Activating the patient’s immune system to fight cancer

4Q and Full Year 2018

14 February 2019
This report contains certain forward-looking statements based on uncertainty, since they relate to events and depend on circumstances that will occur in future and which, by their nature, will have an impact on the results of operations and the financial condition of Targovax. Such forward-looking statements reflect the current views of Targovax and are based on the information currently available to the company. Targovax cannot give any assurance as to the correctness of such statements.

There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied in these forward-looking statements. These factors include, among other things, risks or uncertainties associated with the success of future clinical trials; risks relating to personal injury or death in connection with clinical trials or following commercialization of the company’s products, and liability in connection therewith; risks relating to the company’s freedom to operate (competitors patents) in respect of the products it develops; risks of non-approval of patents not yet granted and the company’s ability to adequately protect its intellectual property and know-how; risks relating to obtaining regulatory approval and other regulatory risks relating to the development and future commercialization of the company’s products; risks that research and development will not yield new products that achieve commercial success; risks relating to the company’s ability to successfully commercialize and gain market acceptance for Targovax’s products; risks relating to the future development of the pricing environment and/or regulations for pharmaceutical products; risks relating to the company’s ability to secure additional financing in the future, which may not be available on favorable terms or at all; risks relating to currency fluctuations; risks associated with technological development, growth management, general economic and business conditions; risks relating to the company’s ability to retain key personnel; and risks relating to the impact of competition.
1. Intro & Highlights

2. TG neo-antigen vaccine program
3. ONCOS oncolytic virus program
4. 4Q 2018 Financials
TARGOVAX’S POSITION IN THE FUTURE CANCER THERAPY LANDSCAPE
Targovax has two programs in clinical development, with an **ONCOLYTIC VIRUS LEAD PRODUCT CANDIDATE**

**ONCOS**

**Oncolytic virus**

- **Lead product candidate**
  - Genetically **armed adenovirus**
  - Turns **cold tumors hot**
  - Induces **tumor specific T-cells**
  - Single agent **phase I completed**
  - **4 ongoing combination trials**

**Pipeline product**

- **Shared neoantigen**, therapeutic peptide vaccine
- Triggers the **T-cell response** to oncogenic **RAS driver mutations**
- **32 patient phase I/II trial completed**

**Activates the immune system**

**Triggers patient-specific responses**

**No need for individualization**
## PIPELINE OVERVIEW AND MILESTONES

<table>
<thead>
<tr>
<th>Platform</th>
<th>Product candidate</th>
<th>Preclinical</th>
<th>Phase I</th>
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<th>Last event</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>ONCOS</strong> Oncolytic adenovirus</td>
<td><strong>ONCOS-102</strong></td>
<td>Mesothelioma Comb. w/ pemetrexed/cisplatin</td>
<td><img src="image1" alt="Icon" /></td>
<td><img src="image2" alt="Icon" /></td>
<td><img src="image3" alt="Icon" /></td>
<td>Phase Ib safety lead-in cohort, incl. immune activation and ORR data (6 pts)</td>
<td>1H 2020 Randomized ORR data</td>
</tr>
<tr>
<td></td>
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<td>Melanoma Comb. w/Keytruda</td>
<td><img src="image4" alt="Icon" /></td>
<td><img src="image5" alt="Icon" /></td>
<td><img src="image6" alt="Icon" /></td>
<td>ORR and immune activation (6 pts), 1/6 CR</td>
<td>1H 2019 ORR and immune data first cohort</td>
</tr>
<tr>
<td></td>
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<td>Peritoneal metastases&lt;sup&gt;1&lt;/sup&gt; Collab: Ludwig, CRI &amp; AZ Comb. w/Imfinzi</td>
<td><img src="image7" alt="Icon" /></td>
<td><img src="image8" alt="Icon" /></td>
<td><img src="image9" alt="Icon" /></td>
<td>First dose escalation cohort safety review (4 pts)</td>
<td>Update by collaborator, expected 2019</td>
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<tr>
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<td>Prostate Collab: Sotio Comb. w/DCVAC</td>
<td><img src="image10" alt="Icon" /></td>
<td><img src="image11" alt="Icon" /></td>
<td><img src="image12" alt="Icon" /></td>
<td>First patient dosed</td>
<td>Update by collaborator, expected 2019</td>
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<tr>
<td><strong>Next-gen ONCOS</strong></td>
<td><strong>3 viruses undisclosed</strong></td>
<td></td>
<td><img src="image13" alt="Icon" /></td>
<td><img src="image14" alt="Icon" /></td>
<td><img src="image15" alt="Icon" /></td>
<td>Virus construct cloning and <em>in vitro</em> validation</td>
<td>2H 2019 Pre-clinical data</td>
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<tr>
<td><strong>TG</strong> Neo-antigen cancer vaccine</td>
<td><strong>TG01</strong></td>
<td>Pancreatic cancer Comb. w/gemcitabine</td>
<td><img src="image16" alt="Icon" /></td>
<td><img src="image17" alt="Icon" /></td>
<td><img src="image18" alt="Icon" /></td>
<td>mOS 33.4 months Demonstrated mutant RAS-specific immune activation</td>
<td>1H 2019 3-year survival data</td>
</tr>
<tr>
<td></td>
<td><strong>TG02</strong></td>
<td>Colorectal cancer Proof-of-mechanism Comb. w/Keytruda</td>
<td><img src="image19" alt="Icon" /></td>
<td><img src="image20" alt="Icon" /></td>
<td><img src="image21" alt="Icon" /></td>
<td>First safety review, incl. immune activation data (3 pts)</td>
<td>1H 2019 Immune activation and mechanistic data (mono)</td>
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<td></td>
<td><strong>TG02</strong></td>
<td>CPI synergy TG + PD-1</td>
<td><img src="image22" alt="Icon" /></td>
<td><img src="image23" alt="Icon" /></td>
<td><img src="image24" alt="Icon" /></td>
<td></td>
<td>2H 2019 Pre-clinical data</td>
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</table>

