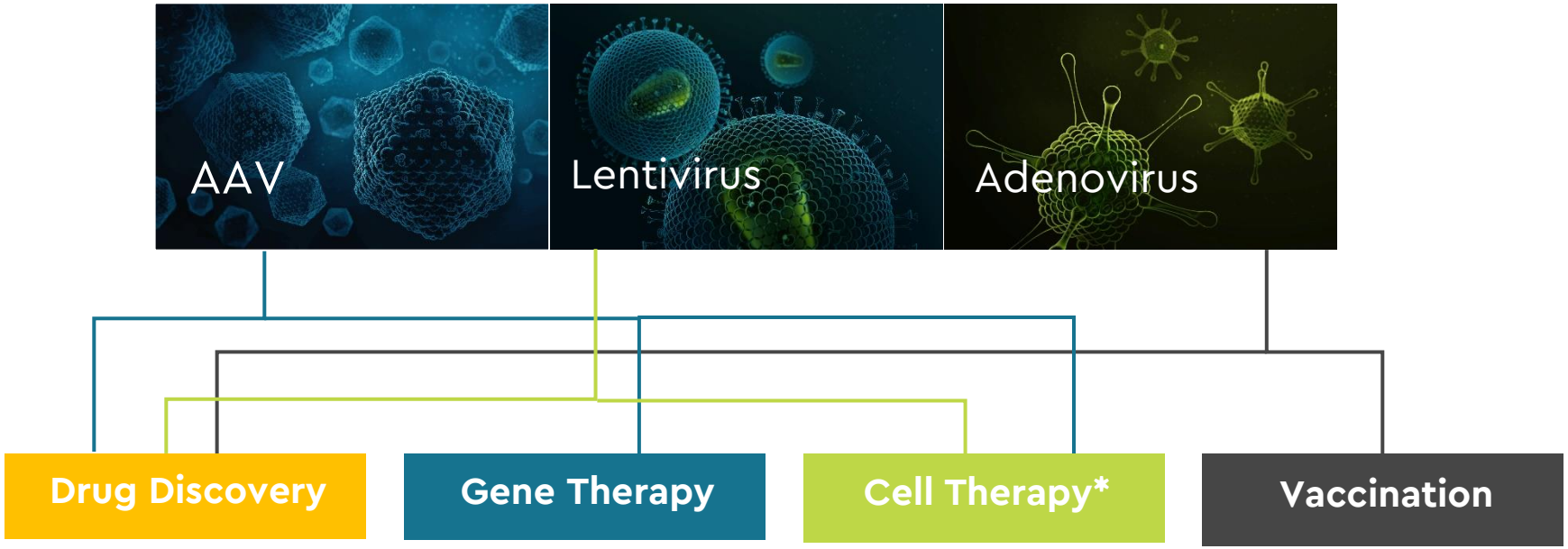
SIRION Biotech founded in 2005 by Dr. Christian Thirion (CEO)

- Headquarters in Munich (Germany)
- Office branches in Boston (USA) & Paris (France)
- Global presence including Israel, UK, Switzerland, Japan and Korea
- SIRION Biotech is growing >40% p.a. (2011-2019)
- 45 employees today

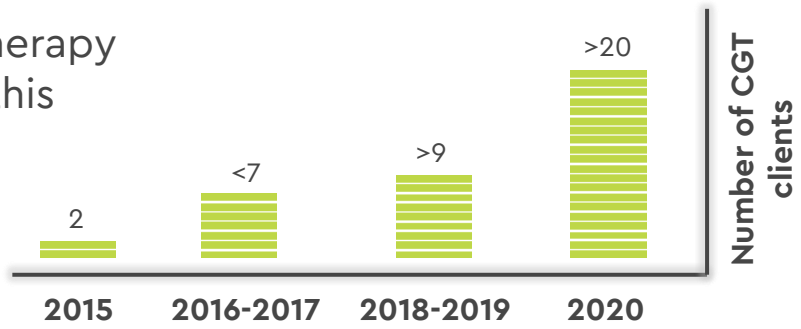
Serving the entire value chain: Discovery through Preclinic to GMP

