Forward Looking Statements

This presentation contains certain forward looking statements relating to the company’s business prospects and the development and commercialization of REOLYSIN®, 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.
### Rapid Recent Progress

<table>
<thead>
<tr>
<th>More than doubled Overall Survival in ER+PR+/HER2- patients</th>
<th>155,000+ metastatic breast cancer patients annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granted Fast Track Designation</td>
<td>Announced Keytruda safety data at ASCO 2017</td>
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</tbody>
</table>
  - Addressing unmet medical need                             |
  - Expedited and rolling review                              |
| Successful EOP2 meeting with FDA                            | Collaboration with Celgene & Myeloma UK              |
  - One phase 3 study                                         |
  - 400 patients                                              |
|                                                             | - Combo with Revlimid® or Imnovid®                    |
|                                                             | - First IMiD combination study                       |
What is REOLYSIN®?

- First intravenously delivered immuno-oncolytic virus (IOV) agent to demonstrate overall survival benefit
- Unmodified BL2 reovirus does not require special handling
- Non-pathogenic proprietary isolate of the unmodified reovirus: DOES NOT REQUIRE SPECIAL HANDLING OR DELIVERY
REOLYSIN® Mechanism of Action (MoA)

More than 40 supporting publications
What does REOLYSIN® do?

Turns **COLD** tumors **HOT**

Dual Mechanism of Action:
- Selective tumor cell lysis kills cancer cells stressed by chemo and/or radiation
- Activates innate and adaptive immune systems
  - Induces PD-1 & PDL-1 expression on T-cells and tumor-cells
  - Increases Natural Killer and T cell activation

Potentiator for all agents affecting both innate and adaptive immunity
REOLYSIN® and Safety

- 1,100+ patients treated, 900+ intravenously
- 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, and lymphopenia or neutropenia
- Transient grade 3 and 4 toxicities have also included lymphopenia or neutropenia

*Symptoms frequently observed from day 2 of treatment and usually lasted < 6 hours*
Clinical Data & Development Plan
Clinical Development Plan: Pathways

The clinical development plan addresses drug combinations that can potentially boost each response of the MOA

1. **Path 1 - Chemo combinations** *(direct cell lysis)*: The basis for our metastatic breast cancer registration pathway.

2. **Path 2 - Immunotherapy combinations** *(adaptive immune response)*: Approaches with checkpoint inhibitors embodied in the ongoing REOLYSIN® + pembrolizumab study and possible future collaborations.

3. **Path 3 - Combination with IMiD’s / targeted therapy** *(innate immune response)*: Currently in combination with Celgene’s Imnovid® & Revlimid® in a first-of-its-kind immunotherapy trial that aims to modulate the immune system to target myeloma. Exploring additional collaborations.
Path 1: Chemotherapy Combinations

Metastatic Breast Cancer

Regulatory Status
- Statistically significant phase 2 OS data
- Successful End-of-Phase 2 Meeting
- Potential for Breakthrough Designation and/or SPA
- Seeking scientific advice with EMA
- Preparing for 400-patient registration study

Metastatic Pancreatic Cancer (1st Line)

Regulatory Status
- Orphan Drug Designation Granted (FDA / EMA)
- Potential for Fast-Track Designation
- Preparing for End-of-Phase 2 Meeting
Path 1: Chemo-Combo / Breast Cancer