1 Patients with advanced peritoneal disease, who have failed prior standard chemotherapy and have histologically confirmed platinum-resistant or refractory epithelial ovarian or colorectal cancer

Ongoing collaborator sponsored trials
## 2018 & 4Q HIGHLIGHTS

### ONCOS

- **TG01 Resected pancreatic cancer phase I/II:**
  - Encouraging two-year survival, medium OS and medium DFS compared to historical control
  - RAS-specific immune activation in 94% of patients

### TG01

- **Encouraging two-year survival, medium OS and medium DFS compared to historical control**
- **RAS-specific immune activation in 94% of patients**

### Corporate

- Granted product patent in the EU for TG to 2034
- Dr. Catherine Wheeler was elected to the Board
- Torbjørn Furuseth appointed CFO
TG mutant RAS vaccine program

3. ONCOS oncolytic virus program
4. 4Q 2018 Financials
**TG01 IN RESECTED PANCREATIC CANCER**

**EFFICACY SIGNAL SEEN IN PHASE I/II TRIAL**

<table>
<thead>
<tr>
<th></th>
<th>Median overall survival, months</th>
<th>Median disease free survival, months</th>
<th>RAS-specific immune activation</th>
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<tr>
<td></td>
<td>ESPAC 4</td>
<td>First cohort</td>
<td>Second cohort</td>
</tr>
<tr>
<td>ESPAC 4</td>
<td>27.6</td>
<td>33.1</td>
<td>Not yet reached</td>
</tr>
</tbody>
</table>

**Preliminary data**

- ESPAC4 trial for gemcitabine alone
- DFS both cohorts: 16.1 months

*TG01 is well-tolerated - improved dosing regimen in second cohort*
TG01 resected pancreas cancer trial survival - first vs. second patient cohorts

SECOND PATIENT COHORT NOT YET REACHED MEDIAN OS

- **2nd cohort**: optimized dosing regimen
  - 77% 2-year survival rate (10/13)
  - mDFS 19.5 months
  - mOS not reached
  - 9 patients alive at time of analysis

- **1st cohort**: full dosing regimen
  - 68% 2-year survival rate (13/19)
  - mDFS 13.9 months
  - mOS 33.1 months (from surgery)
  - 5 patients alive at time of analysis

Preliminary data
The RAS gene is central in oncogenesis and is mutated in
90% OF PANCREATIC AND 50% OF COLORECTAL CANCERS

RAS mutations are trunk neoantigens that drive oncogenesis.

There are no existing therapies targeting RAS mutations.

