Forward Looking Statements

This presentation contains certain forward looking statements relating to the company’s business prospects and the development and commercialization of pelareorep a first-in-class systemically administered immuno-oncology agent for solid tumors and heme malignancies. These statements are based on management’s current expectations and beliefs and are subject to a number of factors which involve known and unknown risks, delays, uncertainties and other factors not under the company’s control which may cause actual results, performance or achievements of the company to be materially different from the results, performance or other expectations implied by these forward looking statements.

In any forward looking statement in which Oncolytics Biotech® Inc. expresses an expectation or belief as to future results, such expectations or beliefs are expressed in good faith and are believed to have a reasonable basis, but there can be no assurance that the statement or expectation or belief will be achieved. These factors include results of current or pending clinical trials, risks associated with intellectual property protection, financial projections, actions by the FDA/HPB/MHRA and those other factors detailed in the company’s filings with SEDAR and the Securities and Exchange Commission. Oncolytics does not undertake an obligation to update the forward looking statements, except as required by applicable laws.
What is Pelareorep?

- Non-pathogenic proprietary isolate of the unmodified reovirus
- Unarmed intravenously (IV) delivered double stranded RNA (dsRNA) oncolytic virus that creates an inflamed phenotype in tumor tissue
- First IV delivered immuno-oncolytic virus to demonstrate overall survival benefit in a randomized study
The Emerging Role of Pelareorep: Corporate & Industry Progress

- Statistically significant increase in overall survival (OS) in phase 2 randomized metastatic breast cancer study
- Committed relationships with Roche, Merck, BMS & Celgene
- Established Adlai Nortye partnership to develop Chinese market
- Clinical evidence that viral dsRNA promotes inflamed phenotype

Large pharma recognition of the importance of oncolytic viruses: multiple recent partnerships and acquisitions
# Pelareorep Advantages

## Other OV’s

**IT Delivery**
- Specialized delivery
- Variable dose
- Assured delivery to tumor

**Armed Virus**
- Specialized delivery and customized handling
- Biosafety Level 3

**Unarmed Virus**
- No change to standard practice
- Biosafety Level 2

## Pelareorep

**IV Delivery**
- Ease of delivery
- Standard dose
- Accesses metastatic disease
Pelareorep
Mechanism of Action

Synergy with chemotherapies & immunotherapies by promoting:

- Viral replication with accumulation of dsRNA
- Activating NK cells, dendritic cells and T-cells
- Recruiting tumor infiltrating lymphocytes

More than 40 supporting publications
Clinical Development Plan

Addresses drug combinations that can potentially boost each response of the MOA

• Chemo combinations
  Chemotherapy assists the escape of the virus from the vasculature and enhances the distribution of the virus in the tumor

• Immunotherapy combinations
  Pelareorep creates an inflamed phenotype promoting synergies with immune checkpoint inhibitors (PD-1/PD-L1)

• Targeted/IMiD combinations
  Pelareorep upregulates NK cells (natural killer cells) promoting synergies with targeted therapies, including combinations with CDK 4/6 and PARP inhibitors

Recent clinical results suggest that combining these interventions may improve patient outcomes by further enhancing immunogenic cell death
Metastatic Breast Cancer: Our Path to Registration
## Chemo-Combo / Breast Cancer

### (IND-213) Phase 2 Design

- Randomized, non-blinded study, with IV administered pelareorep given in combination with paclitaxel versus paclitaxel alone
- Patients with advanced or metastatic breast cancer
- Paclitaxel weekly, on days 1, 8 and 15 of a 28-day cycle and test arm with the addition of pelareorep on days 1, 2, 8, 9, 15 and 16
- 74 patients; powered to 90%
- Endpoints:
  - Primary: PFS
  - Secondary: OS
  - Secondary: ORR
  - Secondary: Safety

### (IND-213) Phase 2 Data

- Statistically significant improvement in median OS:
  - **10.4 months to 17.4 months (ITT)**
    - HR = 0.65
    - p = 0.1 (powered to 90%)
  - **10.8 months to 21.0 months (HR+/HER2-)**
    - HR = 0.6
    - p = 0.1 (powered to 90%)
- First IOV to demonstrate a statistically significant median OS advantage in a randomized clinical study
- ORR and PFS similar in both groups
IND-213 randomized phase 2 study from CCTG
Statistically significant improvement in overall survival

Test Arm (paclitaxel/pelareorep) 17.35 months
Control Arm (paclitaxel) 10.35 months

Test n=36
Control n=38
HR+/HER2- ~80%
TNBC ~18%
Prior Chemo 100%
Prior Anthrac. ~90%
Prior Taxanes ~50%
HR (hazard ratio) 0.65
CI (confidence int.) 80% (0.46-0.91)
p-value 0.1 (90% power)
Chemo-Combo / Breast Cancer

