

# Viral Vector Based Immunotherapies

**Corporate Presentation** 

May 5, 2023

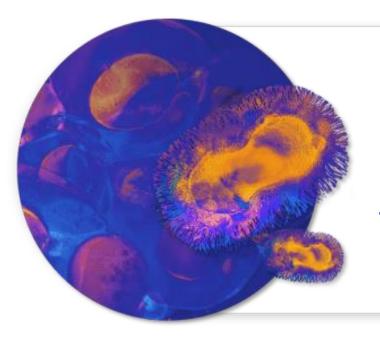


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This presentation contains forward-looking statements, which are subject to numerous risks and uncertainties, which could cause actual results to differ materially from those anticipated. There can be no guarantee that (i) the results of pre-clinical work and prior clinical trials will be predictive of the results of the clinical trials currently under way, (ii) regulatory authorities will agree with the Company's further development plans for its therapies, or (iii) the Company will find development and commercialization partners for its therapies in a timely manner and on satisfactory terms and conditions, if at all. The occurrence of any of these risks could have a significant negative outcome for the Company's activities, perspectives, financial situation, results and development.

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Leader in viral vector-based immunotherapies designed to transform the standard of care of solid tumors

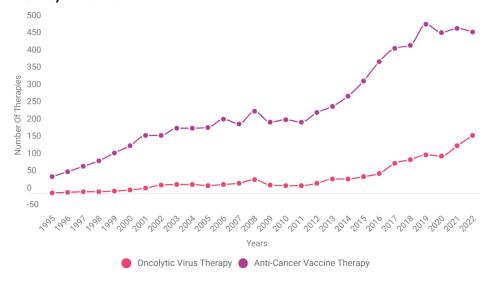
# Transgene is Focused on Two Exciting Areas of Immunotherapy

Therapeutic Cancer Vaccines (TCVs) and Oncolytic Viruses (OVs) on the Rise



# A Promising Future For Oncolytic Viruses As Cancer Immunotherapies

Exhibit 1: Oncolytic Virus Therapy And Anti-Cancer Vaccine Therapy Trends, 1995–2022



Note: annual snapshots are taken each May



### Getting closer to a vaccine for cancer



Oncolytic viruses show promise in cancer-killing combos



Hiding in plain sight: How we can use immune cells to deliver cancer-killing viruses to tumours



Viral Vector Production Evolves to Meet Surging Demand



# ▶ Transgene – a Global Player in Next Generation Cancer Immunotherapies



Our immunotherapies are based on our approach:

RIGHT VECTOR,

RIGHT PAYLOAD,

RIGHT INDICATION



2 highly productive core viral vector platforms based on leading expertise and strong R&D capabilities

- Therapeutic cancer vaccines (TCVs)
- Oncolytic viruses (OVs)



Diversified pipeline of clinical & late preclinical candidates with distinct competitive advantages

- Our TCVs
  demonstrated a clear
  link between the
  immune response they
  generate and clinical
  benefit they deliver
- Our OVs can be given by intravenous (IV) administration opening up multiple solid tumor indications a unique advantage



Strong validation with collaborations from multiple partners/supporters

- NEC, Pfizer and Merck KGaA
- BioInvent and Merck & Co Inc. / MSD



Multiple upcoming clinical/development milestones with value generating potential

- Multiple readouts in next 18 months
- **2 registration targeting trials** to be launched
  in 12-18 months
- Key initial data of exciting OV pipeline expected by 2025



### Harnessing Innovation to Deliver Much Improved Cancer Vaccines

TG4050 – a Novel Individualized Cancer Immunotherapy Designed for Success

### **MVA VECTOR BENEFITS**

- Induces broad and specific immuneresponse
  - Strongly differentiated from mRNAs and peptides
- Excellent safety profile
- Proven immunogenicity in challenging immune contexture

### > THE RIGHT NEOANTIGENS

Comprises **up to 30 neoantigens**selected using NEC's artificial
intelligence/machine learning

Orchestrating a brighter world



### INDICATION

- Targeting head and neck patientsdesigned to prevent relapse
- O No other cancer vaccine is targeting this 70,000-patient market (adjuvant situation)



Immune responses linked to clinical benefits
Potential registrational trial to begin H2 2023



# Harnessing Innovation to Realize the Significant Potential of OVs

TG6050 a Powerful Off-The-Shelf Cancer Immunotherapy Designed for Success

### VV<sub>COP</sub>TK<sup>-</sup>RR<sup>-</sup> VECTOR BENEFITS

- Tumor specific delivery
- Can be administered IV\*
- Good safety
- Can increase PD-L1 expression
- Vector benefits key factors in AstraZeneca deal

### SMART PAYLOAD

- Potent payload can be produced in the tumor
  - IL-12 and Anti-CTLA4 Ab
- Several payloads can be encoded

