

# Viral Vector Based Immunotherapies

**Corporate Presentation** 

May 25, 2023

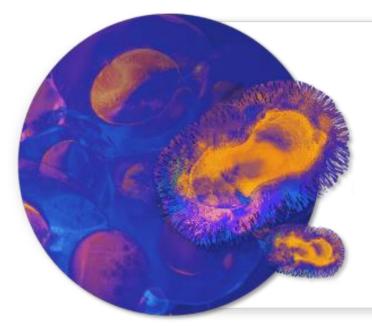




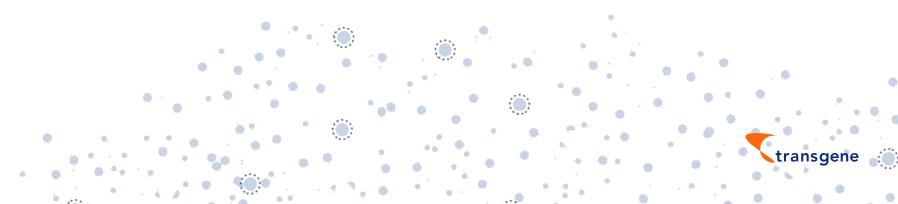
This presentation contains forward-looking statements, which are subject to numerous risks and uncertainties, which could cause actual results to differ materially from those anticipated. There can be no guarantee that (i) the results of pre-clinical work and prior clinical trials will be predictive 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.

For a discussion of risks and uncertainties which could cause the Company's actual results, financial condition, performance or achievements to differ from those contained in the forward-looking statements, please refer to the Risk Factors ("Facteurs de Risques") section of the Universal Registration Document, available on the AMF website (http://www.amf-france.org) or on Transgene's website (www.transgene.fr). Forward-looking statements speak only as of the date on which they are made and Transgene undertakes no obligation to update these forward-looking statements, even if new information becomes available in the future.





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

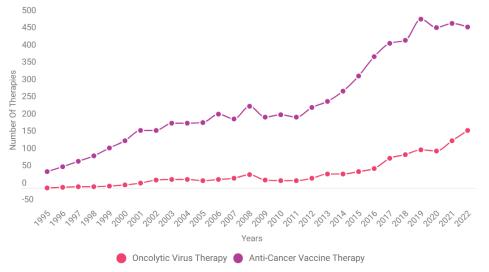


Transgene is Focused on Two Exciting Areas of Immunotherapy Therapeutic Cancer Vaccines (TCVs) and Oncolytic Viruses (OVs) on the Rise



A Promising Future For Oncolytic Viruses As Cancer Immunotherapies

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



**The Washington Post** Democracy Dies in Darkness

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



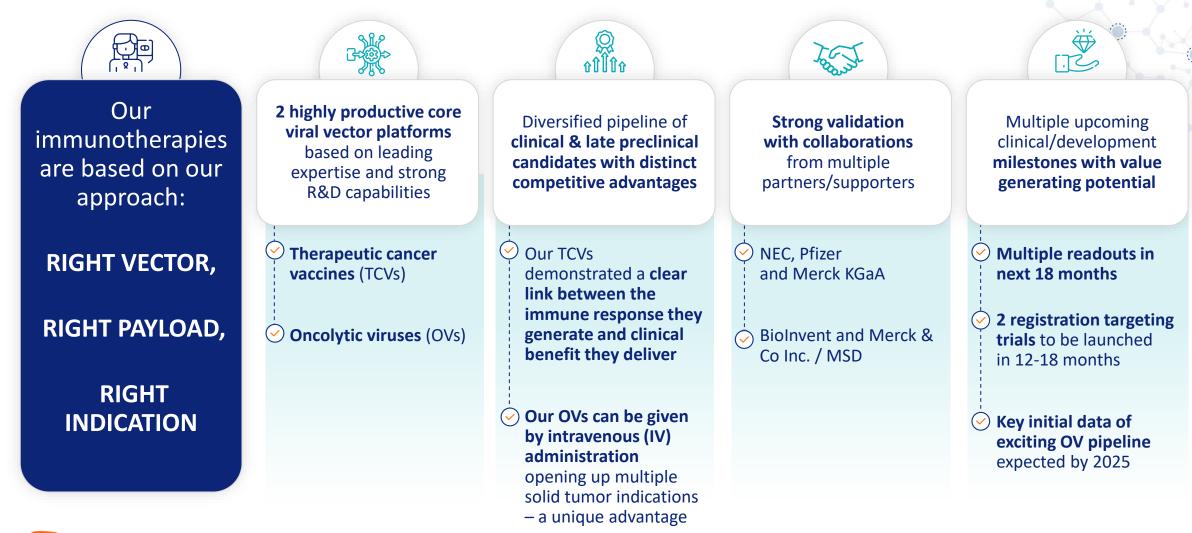
Genetic Engineering & Biotechnology News

Viral Vector Production Evolves to Meet Surging Demand

Note: annual snapshots are taken each May



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





Harnessing Innovation to Deliver Much Improved Cancer Vaccines TG4050 – a Novel Individualized Cancer Immunotherapy Designed for Success