Nearly doubled OS in HR+/HER2-
More than doubled OS in ER+/PR+/HER2-

Overall survival for 57 patients in IND-213 breast cancer study with ER+/HER2- status

Overall survival for 47 patients in IND-213 breast cancer study with PgR+/HER2- status

<table>
<thead>
<tr>
<th>Test Arm</th>
<th>Control Arm</th>
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<tbody>
<tr>
<td>(paclitaxel/pelareorep)</td>
<td>(paclitaxel)</td>
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<tr>
<td>HR = 0.36</td>
<td>HR = 0.60</td>
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<tr>
<td>p = 0.003</td>
<td>p = 0.1 (powered to 90%)</td>
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<tr>
<td>Median OS = 10.8 mths vs 21.8 mths</td>
<td>Median OS = 10.8 mths vs 21.0 mths</td>
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<tr>
<td>Test = 26</td>
<td>Test = 28</td>
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<tr>
<td>Control = 21</td>
<td>Control = 29</td>
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</tbody>
</table>

CCTG: Canadian Cancer Trials Group
Chemo-Combo / Breast Cancer

**Metastatic Breast Cancer (2\textsuperscript{nd}, 3\textsuperscript{rd} & 4\textsuperscript{th} Line)**

- Statistically significant phase 2 OS data
- Regulatory Feedback:
  - Favorable FDA End-of-Phase 2 (EOP2) Meeting
  - Favorable EMA Final Advice Letter (FAL)
  - Fast Track Designation
  - Special Protocol Assessment Agreement
    - Preparing for 450-patient adaptive design registration study with OS endpoint

Can the positive results observed in our phase 2 mBC study be enhanced by the addition of a checkpoint inhibitor?
Pelareorep’s Promotion of an Inflamed Phenotype

Pre-treatment
Lack of PD-L1 staining

One week after pelareorep + carfilzomib
>90% PD-L1 staining

7-8 days

Pelareorep’s ability to create an inflamed phenotype is enhanced by combinations with chemotherapy
Registration Strategy: Breast Cancer and the Possible Impact of Checkpoint Inhibitors
Window of Opportunity (WOO): Defining Pelareorep as an I-O

Breast Cancer: AWARE-1

- **Pelareorep/Tecentriq® combination**
  - Window of opportunity study combining pelareorep with standard-of-care in neoadjuvant breast cancer treatment to supplement and confirm data from our phase 2 IND-213 in mBC
    - 38 patients
  - Primary Endpoint: Overall CelTIL (cellularity and tumor-infiltrating lymphocytes)
  - Secondary/Exploratory Endpoints:
    - CelTIL by breast cancer subtype
    - Safety
    - Tumor and blood-based immune biomarkers

- **First use of clinical supply agreement with Roche**
Defining the Path Forward

Secure SPA
Final advice from FDA following EOP2 meeting

Window Of Opportunity Study
Confirm Pelareorep is Acting as an Immunotherapy
- Promotes an inflamed phenotype
- Increases PD-L1 expression on tumor targets
- Enhances the activity of Tecentriq® in breast cancer
- Confirm biomarker data for phase 3 registration study

Going Forward Options
1) Add checkpoint inhibitor arm to existing phase 3 based on WOO data
or
2) Advance phase 3 under existing SPA
Taking Advantage of an Inflamed Phenotype: Establishing Pelareorep as a Backbone for Immunotherapies
Keytruda Combination: Metastatic Pancreatic Cancer

Metastatic Pancreatic Cancer (2nd Line)

- Results from REO 024 Keytruda® combination study data . . .
  - Two patients with SD: 126 and 277 day
  - One patient with PR lasting 504 days (35 cycles)
  - On treatment biopsy: infection in cancer cells and immune infiltrates

- . . . lead to our phase 2 Keytruda combination
  - Up to 30 patients
  - Primary Endpoint: ORR by iRECIST
  - Secondary Endpoints:
    - Blood-based immune biomarker data
    - PFS and mOS

Keytruda Combination: Multiple Myeloma

Multiple Myeloma

- Pelareorep/Keytruda® combination
  - 22 patients in phase 1 study
  - Primary Endpoint: ORR by iRECIST
  - Secondary Endpoints:
    - Blood-based immune biomarker data
    - PFS and mOS

Opdivo Combination: Multiple Myeloma

Multiple Myeloma

- Pelareorep/Opdivo® combination
  - 40 to 50 patients in phase 1 study
  - Primary Endpoint: Safety & Dosing
  - Secondary Endpoints:
    - Blood-based immune biomarker data
    - TTP, PFS & OS