Targovax’ TG program is a unique vaccine approach for mutant RAS cancer.
# THE RAS DEVELOPMENT LANDSCAPE

TG is the most advanced RAS-targeting product in active development

<table>
<thead>
<tr>
<th>Company</th>
<th>Mechanism of Action</th>
<th>Highest Phase</th>
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<tbody>
<tr>
<td>GLOBE IMMUNE</td>
<td>Heat-inactivated yeast expressing target RAS mutations</td>
<td>Phase II (halted)</td>
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<tr>
<td>targovax</td>
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<td>Silenseed</td>
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<td>ADT PHARMACEUTICALS</td>
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<td>Nant Bionscience</td>
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<td>Warp Drive Bio</td>
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<td>Astellas</td>
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<td>Boehringer Ingelheim</td>
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<tr>
<td></td>
<td>Peptide cancer vaccine targeting RAS mutations</td>
<td>Phase II</td>
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<tr>
<td></td>
<td>RNAi targeting mutant KRAS</td>
<td>Phase I/II</td>
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<td></td>
<td>Antisense oligonucleotide (ASO) KRAS inhibitor</td>
<td>Phase I</td>
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<td>mRNA KRAS cancer vaccine</td>
<td>Phase I</td>
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<td>Small molecule inhibitor of RAS</td>
<td>Preclinical</td>
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<td></td>
<td>Small molecule inhibitors of mutant KRAS</td>
<td>Preclinical</td>
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<tr>
<td></td>
<td>Small molecule inhibitor RAS</td>
<td>Discovery</td>
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<td></td>
<td>Small molecule inhibitors of KRAS regulators</td>
<td>Discovery</td>
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<tr>
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<td>Small molecule inhibitors of KRAS</td>
<td>Discovery</td>
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<tr>
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<td>Small molecules targeting SOS (Son Of Sevenless), a RAS regulator</td>
<td>Discovery</td>
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TG DEVELOPMENT STRATEGY

TG pivotal development
Future indications TBD

Collaborative pancreas trial
Pursue opportunities for collaborative trials in pancreatic cancer

CPI combination clinical trial
Evaluate clinical benefit of TG vaccination in combination with PD-1/L1 blockade

Pre-clinical package
Generate supporting pre-clinical TG data package, incl. CPI and ONCOS combination

TG01 historical data
TG01-01 phase I/II data, Hydro Pharma data
TG CLINICAL PROGRAM OVERVIEW

Phase I & II - Pancreas
Monotherapy
>200 patients

Phase I/II
Resected pancreas
Adjuvant, w/chemo
32 patients

Colorectal - TG02
Phase I
12 - 20 patients

○ Mechanism of action
○ 2nd generation TG vaccine
○ Combination w/Keytruda

TG in combination with CPI
Phase I
Pancreas

○ Evaluate TG in combination with PD-1/L1 blockade

TG01 in resected pancreatic cancer

○ Pursue opportunities for cost efficient trials in collaborations

14

- Completed trial
- Ongoing trial
- Trial under planning
TG CLINICAL DEVELOPMENT STRATEGY

1. Resected pancreatic cancer
   - TG01 indication
     - Ph I/II completed
     - Next steps being reassessed
     - ~40,000 incidents

2. Colorectal cancer
   - TG02 lead indication
     - Ph I trial ongoing
     - 50% mutRAS
     - ~0.5m incidents

3. Lung cancer (NSCLC)
   - TG02 potential future indication
     - 30% mutRAS
     - ~0.5m incidents

4. All mutRAS cancers
   - TG02 + TG03 long-term potential
     - Up to 30% of all cancer patients

Source: Global data, Riva et al. Plos One 2017
Estimated total addressable patient number with RAS mutations in US, EU and China
ONCOS oncolytic virus program

4. 4Q 2018 Financials
ONCOS-102 IS AN ONCOLYTIC ADENOVIRUS SEROTYPE 5, ARMED WITH A GM-CSF TRANSGENE

1. Selective replication in cancer cells

2. Boosting the immune activation

3. Enhanced infection of cancer cells
BENEFITS OF ADENOVIRUS SEROTYPE 5 BACKBONE

- Highly immunogenic, Toll like receptor 9 (TLR9) agonist
- Well-characterized, well-tolerated and few safety concerns
- Double stranded DNA, possibility for transgenes, non-enveloped
- Pre-existing immunity, reduced issue of immuno-dominance
ONCOS-102 CLINICAL DEVELOPMENT PROGRAM

- Compassionate use program
  115 patients

- Phase I trial
  12 patients
  7 indications

- CPI refractory melanoma
  Phase I
  9 +12 patients
  - Combination with Keytruda
  - CPI refractory PoC
  - First 6 patients completed
  - Second cohort opened recruitment