- Fast expanding global customer footprint: over 2,000 projects
- More than 300 recurring industry (biotech / big pharma) & academic clients
- Transduction technology in 20 clinical programs: Ph-I/II and Ph-III testing in Europe & USA
- First gene therapy drug market approval by a client with SIRION technology included June 2019 (EMA)
- Technology Innovation: Research & Development Partnerships

VIRAL VECTOR PLATFORM TO FIT ANY TYPE & STAGE OF DEVELOPMENT



Client development over the years:
Increasing number of pure Cell & Gene Therapy developers confirms SIRION expertise in this therapeutic area



* Include gene-modified cell therapies

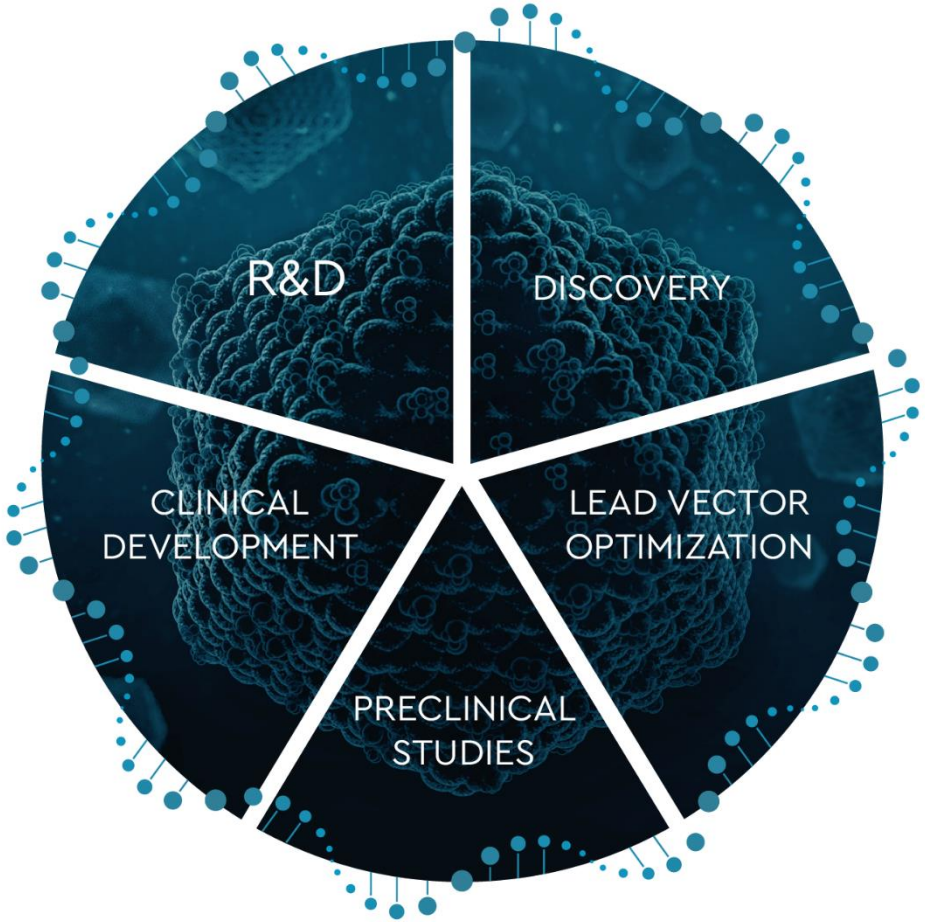
A HOLISTIC VIEW OF THERAPEUTIC DEVELOPMENT: GUIDING PROJECTS THROUGH THE ENTIRE CGT CHAIN

R&D COLLABORATIONS & LICENSING

- AAV vector evolution projects
- LentiBOOST® transduction enhancer with proven clinical success
- BAC technology & Ad19a/64 license opportunities for R&D and clinical applications

GMP ALLIANCES

- Vector productivity evaluation and non-GMP manufacturing of late preclinical batches
- Extended QC and documentation
- Selection of best suitable CDMO and project transfer
- GMP-compliant Process transfer and validated Assay transfer to CDMO (under development)