### INDICATION

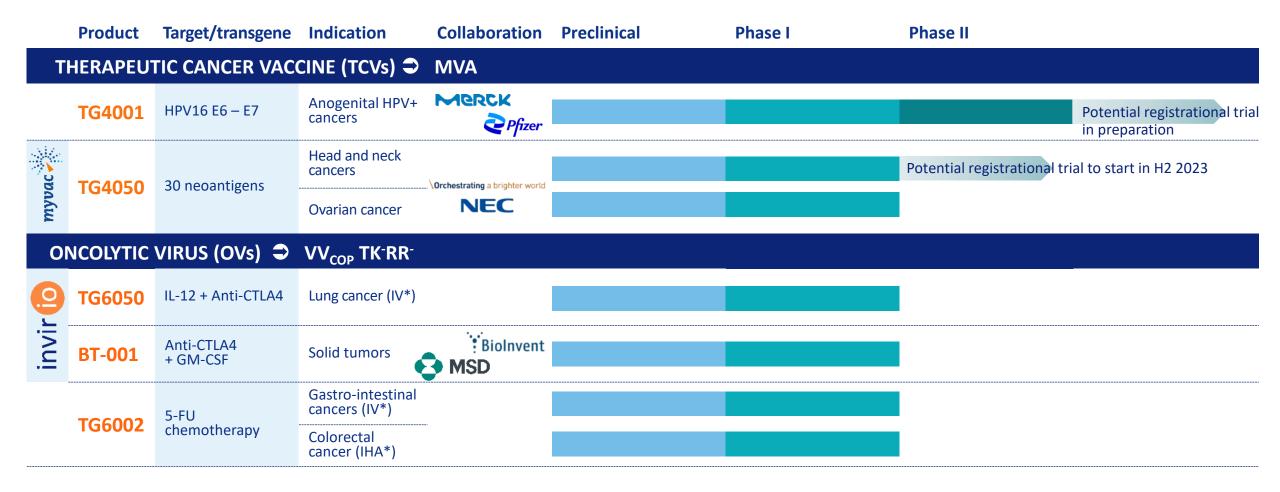
- Initial indication metastatic **nonsmall cell lung cancer**, 2L
- A 160,000-patient market



Generated a multi armed IV OV that can potentially be an industry leading product for solid tumors

### Advancing a Diversified Immunotherapy Portfolio

From off-the-shelf treatments to patient tailored therapies





### 2022 Achievements are Solid Basis for Multiple Readouts in Next 18 Months

### The Viral Vector Experts In Immuno-Oncology

### **TG4050**



- Promising data as single agent
  - → H1 2023 | Start treatment of last patient in H&N Phase I
  - → H2 2023 | Potential registrational Phase II trial expected to start

#### **TG4001**

- Positive Interim Analysis Results based on PFS
  - → H1 2024 | Last patient randomized, 2024 | Phase II results
  - → Intend to rapidly start registration-directed trial

# transgene

# invirio

- > PoC of IV administration
  - → Expand the potential of our technologies through existing and new partnerships, and proprietary development

### TG6050 (IV)

- Positive data demonstrating IV feasibility of Invir.IO® backbone
  - → H1 2023 | Enroll first patient

### BT-001 (IT)

- Positive initial data as single agent (IT)
  - → H1 2023 | Ph. I part A (single agent) data to be communicated
  - → H2 2023 | Ph. I part B (combin. w. pembrolizumab) to start

# Transgene – 2028 Snapshot – Significant Value Created

Two approved products targeting sizeable market opportunities with clear clinical benefits



Ongoing trials in

additional indications

TG4050

**Conditional approval for first indication:**Head and Neck cancer

Head and Neck cance (maintenance)

~\$1+ bn market opportunity

No other cancer vaccines targeting this indication

Potential registrational trial to start in H2 2023



Delivered high value clinical data in initial indication when given IV

NSCLC 2L: \$1.5+ bn market opportunity

Broader clinical development plan to be implemented



Generated several additional new cancer vaccines and IV OV candidates based on right vector, right payload, right indication approach

Further strengthened our viral vector and payload engineering technology platforms

Source: Company estimate



# Cancer Therapeutic Vaccines

Potent immunotherapies
to induce specific antitumor immune responses
and improve patient outcome

# Therapeutic Cancer Vaccines - Educate the Immune System to Destroy Cancer Cells

### MVA-based vaccines activate T cells through several mechanisms

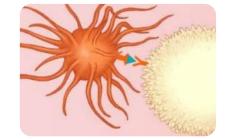
#### **SIGNAL ACTIVATION**

Infected cells will **express vaccine antigens** that will be uptaken by APCs



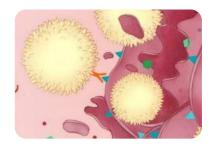
#### **IMMUNE AMPLIFICATION**

APCs boost specific antitumoral T cells



#### **CANCER CELL KILLING**

T cells attack tumor cells



Strongly differentiated from mRNAs and peptide approaches

# Induction of broad immune responses to induce antitumor activity

- Priming of innate immunity
- Development of an active adaptive response – Increase of effector subgroups of CD4 and CD8 T-cells

Tumor-specific antigens and neoantigens can be used to target a broad range of solid tumors