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



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





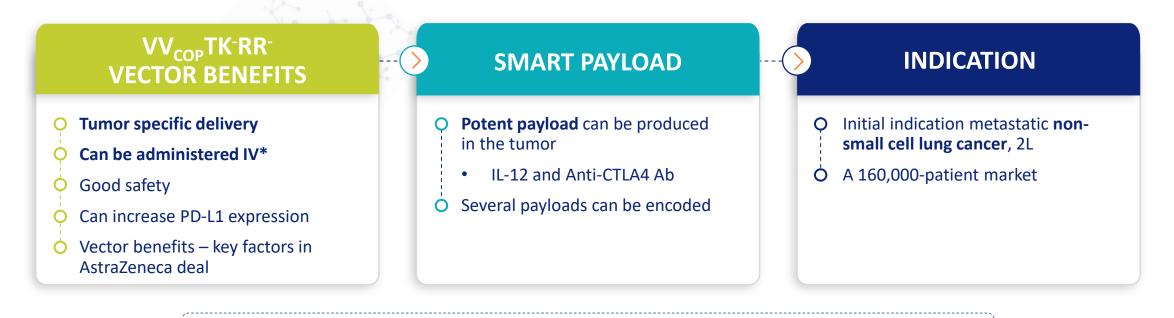
- Targeting head and neck patients
   designed to prevent relapse
- No other cancer vaccine is targeting this 70,000-patient
- market (adjuvant situation)



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





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

	Product	Target/transgene	Indication	Collaboration	Preclinical	Phase I	Phase II	
THERAPEUTIC CANCER VACCINE (TCVs) 🗢 MVA								
	TG4001	HPV16 E6 – E7	Anogenital HPV+ cancers					Potential registrational trial in preparation
myvac	TG4050	30 neoantigens	Head and neck cancers (adjuvant)	\Orchestrating a brighter world			Potential registrational	trial to start in H2 2023
myu			Ovarian cancer	NEC				
			VV <sub>COP</sub> TK <sup>-</sup> RR <sup>-</sup>					
9	TG6050	IL-12 + Anti-CTLA4	Lung cancer (IV*)					
invir	BT-001	Anti-CTLA4 + GM-CSF	Solid tumors	BioInvent				
	TG6002	5-FU chemotherapy	Gastro-intestinal cancers (IV*)					
			Colorectal cancer (IHA*)					



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

#### The Viral Vector Experts in Immuno-Oncology

### TG4050 | Neoantigen vaccine



#### Promising data as single agent (adjuvant setting)

- → June 2023 | Updated data to be presented (head and neck)
- → H2 2023 | Potential registrational Phase II trial expected to start
- → Mid-2024 | Final results of head and neck cancer trial

### TG4001 | HPV16 cancers

- Positive Interim Analysis Results based on PFS
  - → June 2023 | Translational data to be presented at ASCO
  - → H1 2024 | Last patient randomized
  - → 2024 | Phase II results
  - → Intend to rapidly start registration-directed trial

### invirio | Oncolytic Viruses Platform

#### > PoC of IV administration

Expand the potential of our technologies through existing and new partnerships, and proprietary development

### TG6050 (IV) | IL12 + anti-CTLA4

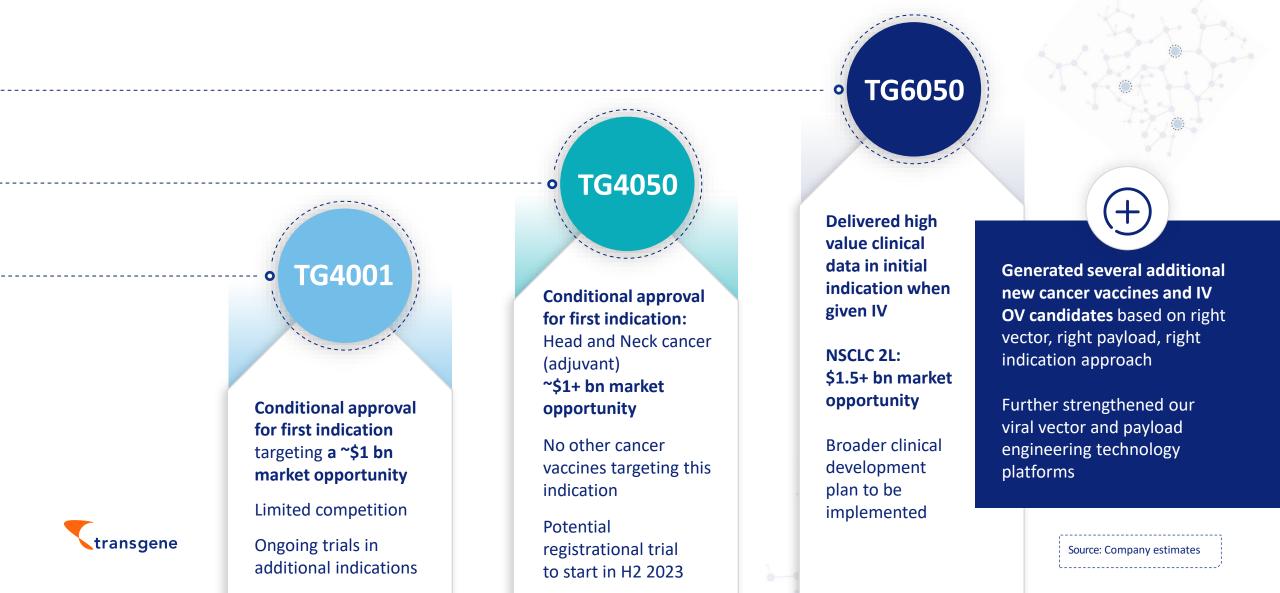
- Positive data demonstrating IV feasibility of Invir.IO<sup>®</sup> backbone
- → H2 2024 | Phase I trial completion