DISCOVERY & PRECLINICAL MANUFACTURING

- Customized viral vectors (LV, AAV, AV) for both in vitro & in vivo applications
- Different R&D scales & bulk production for preclinical animal studies
- Stringent quality controls & fast and reliable timelines

CLINICAL SUPPORT

- Clinically compliant viral vector design
- Efficacy & Safety: Optimizing the "therapeutic payload" cassette
- Non-GMP platform manufacturing process for preclinical vector evaluation
- Process development and optimization

PARNTERS

- In house consultancy
- Large animal testing /NHP studies
- CDMO network

SIRION'S BENEFITS AT GLANCE

PROJECT SETUP

- Personal consultancy and planning for each individual project
- Short lead time: we integrate your project into our pipeline in a matter of days

VECTOR DESIGN & MANUFACTURING

- Flexible & customize engineering services for integration of virtually every desired expression construct
- Various manufacturing scales and possibility for upscaling
- Platform processes for each viral vector type

QUALITY CONTROLS

- Guaranteed standards for reliable batch-to-batch manufacturing consistency
- Different qualities to fit any step from R&D and preclinical to clinical development

CLINICAL MANUFACTURING*

- Partnerships with CDMOs for manufacturing under GMP conditions

*Provided by external collaborator

OPEN TO EXPLORE COLLABORATION OPPORTUNITIES & SYNERGIES WITH ALL INTERESTED INSTITUTIONS

RESEARCH MODEL

- Cell based assays
- Small animals (mouse, rats)
- Large animals (pigs, NHPs)

DEVELOPMENTAL STAGE

Basic Research & Drug Discovery

- Target identification & validation
- Assay development & screening
- Lead identification & optimization

Preclinical Studies

- In vivo NHP biodistributrion
- Formulation & drug delivery
- Large scale manufacturing

FIELD OF APPICATION

- Cancer
- Rare diseases
- Infectious diseases
- Immunodeficiencies
- Metabolic conditions
- Neurodegenerative & eye disorders

PARNTERSHIP TYPE

- Academia
- Research Institution
- Biotech
- Big pharma
- CMO/CDMO
- Agents/Distributors

SIRION BIOTECH

THANK YOU!

ありがとうございました。

DANKESCHÖN

SIRION BIOTECH

Dr. Cristina I. Ureche

Director Sales, APAC
Head Discovery & Preclinical Services

ureche@sirion-biotech.de

SIRION Biotech GmbH

Am Klopferspitz 19
82152 Martinsried
Germany

www.sirion-biotech.com

ANY GENE TO ANY CELL

EFFICIENT & HIGHLY SPECIALIZED VIRAL VECTOR PORTFOLIO TO TARGET ANY GENE TO ANY CELL

DISCOVERY & PRECLINICS

Vector engineering & manufacturing

- AAV, LV, AV
- State of the art USPs & DSPs
- Approval compliant QC & documentation
- Professional project development
- Fast project implementation

Advanced platform technologies

- RNAiONE for highly efficient shRNA identification
- TET inducible system

GENE THERAPY

AAV clinical vector design

- Clinical compliant AAV vector development
- Capsid evolution, shuffled and peptide insertion

AAV manufacturing

- Process development USP/DSP for novel vectors
- Non-GMP manufacturing for *in vivo* PoC studies
- GMP manufacturing in collaboration with CDMO partners

CELL THERAPY

LV clinical vector design

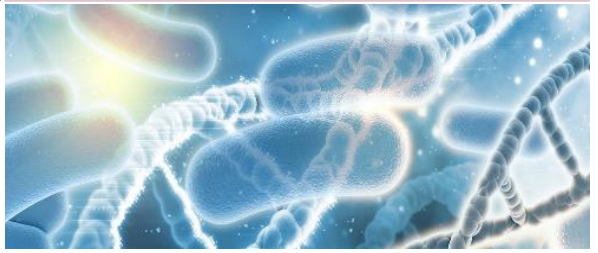
- Clinical compliant LV vector development

Superior LV transduction

- LentiBOOST® for ex vivo gene transfer/ CAR-T/TCR gene transfer

LV manufacturing

- Non-GMP manufacturing for *in vivo* PoC studies
- GMP manufacturing in collaboration with CDMO partners