### **Compelling clinical evidence obtained**

- Good safety profile
- Strong immune responses to antigen/neoantigen payloads
- Signs of clinical benefit for patients
  - As single agent in maintenance setting
  - In combination with ICI in advanced setting



# myvac® - TG4050 | Individualized Neoantigen Cancer Vaccine

Taking the Treatment of Each Patient's Tumor to a New Level

# MVA viral vector: a powerful platform for vaccine development



### Strongly immunogenic vector

- Demonstrated capability to express complex antigen structures and have them presented by APCs
- Ability to elicit strong, durable and specific immune response
- Established safety profile

### **Optimal neoantigen display**

- VacDesignR™ for optimal design of the recombinant cassettes
- Selection of best promoter sequences





one patient • one genome
• one vaccine



- NEC's machine learning environment based on multiple parameters to classify most immunogenic neoantigens from whole tumor genome analysis\*
  - Takes in account multiple parameters
- NEC covers 50%
   of the development cost of TG4050

NEC



First clinical data has already shown remarkable induction of immune responses against chosen neoantigens and signs of patient benefit









# TG4050 is already Showing the Potential To Manage Patients with High-Risk of Recurrence or Molecular Relapse



one patientone genomeone vaccine



to extend remission period in high-risk patients after initial cancer surgery



To induce specific T cell response in patients in clinical remission but with high risk of relapse

Two ongoing clinical trials – Head & Neck and Ovarian cancers TG4050 given as single agent

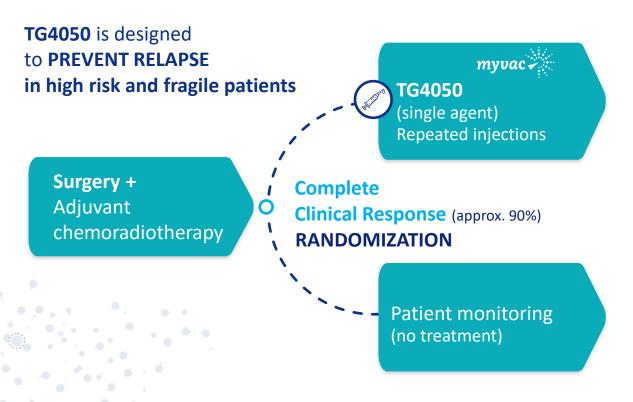
- Positive initial data (safety, immunogenicity, first signs of efficacy)
- O Intend to launch potential registrational Phase II trial in H2 2023
- Mid-term objective: Establish TG4050 as the SOC in maintenance setting for patients with H&N cancers, a \$1+ bn market

Potential to address numerous solid tumors after surgery in adjuvant/maintenance settings W or w/o ICIs, such as H&N, ovarian, urothelial, breast, lung cancers, ie a multi billion market



<sup>\*</sup>TMB: tumor mutational burden

### ▶ **TG4050** | HPV-Negative Head and Neck Cancer - Trial after Surgery and Adjuvant Therapy



#### Recurrence

**12-month PFS is approx. 60%** (w/o TG4050)\* Clinical situation where checkpoint blockers have failed (ie. KN412)

#### **Randomized Phase I Trial**

**30 Patients** (NCT04183166)
Last patient treatment expected in **H1 2023** 



**LEAD INVESTIGATOR: Pr. Christian Ottensmeier,**Clatterbridge Cancer Care Center, Liverpool



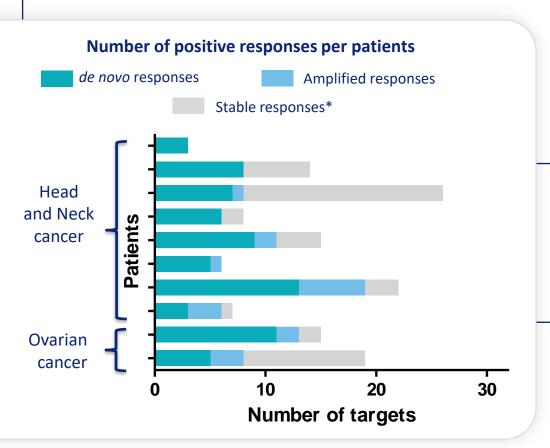






# TG4050 – Generates an Unprecedented Rate of T Cell Response Against Tumor Specific Epitopes

### Induction of multiple T cell responses in all treated patients





Responses were either amplification of pre-existing responses (20%) or *de novo* responses (80%) induced during vaccination