### BT-001 (IT) | Anti-CTLA4 + GM-CSF

- Positive Phase I part A data (single agent)
  - → H2 2023 | Start Ph. I part B (combination w. pembrolizumab)

### Transgene – 2028 Snapshot – Significant Value Created

Two Approved Products Targeting Sizeable Market Opportunities with Clear Clinical Benefits





# **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



T cells

APCs boost specific antitumoral

#### **CANCER CELL KILLING**

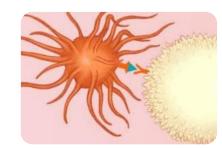
T cells attack tumor cells

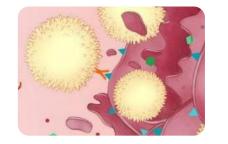
# Strongly differentiated from mRNAs and peptide approaches

# 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

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### myvac<sup>®</sup> - 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<sup>™</sup> for optimal design of the recombinant cassettes
- Selection of best promoter sequences

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



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myvac 🗸

one patient • one genomeone vaccine

Artificial Intelligence to identify up to 30 potent neoantigens

- 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



\*Source: Mallone et al., "Performance of neoantigen prediction for the design of TG4050, a patient-specific neoantigen cancer vaccine", <u>AACR</u>, June 2020, Poster presentation TG4050 is already Showing the Potential To Manage Patients with High-Risk of Recurrence or Molecular Relapse



one patient • one genome • one vaccine

## Goal

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

\*TMB: tumor mutational burden

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)
- 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



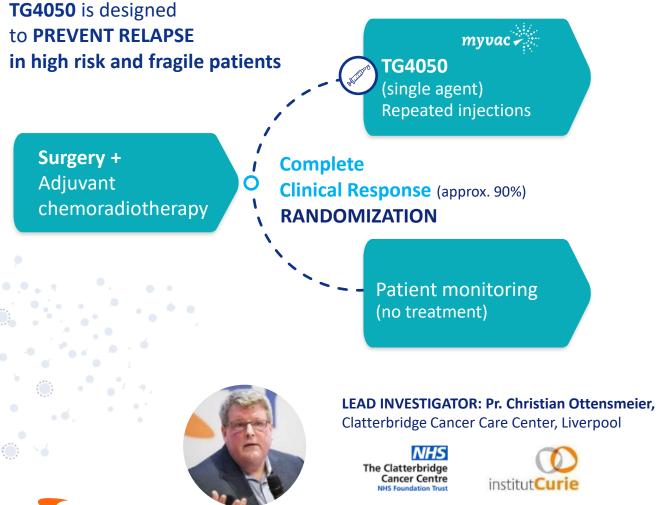
### TG4050 | HPV-Negative Head and Neck Cancer - Trial after Surgery and Adjuvant Therapy

**Recurrence** 

have failed (ie. KN412)

**Randomized Phase I Trial** 

**30 Patients** (NCT: 04183166)



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#### \* Source: Bernier et al, The Oncologist, 3005, 10, 215

**12-month PFS is approx. 60%** (w/o TG4050)\*

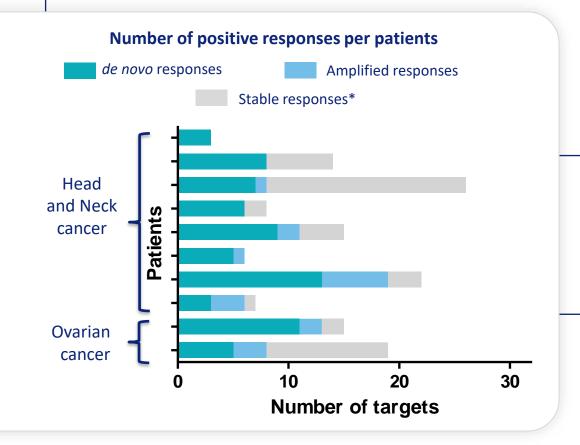
Clinical situation where checkpoint blockers

Last patient treatment expected in H1 2023

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

Induction of multiple T cell responses in all treated patients



\*Immunoreactive T-cells present at baseline but not amplified by vaccine.