Immunomodulatory (IMiD) Combinations

Pelareorep + Imnovid® or Revlimid® in multiple myeloma

Ongoing collaboration with Celgene & Myeloma UK

Establish safety profile in phase 1b
- Rescue treatment in relapsing myeloma patients
- Enrolling up to 44 patients

UNIVERSITY OF LEEDS
Pharma’s Growing Interest in Oncolytic Viruses

Large pharma has recently realized the importance of oncolytic viruses with checkpoint blockade:

- Amgen acquired Biovex (HSV – phase 3)
- Merck acquired Viralytics (Coxsackie virus – phase 1b)
- AbbVie partnered Turnstone Biologics (Rhabdovirus isolates – phase 1/2)
- Bristol-Myers Squibb partnered PsiOxus (Adenovirus – phase 1)
- Merck KGgA partnered Vyriad (Measles – phase 1/2)
- Boehringer Ingelheim acquired ViraTherapeutics (VSV – preclinical)
- Jansen acquired BeneVir (Undisclosed – preclinical)

Partnerships and acquisitions were frequently preceded by an active research collaboration between the parties
## Clinical Development Program

<table>
<thead>
<tr>
<th>Programs</th>
<th>Indication</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
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<td><strong>Chemotherapy Combo</strong></td>
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<td>Pelareoprep + PACLITAXEL</td>
<td>mBC</td>
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<td><strong>Immunotherapy Combo</strong></td>
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<td>Pelareoprep + Keytruda</td>
<td>Pancreatic Cancer</td>
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<td><strong>Immunomodulatory Combo</strong></td>
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<td>Pelareoprep + Imnovid</td>
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<tr>
<td>Pelareoprep + Revlimid</td>
<td>R/R MM</td>
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Safety, Manufacturing & Intellectual Property
Pelareorep and Safety

- Significant safety database: both IV and local delivery
- No maximum tolerated dose (MTD) reached to date

Monotherapy Toxicity Symptoms

- Toxicities have generally been mild (grade 1 or 2) and included chills, fever, headache, cough, myalgia, runny nose, sore throat, fatigue, lymphopenia or neutropenia

- Transient toxicities (grade 3 or 4) also included lymphopenia or neutropenia

Symptoms frequently observed from day 2 of treatment and usually lasted < 6 hours
Established Manufacturing Capability

- Final formulation produced at 100 liter-scale under cGMP
- > 50,000 standard doses per production run
- Commercial scale manufacturing agreement with SAFC (part of Merck Millipore Sigma)
- When stored frozen, liquid formulation is stable for at least five years (stability testing ongoing)
- Biosafety Level 2 classification requiring no specialized handling requirements
- Cost of Goods (COGS) are in line with those of other products made via vaccine manufacturing process
Strong Patent Portfolio

- More than **397 patents** issued worldwide, including **49 US** and **21 Canadian**
- Over **28 pending applications** worldwide

- Reovirus issued patent claims cover:
  - Compositions of matter comprising reovirus
    - Through 2028 and extendable to 2033
  - Pharmaceutical use of reoviruses to treat neoplasia and cellular proliferative diseases
  - Combination therapy with radiation, chemotherapy and/or immunesuppressants
  - Methods for manufacturing reovirus and screening for susceptibility to reovirus
  - Pharmaceutical use of reoviruses in transplantation procedures

As of September 30, 2018
Corporate
Objective: Joint Development and Commercialization Partnership

- Support of breast cancer registration study as well as other potential registration opportunities
- Financial and clinical support for other company-sponsored and/or IST studies
- Expansion of indications
- Improved ability to meet timelines while lowering development and manufacturing costs
- Maintain rights in North America in part or in whole
- Out-license ROW rights

Monetize certain geographies

- Successful partnership with Adlai Nortye
  - China, Hong Kong, Macau, Singapore, South Korea and Taiwan
  - Upfront and milestone payments of up to $86.6M
  - $21M in milestone payments largely under Oncolytics’ control
  - Double-digit royalties
  - $65M tied to potential development expansion
Experienced Leadership

Extensive knowledge of oncology/immunotherapy | Public company experience
Strong business development and commercialization expertise