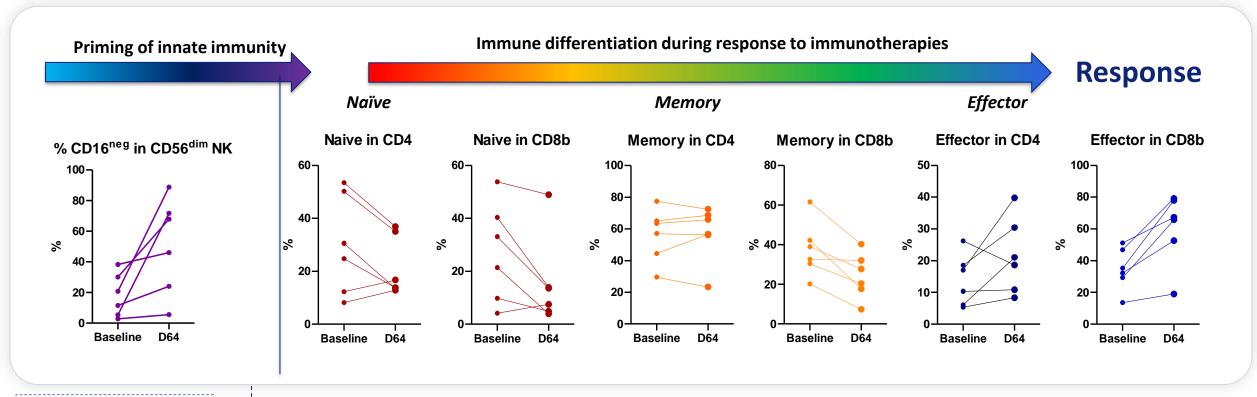
Profound remodeling of immune cells consistent with anti tumor response



Source: Lalanne et al, "Phase 1 studies of personalized neoantigen vaccine TG4050 in ovarian carcinoma (OvC) and head and neck squamous cell carcinoma (HNSCC)" <u>AACR 2023</u>, April 18, 2023, Poster presentation

# Profound Remodelling of Immune Cells consistent with Anti Tumor Response

Suggesting that the Vaccine Effectively Primes the Immune System





Source: Block et al, "Phase I trials of personalized cancer vaccine TG4050 in surgically treated high-risk head and neck squamous cell carcinoma (HNSCC) and relapsing ovarian cancer (OvC) patients" AACR 2022, April 12, 2022, Poster presentation

Priming of innate immunity: Loss of CD16 on CD56dim NK cells suggests ongoing antitumor activity

Maturation and differentiation of CD4 and CD8 into effector cells – Consistent with the **development of** an active adaptive response

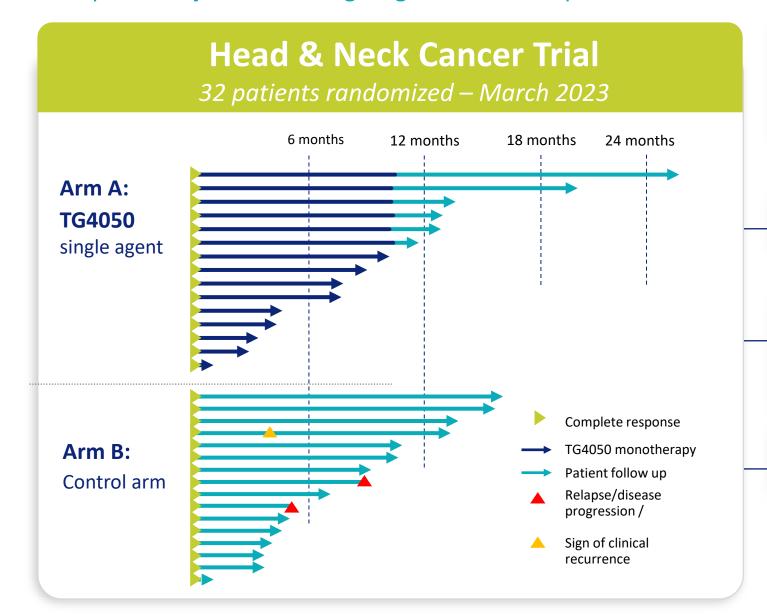
**Ö**Effector subgroups of CD4 and CD8 T-cells are increased

OConsistent with decrease in naive and memory CD4 and CD8 T-cell over treatment



### Extremely Promising First Signals of Clinical Activity

Repeated Injections of single agent TG4050 in patients with minimal residual disease





No related SAEs
Good safety profile

All 16 treated patients are stable

Only patients in the control arm have relapsed

**Trial fully enrolled** 



Source: Lalanne et al, "Phase 1 studies of personalized neoantigen vaccine TG4050 in ovarian carcinoma (OvC) and head and neck squamous cell carcinoma (HNSCC)" AACR 2023, April 18, 2023, Poster presentation

### **TG4050** | Exciting First Data Justifies our Ambitious Development Plan



Excellent safety profile

Signs
of clinical
activity
in high-risk
patients

Induces
neoantigenspecific
immune
response

Induces

broad T cell
response



New promising data presented at AACR 2023



Intend to launch potential registrational **Phase II trial** in H2 2023



Potential to extend remission period for high-risk patients and address a \$1+ bn market\*

(head and neck cancer – adjuvant)



Potential to address other solid tumors after surgery in adjuvant/maintenance settings w or w/o ICIs, such as ovarian, urothelial, breast, lung cancers, ie a multi billion market



# TG4001 | Designed to Boost the Patient's Immune System against HPV-Positive Tumors



**INDUCES SPECIFIC** AND DURABLE T CELL RESPONSES



Unsatisfactory treatment options for advanced HPV+ cancer patients In 2L, ORR is around 10–15%, median PFS is around 2 months and median OS is less than 11 months with ICI single agent\* Goal to double performance of SOC