Median of 9 positive responses per patient, out of 30

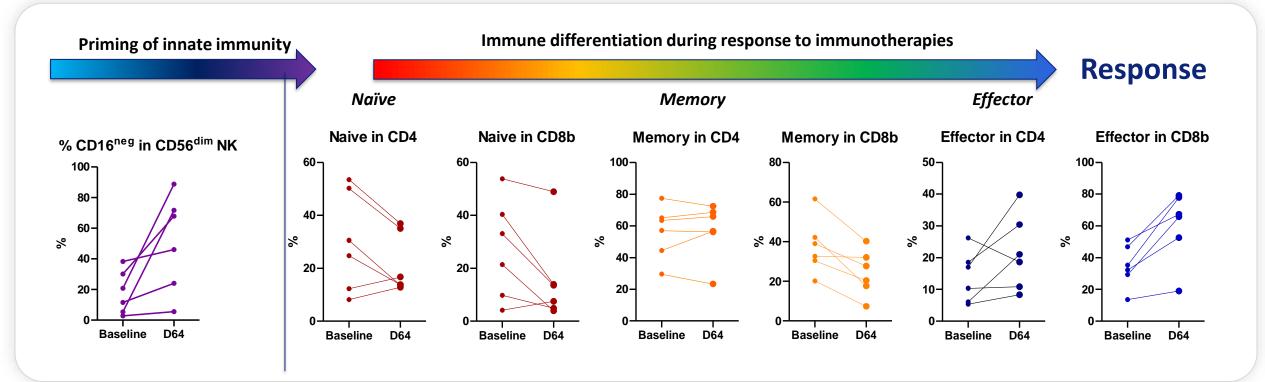
Responses were either **amplification** of pre-existing responses (20%) or *de novo* responses (80%) induced during vaccination

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" <u>AACR 2022</u>, April 12, 2022, Poster presentation Priming of innate immunity: Loss of CD16 on CD56<sup>dim</sup> 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

**OEffector subgroups of CD4 and CD8 T-cells are increased** 

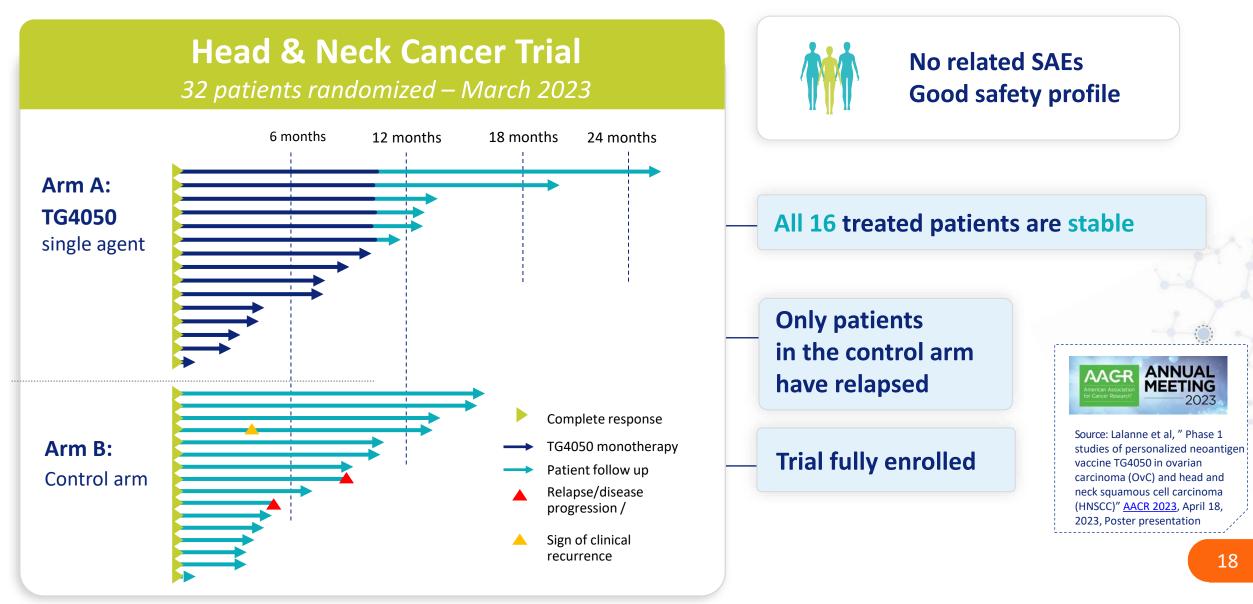
OConsistent with decrease in naive and memory CD4 and CD8 T-cell over treatment

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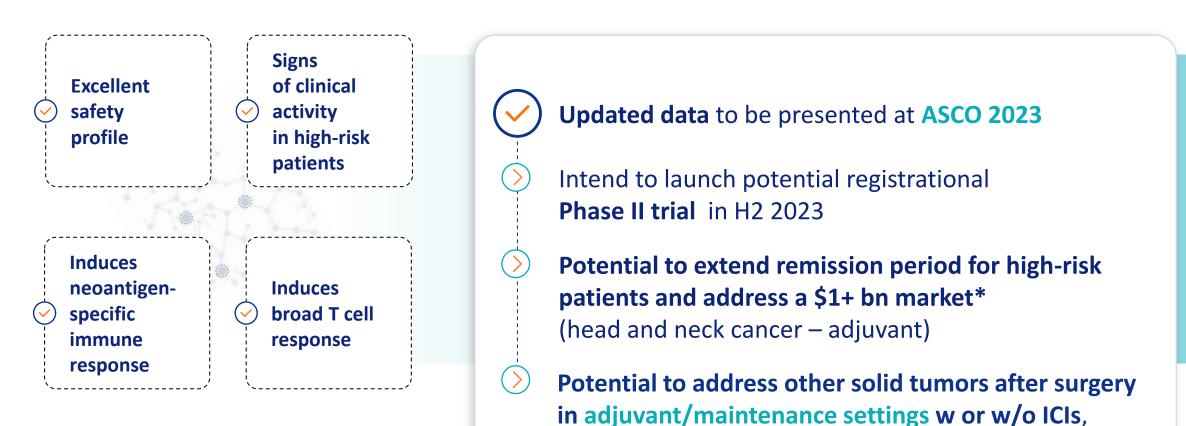
### Extremely Promising First Signals of Clinical Activity