- Mesothelioma
  Phase I/II - randomized
  30 patients
  - Combination with SoC chemo
  - Path-to-market
  - Orphan drug status

- Peritoneal metastases
  Phase I/II
  up to 78 patients
  - Combination with Imfinzi
  - Intraperitoneal administration
  - Collaboration with MedImmune / AZ, CRI, & Ludwig

- Prostate cancer
  Phase I
  up to 15 patients
  - Combination with dendritic cell vaccine (DCVAC)
  - Collaboration with Sotio

- Completed
- Ongoing trials sponsored by Targovax
- Ongoing trials sponsored by partner
ONCOS-102 MELANOMA EARLY DATA

- **Compassionate use program**
  - 115 patients

- **Phase I trial**
  - 12 patients
  - 7 indications

- **CPI refractory melanoma**
  - Phase I
  - 9 +12 patients
  - Combination with Keytruda
  - CPI refractory PoC
  - First 6 patients completed
  - Second cohort opened recruitment

- **Mesothelioma**
  - Phase I/II - randomized
  - 30 patients
  - Combination with SoC chemo
  - Path-to-market
  - Orphan drug status

- **Peritoneal metastases**
  - Phase I/II
  - up to 78 patients
  - Combination with Imfinzi
  - Intraperitoneal administration
  - Collaboration with MedImmune / AZ, CRI, & Ludwig

- **Prostate cancer**
  - Phase I
  - up to 15 patients
  - Combination with SoC chemo
  - Combination with dendritic cell vaccine (DCVAC)
  - Collaboration with Sotio

- Completed
- Ongoing trials sponsored by Targovax
- Ongoing trials sponsored by partner
ONCOS-102 & Keytruda combination

MELANOMA PHASE I TRIAL STUDY DESIGN

First read out autumn 2018:
• Six patients

3 biopsies per patient
Baseline  DAY 22  DAY 64

CPO  ONCOS-102  Pembrolizumab

CPO: Cyclophosphamide
COMPLETE RESPONSE IN ONE OF SIX PATIENTS
following ONCOS-102 and Keytruda combination treatment

Patient 5
Previous Yervoy & Keytruda

Baseline
Progression on Keytruda

Week 3
Visible tumor regression after 3x ONCOS-102 injections

Week 9
Complete response after 3x ONCOS-102 injections & 2x Keytruda infusions

Patient 4
Previous Yervoy, Keytruda & Imlygic

Baseline
No clinical benefit with Keytruda monotherapy

Week 9
SD – Transient tumor regression observed by clinical assessment

By week 15
Withdrawn due to distant metastasis
### TUMOR SPECIFIC T-CELLS IN TUMOR BIOPSIES

**Tumor antigen specific T-cell response**
IFN-γ ELISPOT analysis for tumor antigen activated T-cells

<table>
<thead>
<tr>
<th>Patient 5</th>
<th>Previous Yervoy &amp; Keytruda</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAGE-A1</td>
<td>Week 3</td>
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<tr>
<td>-</td>
<td>+</td>
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</tbody>
</table>

**Increased infiltration of MAGE-A1 tumor specific T-cells**
- MAGE-A1 T-cells also detected at baseline

<table>
<thead>
<tr>
<th>Patient 4</th>
<th>Previous Yervoy, Keytruda &amp; Imlygic</th>
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<tbody>
<tr>
<td>NY-ESO-1</td>
<td>Week 3</td>
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**De novo induction of NY-ESO-1 tumor specific T-cells**
- Not present at baseline

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**De novo induction of MAGE-A1 tumor specific T-cells**
- Not present at baseline

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Preliminary data
INCREASED LEVEL OF CYTOTOXIC CD8+ TILs

Granzyme B expressing CD8+ T-Cells (TILs)
Fold change from baseline

Preliminary data
ONCOS-102 + KEYTRUDA MELANOMA TRIAL
one patient had a complete response by week 9

1 Safety
✓ First safety review completed with no concerns
✓ ONCOS-102 and Keytruda combination is well-tolerated

2 Innate immune activation
✓ Systemic increase of pro-inflammatory cytokines (6/6 patients)
✓ All patients develop fever

3 Adaptive immune activation
✓ Increase in tumor T-cell infiltration (TILs, 3/4 patients)
✓ Tumor-specific T cells in 2/4 patients
✓ Abscopal immune response in one patient

4 Efficacy
✓ Complete response in 1/6 patients (very rare)
✓ Transient local regression observed in 3 patients
✓ Associated with level of immune activation