A \$1 bn market opportunity (EU, UK, US, Japan)



### MoA and first signals of efficacy demonstrated in clinic in combination with ICI

- Clinically relevant anti-tumor activity Induces strong and long lasting, specific responses against tumors
- Excellent safety profile Good combination candidate
- In hard-to-treat HPV cancer patients, has induced
  - Increase of CD3, CD8 infiltrates
  - Increase of PD-L1 expression
  - Shifts cold tumours into hot tumors, in combination with ICIs

ORR: objective response rate (RECIST 1.1); m PFS: median progressionfree survival; m OS: median overall survival: SOC: standard of care









# TG4001 + Avelumab (Single Arm Ph. lb/II) | Increased Benefit and Long-Lasting Responses

Landmark Data Compare Favorably to ICIs in Monotherapy and Competitive Landscape

# Increased ORR and durable responses n=25

- ORR: 32%
- mPFS: 5.6 months
- **mOS**: 13.3 months
- Good safety profile

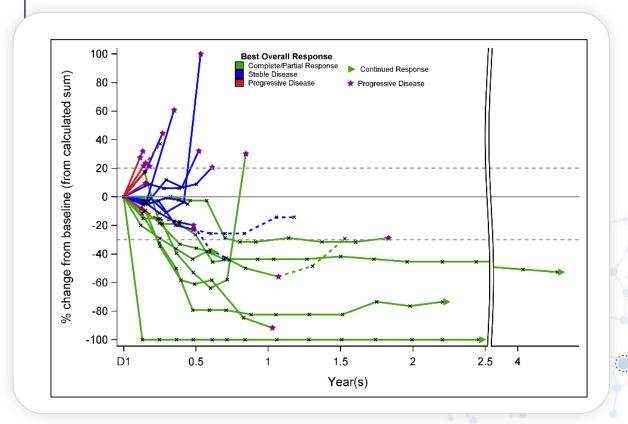
# 1 COMPLETE RESPONSE

Patient with anal cancer and peritoneal extension that all disappeared – still followed in the trial 7 PARTIAL RESPONSES

9 STABLE DISEASES

Compares favorably to ICIs in monotherapy and competitive landscape

Long lasting responses in metastatic patients without liver metastases - Aug. 2022

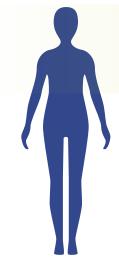


Clinical collaboration for avelumab free supply



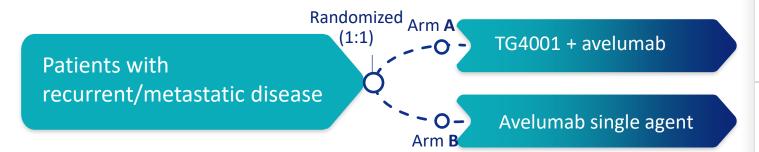


### **TG4001** Current Randomized Controlled Phase II Trial to Deliver Final Data in 2024



### Patients with HPV16-positive anogenital cancer incl. cervical, vulvar, vaginal, penile and anal cancers

- With recurrent/metastatic disease
- Treated in 1st line or in 2nd line (with a maximum of 1 prior systemic chemotherapy vs 2 allowed in Phase Ib/II trial)
- Without previous exposure to cancer immunotherapy
- O Without liver metastasis at baseline
- Including all levels of PD-L1 expression







### **POSITIVE INTERIM ANALYSIS RESULTS**

(November 2022)

- First efficacy signals observed
- Good safety profile
  - Trial to enroll up to 120 Patients (NCT03260023)

### PRIMARY ENDPOINT

**Progression-Free Survival** (RECIST 1.1)



Our Goal with TG4001: Boost Response to Immune Checkpoint Inhibitors in HPV+ Cancers



TG4001 is the only HPV vaccine developed in comparison with ICI monotherapy that has shown a benefit from MOA\*

- Good safety profile
- Increased Response Rate and PFS in hard-totreat patients
- Induces antigen-specific immune response
- Induces broad T cell response
- Long-lasting responses
  - Active in PD-L1 positive and negative patients



First Randomized Phase II trial of HPV vaccine + ICI expected to read out

Randomized Phase II data expected in 2024

Upcoming registration targeting trial in preparation, aiming for a \$1bn market opportunity

TG4001 is owned 100% by Transgene





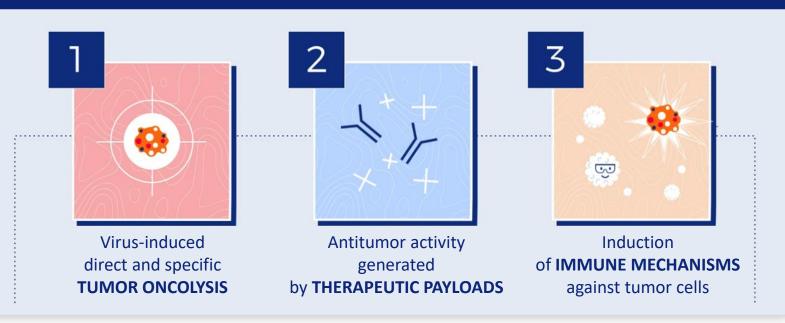
# Oncolytic Viruses

Rapidly Generating Multiple Virus-Powered
Off-the-Shelf Drug Candidates Targeting Solid Tumors