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



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





ie a multi billion market

such as ovarian, urothelial, breast, lung cancers,

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



## INDUCES SPECIFIC AND DURABLE T CELL RESPONSES



MVA virus - E6 and E7 HPV antigens + IL2 Designed to induce specific E6 and E7 T cell response

#### **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\*  $\dot{\varphi}$  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
- Second Excellent safety profile Good combination candidate
- ✓ In hard-to-treat HPV cancer patients, has induced
  - Increase of CD3, CD8 infiltrates
  - O Increase of PD-L1 expression
  - **O** Shifts cold tumours into hot tumors, in combination with ICIs

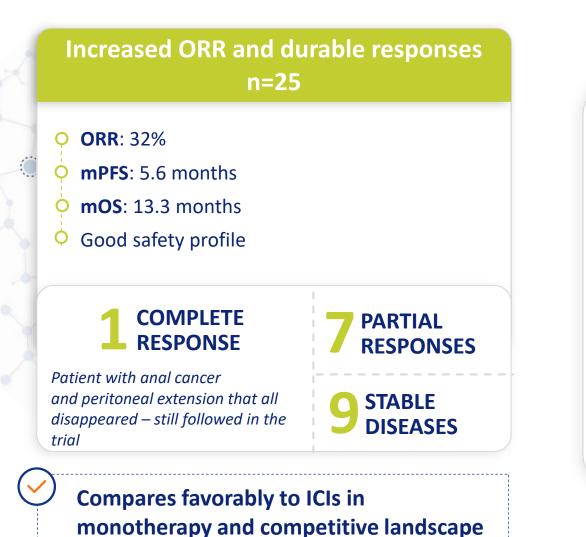
ORR: objective response rate (RECIST 1.1); m PFS: median progressionfree survival; m OS: median overall survival: SOC: standard of care

\*Estimates based on the following trials: • Anal 2L: NCI9673 (Nivolumab, Phase II) [ref]; KN028 + KN158 [ref] (pooled analysis: Phase Ib KN028 and Phase II KN158); CARACAS (Phase II) [ref] • Cervical 2L: KN158 (Phase II) [ref] • Cervical, vaginal vulvar 2L: CM 358 (Phase II) [ref]

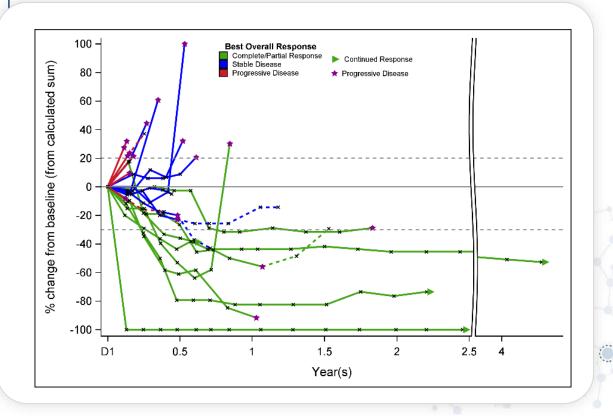
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TG4001 + Avelumab (Single Arm Ph. Ib/II) | Increased Benefit and Long-Lasting Responses Landmark Data Compare Favorably to ICIs in Monotherapy and Competitive Landscape