<table>
<thead>
<tr>
<th>MANAGEMENT</th>
<th>NON-EXECUTIVE DIRECTORS</th>
<th>SCIENTIFIC ADVISORY BOARD</th>
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<tbody>
<tr>
<td><strong>Matt Coffey, PhD, MBA</strong></td>
<td><strong>Wayne Pisano, MBA</strong></td>
<td><strong>Dr. Martine Piccart, MD, PhD</strong></td>
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<tr>
<td>Co-founder, Director, President &amp; CEO</td>
<td>Chair of the Board, OncoLYtics</td>
<td>Professor of Oncology, Université Libre de Bruxelles</td>
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<tr>
<td></td>
<td>Former President, Sanofi Pasteur</td>
<td>BCRF Scientific Advisory Board</td>
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<tr>
<td><strong>Kirk Look, CA</strong></td>
<td><strong>Angela Holtham, MBA, ICD.D</strong></td>
<td>Co-Founder of Breast International Group (BIG)</td>
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<tr>
<td>Chief Financial Officer EY LLP</td>
<td>Nabisco, Hospital for Sick Children</td>
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<tr>
<td><strong>Andrew de Guttadauro</strong></td>
<td><strong>J. Mark Lievonen, CA</strong></td>
<td><strong>Dr. Aleix Prat, MD, PhD</strong></td>
</tr>
<tr>
<td>Global Head of Business Development Amgen, Biogen, Takeda</td>
<td>Former President, Sanofi Pasteur</td>
<td>Head, Medical Oncology Department, Hospital Clinic of Barcelona</td>
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<tr>
<td><strong>Allison Hagerman, PEng, PMP</strong></td>
<td><strong>Ontario Institute for Cancer Research</strong></td>
<td>SOLTI - Breast Cancer Research Group</td>
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<tr>
<td>VP of Product Development Visionary Biomedical</td>
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<td><strong>Michael Moore</strong></td>
<td><strong>William G. Rice, PhD</strong></td>
<td><strong>Dr. Padmanee Sharma, MD, PhD</strong></td>
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<tr>
<td>VP of IR &amp; Corporate Communications Equicom, Atkins + Associates</td>
<td>President &amp; CEO, Aptose Biosciences President, CEO &amp; Director of Achillion</td>
<td>Professor, Department of Genitourinary Medical Oncology MD Anderson Cancer Center KITE, Amgen &amp; BMS IO Network</td>
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<td></td>
<td><strong>Bernd R. Seizinger, MD, PhD</strong></td>
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<td>Former President &amp; CEO of GPC Biotech</td>
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<td>VP of Oncology Drug Discovery, BMS</td>
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<td></td>
<td><strong>Deborah M. Brown, BSc, MBA</strong></td>
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</table>
## Market and Capital Data

| Exchanges | Nasdaq: ONCY  
| TSX: ONC |
|-----------|-------------|
| Shares Outstanding (November 8, 2018) | 17,059,123 |
| Warrants (November 8, 2018) | 1,730,894 |
| Options (November 8, 2018) | 835,163 |
| Restricted/performance share units (November 8, 2018) | 258,244 |
| Fully Diluted (November 8, 2018) | 19,883,424 |
| Cash / Cash Equivalents / (Q3 reporting) | CDN $16.2 million (USD $12.4 million*) |
| Financial runway | > 12 months |

* Based on FX on November 8, 2018
# Achieved & Anticipated Milestones

<table>
<thead>
<tr>
<th>Event</th>
<th>Timing</th>
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<tbody>
<tr>
<td>Almost doubled OS in HR+/HER2- mBC patients and received SPA</td>
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<tr>
<td>Nasdaq listing</td>
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<td>Executed 4 checkpoint inhibitor combination study agreements</td>
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<td>Executed MCSA with Roche for the use of Tecentriq®</td>
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<tr>
<td>Initiate phase 2 study in pancreatic cancer</td>
<td>Q4 2018*</td>
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<tr>
<td>Initiate phase 1 study in multiple myeloma (Opdivo®)</td>
<td>Q4 2018*</td>
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<tr>
<td>Initiate phase 1b study in multiple myeloma (Keytruda®)</td>
<td>Q1 2019*</td>
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<tr>
<td>Initiate phase 1b Window of Opportunity study in breast cancer: AWARE-1</td>
<td>Q1 2019</td>
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<tr>
<td>Data from Window of Opportunity (WOO) study in breast cancer</td>
<td>mid 2019</td>
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<tr>
<td>Preliminary Data from MUK eleven study in multiple myeloma</td>
<td>mid 2019*</td>
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<tr>
<td>Initiate phase 3 registration study in mBC</td>
<td>After WOO study</td>
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* Guidance provided by principle investigators or sourced on clinicaltrials.gov
## Compelling Opportunity Summary

### Registration pathway
- Almost doubled OS in HR+/HER2- mBC patients
- Favorable FDA & EMA feedback
- SPA agreement
- WOO to supply supplementary data for phase 3 registration study

### Synergies with Immunotherapies
- Published synergy with various immune checkpoint inhibitors
- Demonstrated synergy with IMiD’s
- Preparing to initiate several phase 1 and 2 combination studies
- Investigating additional collaborations with strategic partners

### Competitive advantages
- IV administration (systemic)
- Biosafety Level 2 & extensive safety database
- Broad patent portfolio
- Cost effective manufacturing process