Our Oncolytic Viruses (OV) – Combined Effects of Vector, Payload and Immune Stimulation Competitive Advantage Enhanced by our Patented Backbone VV<sub>cop</sub>TK<sup>-</sup>RR<sup>-</sup> - basis of our Invir.IO<sup>®</sup> Platform

### **Cancer cell death through multiple MOAs**



# Proprietary vector with multiple competitive advantages

- →Encode numerous and various payloads
- → Multiple routes of administration (IV, IT, locoregional) and extend OV market beyond IT administration
- → Potential to target multiorgan lesions and warm up TME
- →Address broad range of solid tumors



### Clinical evidence obtained

- Good safety profile
- Able to reach tumors, selectively replicate and express payload, incl. via intravenous administration

# Compelling Data Generated with TG6002 Support Intravenous (IV) Route of Administration





to target multiorgan lesions and reverse tumor resistance



To turn cold tumors into hot tumors through multi-pronged MoA

#### TG6002 demonstrated PoC of IV Route

- TG6002 replicates in tumor tissue without sign of widespread replication
- The payload is expressed in tumor tissue
- O Long-lasting expression of the payload
- No impact of neutralizing antibodies on PK/PD data
- O T cell activation, immune checkpoint receptor expression and priming of an adaptive response against tumor associated antigens\*

Potential to address numerous solid tumors via multiple routes of administration, in particular intravenous administration

strong differentiation versus other OV players





### BT-001 | Patented OV Armed with Anti-CTLA4 Ab + GM-CSF

Ongoing Phase I Trial Assessing IT\* Route of Administration

50/50 collaboration with BioInvent

### The right virus + payload

VV<sub>cop</sub>TK<sup>-</sup>RR<sup>-</sup> oncolytic armed with BioInvent's potent **anti-CTLA4 Ab** + **GM-CSF** 

- · Activates and increases T-effector cells
- Treg depleting activity
- · Stimulates immune cells (incl. APC)



Winner of the **2022 JITC Best Oncolytic**and Local Immunotherapy Paper **Award** 

# Can be developed for multiple cancer indications lesions with high Treg infiltration



# Positive initial Phase I part A readout

- → Single agent well tolerated
- → Replicates and persists in tumor tissue
- → Anti-CTLA-4 expressed in the tumor with no detectable systemic exposure
- → Tumor shrinkage observed in one patient at the lowest dose level
- **Ph. I part A data** to be released in **H1 2023**

### **Ongoing Phase I**

monotherapy and combination with ICI

Ph. I part B (combination with pembrolizumab) to start in H2 2023

**Objectives**: evaluate safety profile, determine Phase II dose and indications

Collaboration with MSD which provides pembrolizumab (KEYTRUDA®)





# TG6050 administered IV | IL-12 and anti-CTLA4 Produced Directly in the Tumor

### Approved Phase I Trial to assess systemic route of administration

### Oncolytic armed with IL-12 and anti-CTLA4 Ab

- Triggers a powerful antitumor immune response
- Restores the immune defenses within the tumor

### The Invir.IO® objective

- Avoid toxicity / off target thanks to selective replication of viral vector
- Ensure sufficient production of IL-12 in the tumor
- **Outstanding preclinical data (strong antitumor activity)**

#### Phase I trial - Indication: metastatic and PD1 failed tumors

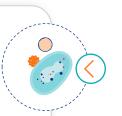
- Advanced or metastatic NSCLC after failure with available treatment options, including anti-PD1/PD-L1 – IV administration
- CTA approved in France First patient to be enrolled in H1 2023

### Potential to address a \$1.5 bn opportunity





Source: Marchand et al, TG6050, "An oncolytic vaccinia virus armed with interleukin 12 and anti-CTLA4 antibody induces TME remodeling and strong anti-tumoral responses" AACR 2023, April 16, 2023, Poster presentation





# **Initial** goal



demonstrate potential of IV administration in "cold", non-resecable metastatic tumors



# Invir.IO® Pipeline Will Allow us to Generate Significant Value



Backbone with highly competitive properties and potential

- Ability to safely be administered IV
- Express selectively its payload in the tumor