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

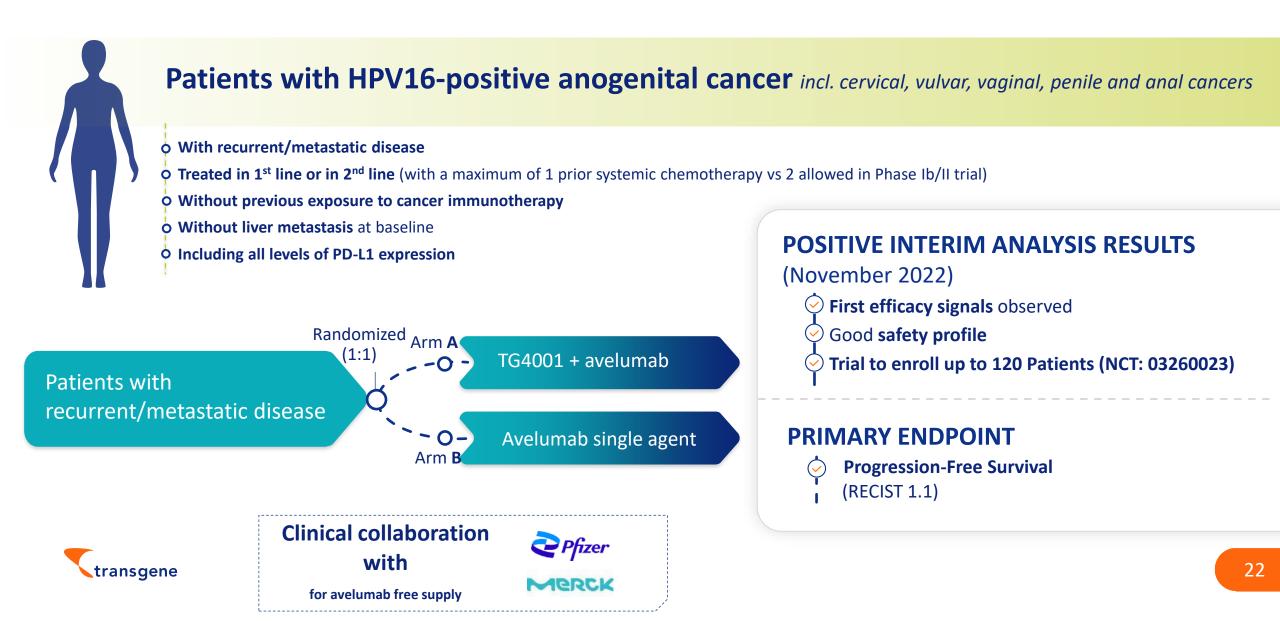


Clinical collaboration for avelumab free supply



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



### 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

Immunological data to be presented at ASCO (June 2023)

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-PoweredOff-the-Shelf Drug Candidates Targeting Solid Tumors



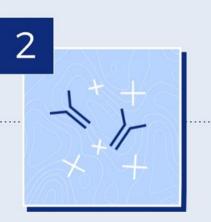


Our Oncolytic Viruses (OV) – Combined Effects of Vector, Payload and Immune Stimulation Competitive Advantage Enhanced by our Patented Backbone VV<sub>cop</sub>TK<sup>-</sup>RR<sup>-</sup> - basis of our Invir.IO<sup>®</sup> Platform

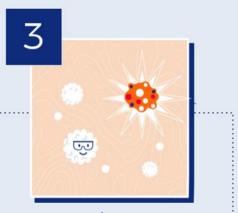
### **Cancer cell death through multiple MOAs**



Virus-induced direct and specific TUMOR ONCOLYSIS



Antitumor activity generated by **THERAPEUTIC PAYLOADS** 



Induction of IMMUNE MECHANISMS against tumor cells

# 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



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



## Goal

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
- O 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\*

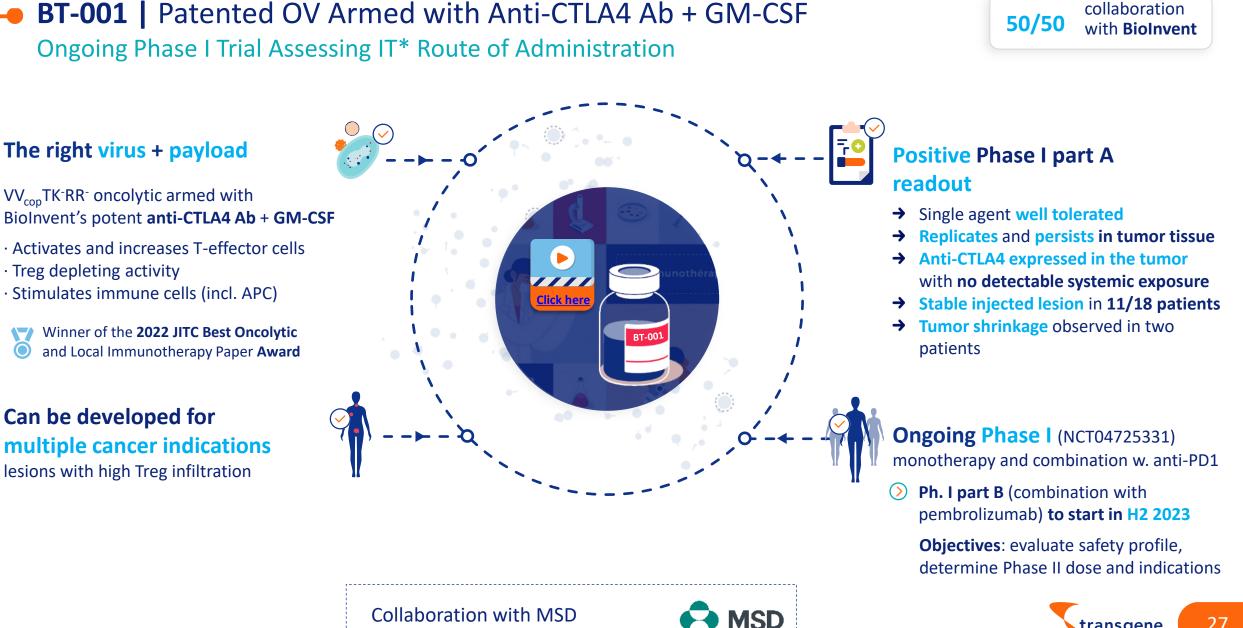
Potential to address numerous solid tumors via multiple routes of administration, in particular intravenous administration

- strong differentiation versus other OV players





Source: Samson et al, TG6050, "Oncolytic virus TG6002 safety and activity after intrahepatic artery administration in patients with liver-dominant metastatic colorectal cancer" <u>AACR 2023</u>, April 18, 2023, Poster presentation



collaboration

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
- P Restores the immune defenses within the tumor