Preliminary data
SECOND DOSE COHORT IS INITIATED
with up to 12 additional patients who will receive 12 ONCOS-102 injections

From:
1st dose cohort
3x ONCOS-102 injections

To:
2nd dose cohort
12x ONCOS-102 injections

CPO: Cyclophosphamide

* = optional
NEXT GENERATION ONCOLYTIC VIRUSES ARE IN DEVELOPMENT

Candidates > Cloning > Validation > In vitro > In vivo > Selection

Next-gen ONCOS

- A
- B
- C

- Same adenovirus backbone as ONCOS-102
- Targets and transgenes not disclosed until IP is secured
- Unique modalities that affects the immune system and the tumor microenvironment
4Q 2018 Financials
# PROFIT AND LOSS

<table>
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<th>4Q17</th>
<th>4Q18</th>
<th>2017</th>
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<td><strong>Total revenue</strong></td>
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<td>External R&amp;D expenses</td>
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<tr>
<td>Payroll and related expenses</td>
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<tr>
<td>Other operating expenses</td>
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<tr>
<td><strong>Total operating expenses</strong></td>
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<td>Operating loss</td>
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<td>Loss before income tax</td>
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<td>Net change in cash</td>
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<td>-22</td>
<td>90</td>
<td>-110</td>
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<td><strong>Net cash EOP</strong></td>
<td>262</td>
<td>151</td>
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<td>151</td>
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TARGOVAX HAS CASH POSITION to continue the planned clinical program into 2020

<table>
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<th>Operations</th>
<th>The share</th>
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<tr>
<td><strong>Cash end of 4Q - Dec 31\textsuperscript{th} 2018</strong></td>
<td><strong>Market Cap - at share price NOK \sim 8</strong></td>
</tr>
<tr>
<td>151 / 17 NOK million / USD million</td>
<td>420 / 48 NOK million / USD million</td>
</tr>
<tr>
<td><strong>Net cash flow - total 4Q</strong></td>
<td><strong>Daily turnover - rolling 6 month avg.</strong></td>
</tr>
<tr>
<td>-25 / -3 NOK million / USD million</td>
<td>1.6 / 0.2 / 0.3% NOK million / USD million</td>
</tr>
<tr>
<td><strong>Annual run rate - last four quarters</strong></td>
<td><strong>Analyst coverage</strong></td>
</tr>
<tr>
<td>112 / 13 NOK million / USD million</td>
<td>DNB, ABG Sundal Collier, Arctic, Redeye, Edison</td>
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<td>Ongoing collaborator sponsored trials</td>
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<td>Melanoma</td>
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<td>Update by collaborator, expected 2019</td>
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<td>Prostate</td>
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<td>Collab: Sotio</td>
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<td>Virus construct cloning and <em>in vitro</em> validation</td>
<td>2H 2019</td>
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<td>Comb. w/DCVAC</td>
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<td>Pre-clinical data</td>
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<td><strong>Next-gen ONCOS</strong></td>
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<td>3 viruses undisclosed</td>
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<td><strong>TG</strong> neo-antigen cancer vaccine</td>
<td>TG01</td>
<td>Pancreatic cancer</td>
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<td>mOS 33.4 months Demonstrated mutant RAS-specific immune activation</td>
<td>1H 2019</td>
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<td>3-year survival data</td>
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<td>TG02</td>
<td>Colorectal cancer</td>
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<td>First safety review, incl. immune activation data (3 pts)</td>
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<td>Proof-of-mechanism</td>
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<td>Immune activation and mechanistic data (mono)</td>
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<td>Comb. w/Keytruda®</td>
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<td>2H 2019 Pre-clinical data</td>
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<td>CPI synergy</td>
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<td>TG + PD-1</td>
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</table>

1 Patients with advanced peritoneal disease, who have failed prior standard chemotherapy and have histologically confirmed platinum-resistant or refractory epithelial ovarian or colorectal cancer

**Note:** ORR = overall response rate; mOS = median overall survival; PD-1 = programmed death-1; CPI = combined programmed death 1.
ACTIVATING THE PATIENT`S IMMUNE SYSTEM
to fight cancer

ONCOS-102:
lead product

Strong single agent data
Several upcoming data points

TG: clinical effect in pancreas

First cancer vaccine to show immune activation against a driver mutation
Ideal combination product

Innovative pipeline

Next generation viruses in testing