LENTIBOOST® - R&D AND CLINICAL BENEFITS AT A GLANCE

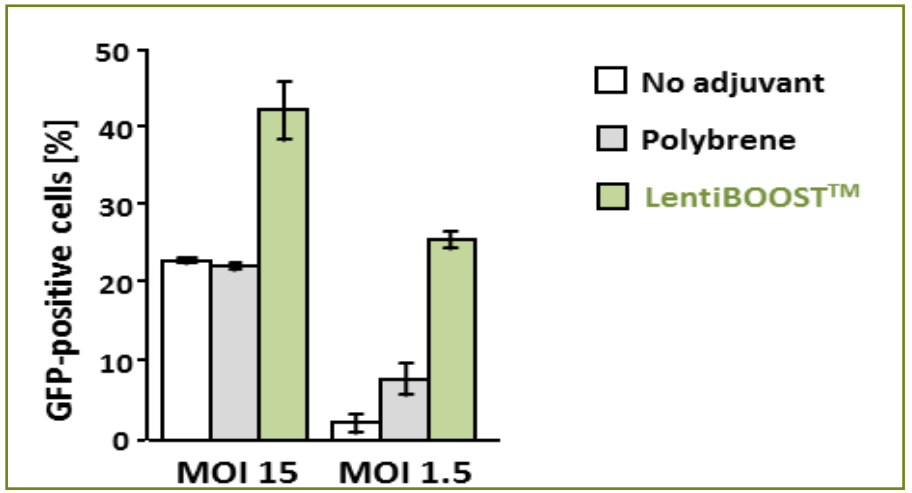
UNIQUE FEATURES

Highly effective, non-cytotoxic transduction enhancer

Universally applicable for preclinical and clinical application of LV vectors

BENEFITS FOR DRUG DEVELOPMENT

- ✓ Increased expression levels and success of clinical trials
- ✓ Positive impact on cell proliferation for T cells
- ✓ Increased safety in line with FDA/EMA criteria
- ✓ Pharma- and GMP-grade batches for preclinical & clinical programs, and commercial use



LentiBOOST elevates lentiviral infection of IL2/OKT3 stimulated PBMCs (peripheral blood mononuclear cells).

1. Anastasov N, Höfig I, Mall S, Krackhardt AM, Thirion C. Optimized Lentiviral Transduction Protocols by Use of a Poloxamer Enhancer, Spinoculation, and scFv-Antibody Fusions to VSV-G. Methods Mol Biol. 2016;1448:49-61. doi: 10.1007/978-1-4939-3753-0_4.
2. Höfig I, Barth S, Salomon M, Jagusch V, Atkinson MJ, Anastasov N, Thirion C. Systematic improvement of lentivirus transduction protocols by antibody fragments fused to VSV-G as envelope glycoprotein. Biomaterials. 2014 Apr;35(13):4204-12. doi: 10.1016/j.biomaterials.2014.01.051.
3. Höfig I, Atkinson MJ, Mall S, Krackhardt AM, Thirion C, Anastasov N. Poloxamer synperonic F108 improves cellular transduction with lentiviral vectors. J Gene Med. 2012 Aug;14(8):549-60. doi: 10.1002/jgm.2653. PMID: 22887595

PROMINENT CLIENTS AND COLLABORATION PARTNERS

- 2021 | Business Wire
  SIRION Biotech Announces Collaboration with Sanofi to Innovate Gene Therapy Treatments with Improved Adeno-Associated Virus Capsids

- 2021 | Business Wire
  SIRION Biotech GmbH Licensed Its LentiBOOST™ Transduction Technology to Cellectis

- 2020 | Business Wire
  Beam Therapeutics Licenses SIRION Biotech's LentiBOOST® Technology for its CAR-T pipeline

- 2020 | Nature, Gene Therapy
  SIRION LentiBOOST® transduction enhancer featured in "*Optimizing lentiviral vector transduction of hematopoietic stem cells for gene therapy*"

- 2019 | Nature, Gene Therapy
  SIRION Biotech and Denali Therapeutics Join Forces to Develop Gene Therapies for Diseases of the Central Nervous System