#### The Invir.IO<sup>®</sup> 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
- Inclusions ongoing (NCT: 05788926)

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

\* IV: intravenous administration \*\*IHA: intrahepatic artery administration





## **Initial goal**

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



### Invir.IO<sup>®</sup> Pipeline Will Allow us to Generate Significant Value

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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

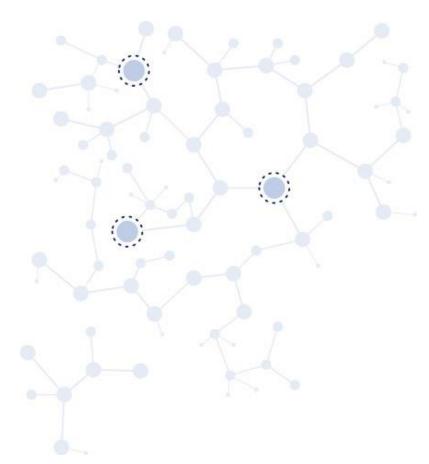
**BioInvent collaboration:** clinical development of BT-001

Biolnvent

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

### FINANCIAL VISIBILITY until early 2024

• **€17.0** million in **cash and cash equivalents** as of March 31, 2023

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



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



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

#### The Viral Vector Experts in Immuno-Oncology

### TG4050 | Neoantigen vaccine



#### Promising data as single agent (adjuvant setting)

- → June 2023 | Updated data to be presented (head and neck)
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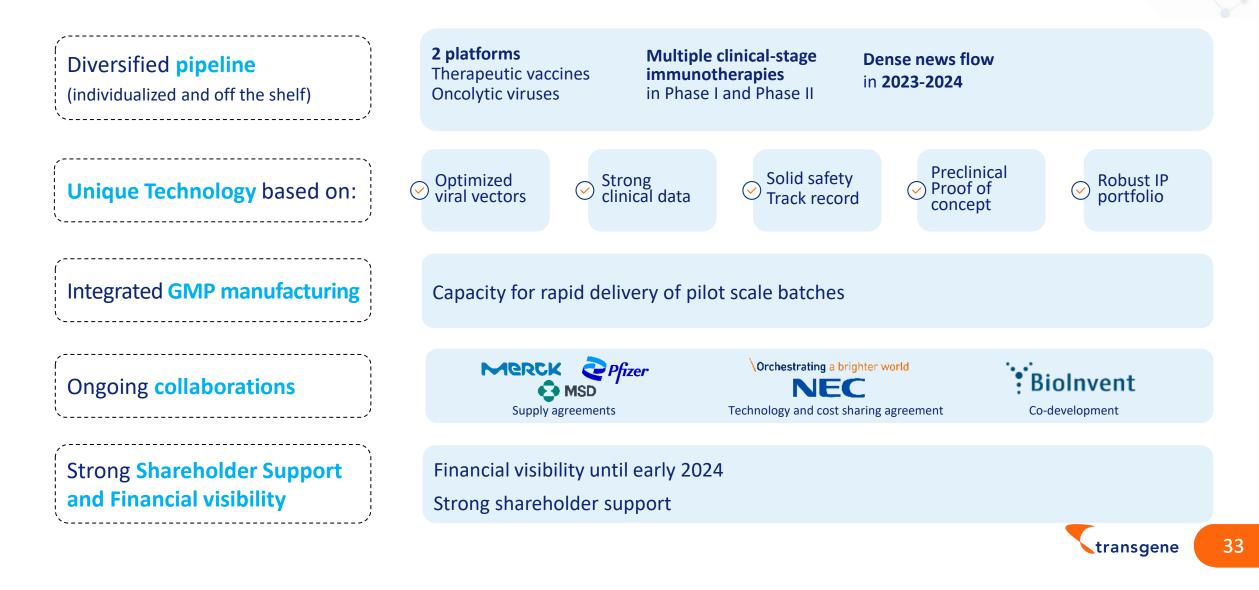
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Transgene – Frontline Player in Virus-Based Immunotherapy Against Cancer Versatile Technology Platforms to Fit Each Patient Need





# Appendices

### An Experienced Management Team

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Board of Directors - as of May 5, 2023