<table>
<thead>
<tr>
<th>(IND-213) Phase 2 Design</th>
<th>(IND-213) Phase 2 Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Randomized, non-blinded study, with IV administered REOLYSIN® given in combination with paclitaxel versus paclitaxel alone</td>
<td>• Statistically significant improvement in median OS:</td>
</tr>
<tr>
<td>• Patients with advanced or metastatic breast cancer</td>
<td>• 10.4 months to 17.4 months (ITT)</td>
</tr>
<tr>
<td>• Paclitaxel weekly, on days 1, 8 and 15 of a 28-day cycle and test arm with the addition of REOLYSIN® on days 1, 2, 8, 9, 15 and 16</td>
<td>• HR = .65</td>
</tr>
<tr>
<td>• 74 patients; powered to 90%</td>
<td>• P = 0.1 (powered to 90%)</td>
</tr>
<tr>
<td>• Endpoints:</td>
<td>• 10.8 months to 21.8 months (ER+PR+/HER2-)</td>
</tr>
<tr>
<td>• Primary: PFS</td>
<td>• HR = .36</td>
</tr>
<tr>
<td>• Secondary: OS</td>
<td>• P = 0.003</td>
</tr>
<tr>
<td>• Secondary: ORR</td>
<td>• First immuno-oncology virus (IOV) to demonstrate a statistically significant median OS advantage in a randomized clinical study</td>
</tr>
<tr>
<td>• Secondary: Safety</td>
<td>• ORR and PFS similar in both groups</td>
</tr>
</tbody>
</table>
Path 1: Chemo-Combo / Breast Cancer

IND-213 randomized phase 2 study from CCTG
Statistically significant improvement in overall survival

ITT Population

Test Arm (paclitaxel/REOLYSIN)  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         0.65
CI         80% (0.46-0.91)
p          0.1 (90% power)
Path 1: Chemo-Combo / Breast Cancer

More than doubled OS in ER+PR+

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

HR = 0.60
p = 0.1 (powered to 90%)
mOS = 10.8 mths vs 21.0 mths

HR = 0.36
p = 0.003
mOS = 10.8 mths vs 21.8 mths

CCTG: Canadian Cancer Trials Group
Path 1: Chemo-Combo / Breast Cancer

As with other IO’s, minimal PFS benefit observed

Time in Months

Test Arm
Control Arm
Targeting the largest Breast Cancer Sub-type

Unlike Triple Negative Breast Cancer, HR+/HER2- not subject to potential future PD-1/PD-L1 disruption

Distribution of Breast Cancer Sub-types

- HR+ HER2-: 73%
- HR+ HER2+: 11%
- HR- HER2+: 4%
- TNBC: 12%
HALAVEN® is the only therapy with demonstrated OS benefit

*Only 2.5 months*

<table>
<thead>
<tr>
<th>Therapy1</th>
<th>Indication</th>
<th>Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TAXOTERE®</strong>&lt;sup&gt;1&lt;/sup&gt; (docetaxel)</td>
<td>Single agent for locally advanced or metastatic BC after chemotherapy failure;</td>
<td>PFS: 6.5 mo. vs. 5.3 mo.; p = 0.45 OS: no benefit</td>
</tr>
<tr>
<td><strong>TAXOL®</strong> (paclitaxel)</td>
<td>Treatment of breast cancer after failure of combination chemotherapy for metastatic disease or relapse within 6 months of adjuvant chemotherapy. Prior therapy should have included an anthracycline unless clinically contraindicated.</td>
<td>PFS OS: no difference</td>
</tr>
<tr>
<td><strong>ABRAXANE®</strong> (paclitaxel, albumin-bound)</td>
<td>Metastatic breast cancer, after failure of combination chemotherapy for metastatic disease or relapse within 6 months of adjuvant chemotherapy. Prior therapy should have included an anthracycline unless clinically contraindicated.</td>
<td>PFS OS: no difference</td>
</tr>
<tr>
<td><strong>GEMZAR®</strong> (Gemcitabine)</td>
<td>In combination with paclitaxel, for first-line treatment of metastatic breast cancer after failure of prior anthracycline-containing adjuvant chemotherapy, unless anthracyclines were clinically contraindicated</td>
<td>PFS OS: no difference</td>
</tr>
<tr>
<td><strong>HALAVEN®</strong> (eribulin mesylate)</td>
<td>Metastatic breast cancer who have previously received at least two chemotherapeutic regimens for the treatment of metastatic disease. Prior therapy should have included an anthracycline and a taxane in either the adjuvant or metastatic setting</td>
<td>OS: 13.1 mo vs. 10.6 mo; HR = 0.81, P = 0.041</td>
</tr>
</tbody>
</table>
Path 1: Chemo-Combo / Breast Cancer