Rapid progress from design to start of clinic development

Potential to generate multiple novel oncolytics



Value provider and collaboration initiator





BioInvent collaboration: clinical development of BT-001

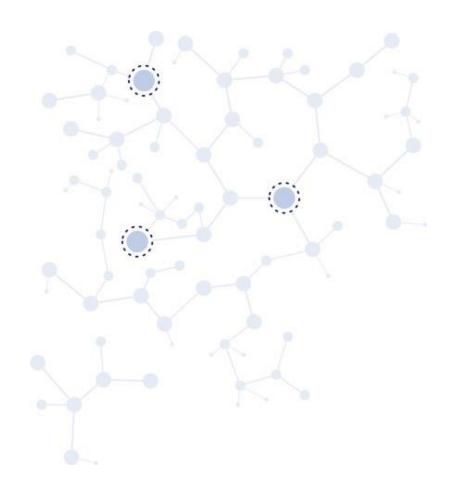


PersonGen collaboration:
preclinical evaluation of CAR-T
cell/OV combination



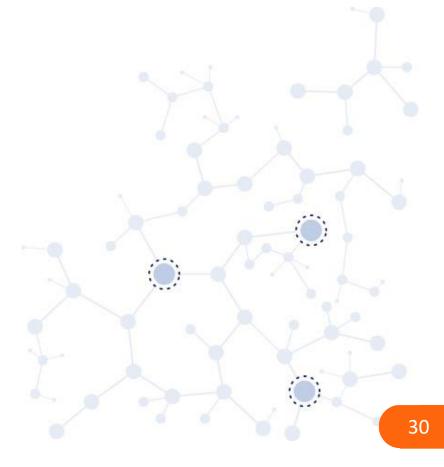
Potential other early outlicensing of new unique OVs or new combinations







# Outlook



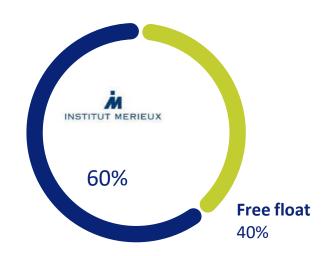
### Company Funded to Deliver Multiple Value Generating Milestones

**€26.8** million in cash and cash equivalents as of December 31, 2022

In addition: **Tasly BioPharmaceuticals shares** valued at **€14.3 million** at the end of Dec. 2022 – Sale of this stake expected to be completed in mid-2023

# FINANCIAL VISIBILITY until early 2024





- Listed on Euronext Paris
- ISIN: FR0005175080 Ticker: TNG



### 2022 Achievements are Solid Basis for Multiple Readouts in Next 18 Months

### The Viral Vector Experts In Immuno-Oncology

### **TG4050**



- Promising data as single agent
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# Transgene – Frontline Player in Virus-Based Immunotherapy Against Cancer

Versatile technology platforms to fit each patient need

Diversified pipeline

(individualized and off the shelf)

2 platforms

Therapeutic vaccines Oncolytic viruses

Multiple clinical-stage immunotherapies in Phase I and Phase II

Dense news flow in 2023-2024

**Unique Technology** based on:

Optimized viral vectors

Solid safety
Track record

Preclinical
Proof of concept

Robust IP portfolio

Integrated GMP manufacturing

Capacity for rapid delivery of pilot scale batches

Ongoing collaborations

**Strong Shareholder Support** and Financial visibility



Orchestrating a brighter world

NEC

Technology and cost sharing agreement



Financial visibility until early 2024

Strong shareholder support



### An Experienced Management Team



**HEDI BEN BRAHIM**Chief Executive Officer

**20 YEARS EXPERIENCE** 











**ÉRIC QUÉMÉNEUR, PHD**Executive VP
Chief Scientific Officer

**30+** YEARS EXPERIENCE











MAUD BRANDELY, MD, PHD VP Medical Affairs Chief Medical Officer

**35+ YEARS EXPERIENCE** 







**STEVEN BLOOM**VP, Chief Business Officer



**US-based** 

**35+ YEARS EXPERIENCE** 







JEAN-PHILIPPE DEL
VP, Chief Financial Officer

**20 YEARS EXPERIENCE** 







ALESSANDRO RIVA Chairman Joined in May 2022

**30+** YEARS EXPERIENCE





...ichnos...