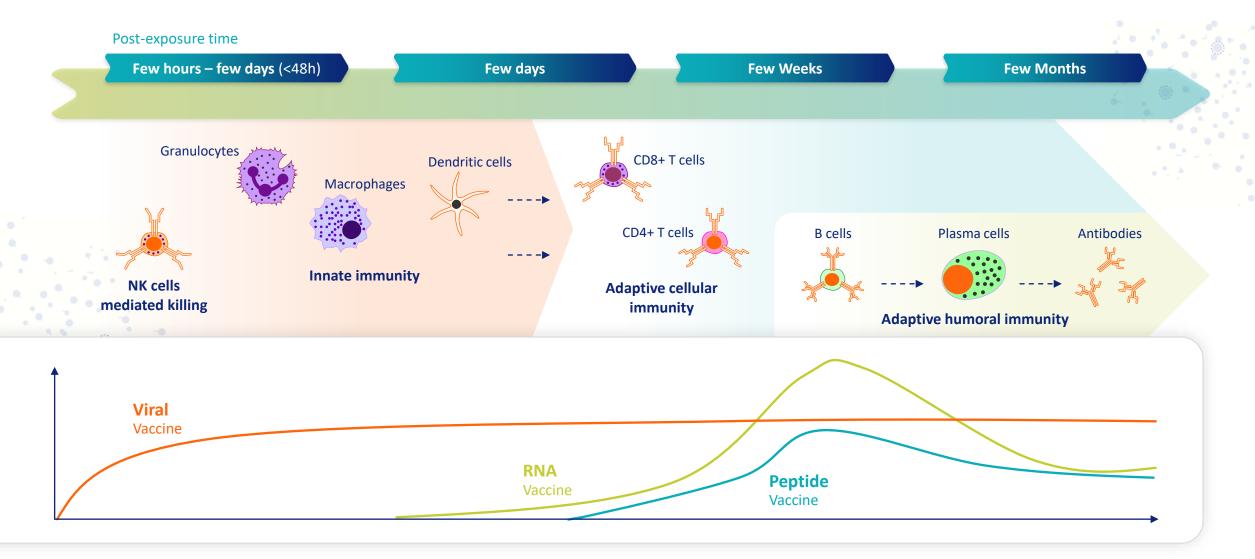
Chairman

transgene

Jean-Luc Bélingard Director Maya SaidJean-Yves BlayBenoît HabertIndependent DirectorIndependent DirectorIndependent Director

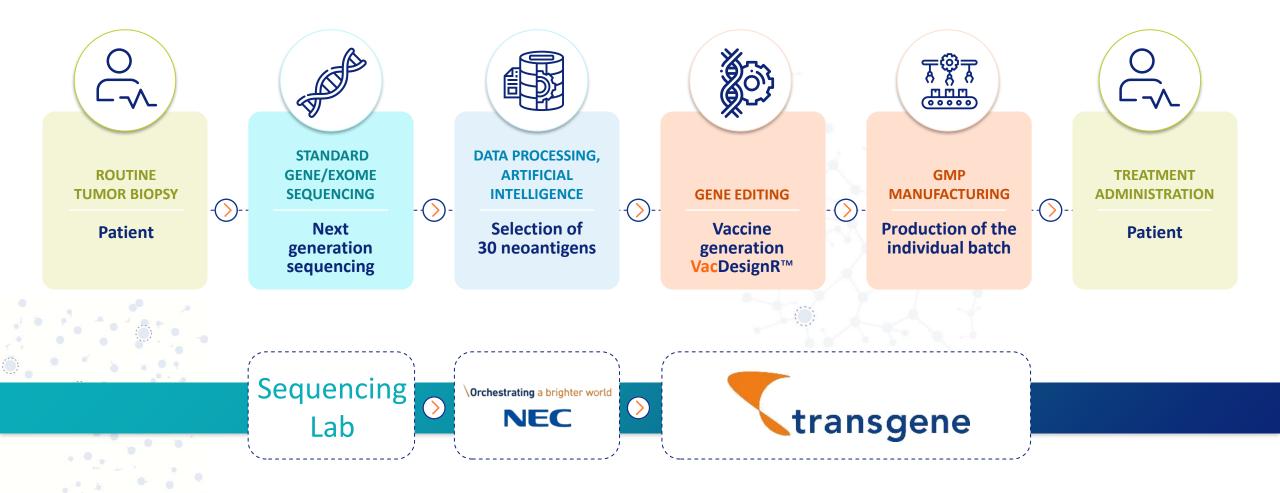
Sandrine Flory Director\*

### Viral Vaccines Prime Both Long Lasting Innate and Adaptive Immunity





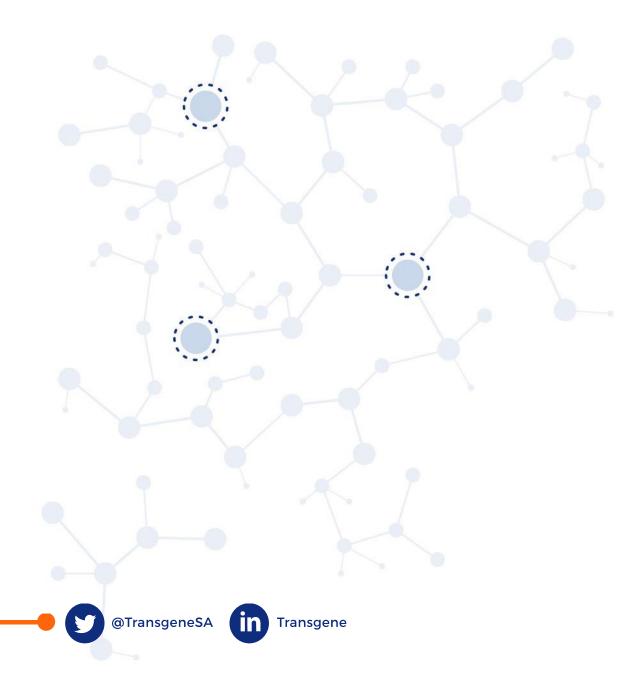
### **TG4050, an Individualized** Neoantigen Vaccine Combining Unique Capabilities Combines Bioengineering and Digital Transformation







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#### CONTACT

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