# Board of Directors - as of May 5, 2023

Director



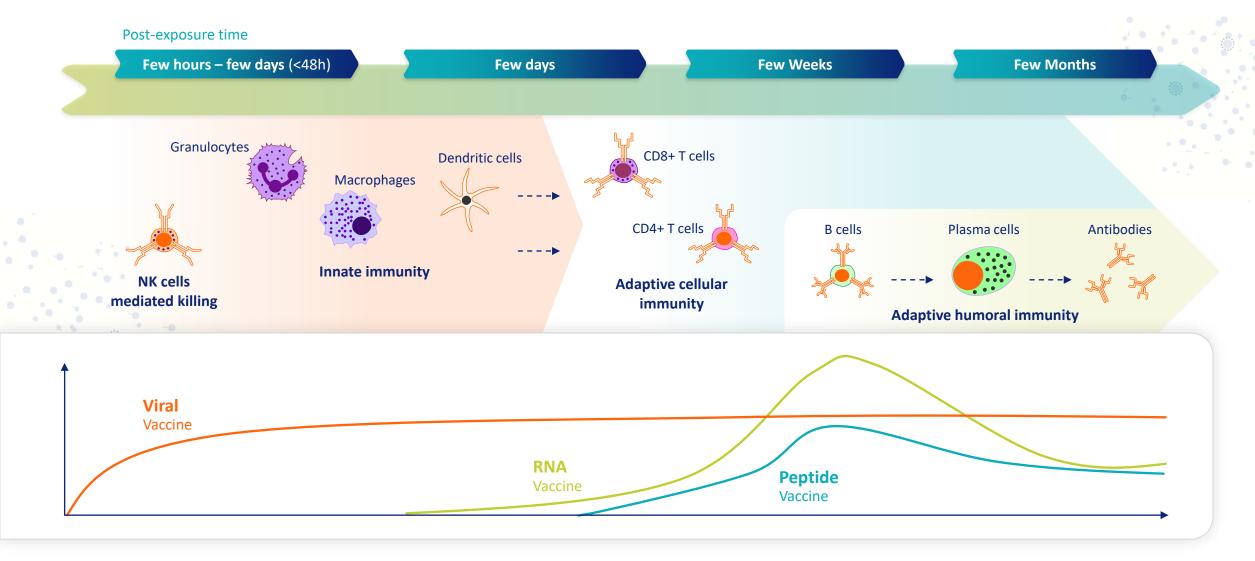


Chairman

Maya Said Jean-Yves Blay Benoît Habert
Independent Director Independent Director

36

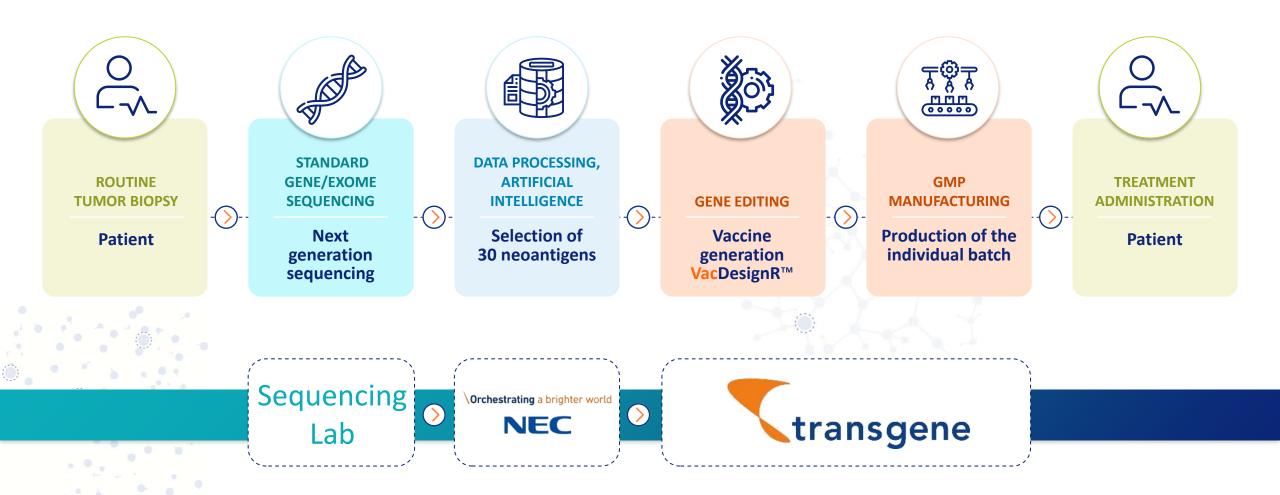
# Viral Vaccines Prime Both Long Lasting Innate and Adaptive Immunity



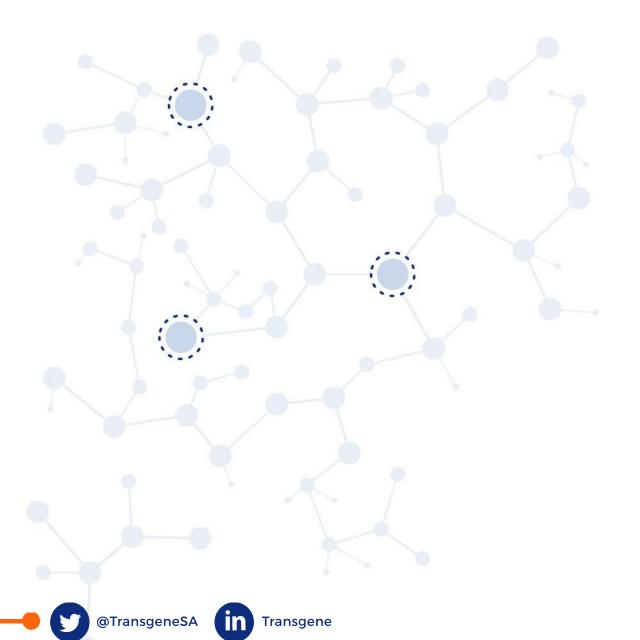


# TG4050, an Individualized Neoantigen Vaccine Combining Unique Capabilities

Combines bioengineering and digital transformation









CONTACT

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Director Investor Relations and Corporate Communication

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