3,560,570
breast cancer prevalence, US 2016

2,599,216
Patients with HR+/HER2- Subtype

154,885
Patients diagnosed with stage IV breast cancer

154,885
addressable patients in North America

2nd most common cancer in women

Nearly 1.7 million new cases diagnosed globally every year

Source: SEER database
Path 1: Chemo-Combo / Breast Cancer

Key Learnings
- REOLYSIN demonstrated to work as a systemic IO therapy
- Consistent with other approved IO therapies, primary endpoint in mBC phase 3 trial will be overall survival (OS)

Regulatory Milestones
- FDA “Fast Track” designation granted – May, 2017
- FDA End-of-Phase 2, Type B meeting – August 18, 2017
  - Clear regulatory pathway to registration in metastatic breast cancer
  - Overall agreement with phase 3 study design (discussions on the final version ongoing)
- EMA Scientific Advice Meeting – November, 2017
Path 1: Supporting OS as Registration Endpoint

Doubling 2-year survival in phase 2 pancreatic studies

Single Arm (REO 017)
- REO + Gemcitabine (n=34)

Randomized Intention-to-Treat (NCI-8601)
- Carbotax + REO (n=36)
- Carbotax (n=37)

Randomized Excluding Crossover
- Carbotax + REO (n=36)
- Carbotax (n=20)

Reo + gem 2y-OS = 24 %

Reo + Carbo-Tax 2y-OS = 20 %

Carbo-Tax 2y-OS = 9 %
Path 2: Immunotherapy Combinations

REO + pembrolizumab (anti-PD-1 antibody) in pancreatic cancer
- Establish safety profile
- Final analysis in 2017

Future potential collaborations pending

Rajani, Viruses 2015, 7:588; Noonan, Mol Ther 2016; Rajani, Mol Ther 2016, 24:166
Path 3: Targeted/IMiD Combinations

REO + lenalidomide and pomalidomide in multiple myeloma

- Establish safety profile
- Ongoing collaboration with Celgene & Myeloma UK
  - Combined with Revlimid® & Imnovid® as a rescue treatment in relapsing myeloma patients
Manufacturing & Intellectual Property
Manufacturing

- 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)
- BL2 classification requiring no specialized handling requirements
- Cost of Goods (COGS) are in line with those of other products made via vaccine manufacturing process
Patent Portfolio

- More than 415 patents issued worldwide, including 61 US and 20 Canadian
- Over 60 pending applications worldwide
- Reovirus issue 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 immune suppressants
  - Methods for manufacturing reovirus and screening for susceptibility to reovirus
  - Pharmaceutical use of reoviruses in transplantation procedures
## Experienced Leadership

### Management

<table>
<thead>
<tr>
<th>Name</th>
<th>Role and Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matt Coffey, PhD, MBA</td>
<td>Co-founder, Director, President &amp; CEO</td>
</tr>
<tr>
<td>Kirk Look, CA</td>
<td>Chief Financial Officer, EY LLP</td>
</tr>
<tr>
<td>Andres Gutierrez, MD, PhD</td>
<td>Chief Medical Officer, Bristol-Myers Squibb</td>
</tr>
<tr>
<td>Andrew de Guttadauro</td>
<td>VP of Business Development, Amgen, Biogen, Takeda</td>
</tr>
</tbody>
</table>

### Non-Executive Directors

<table>
<thead>
<tr>
<th>Name</th>
<th>Role and Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayne Pisano, MBA</td>
<td>Chairman of the Board, Oncolytics, Former President, Sanofi Pasteur</td>
</tr>
<tr>
<td>Angela Holtham, MBA, ICD.D</td>
<td>Nabisco, Hospital for Sick Children</td>
</tr>
<tr>
<td>J. Mark Lievonen, CA</td>
<td>Former President, Sanofi Pasteur, Ontario Institute for Cancer Research</td>
</tr>
<tr>
<td>William G. Rice, PhD</td>
<td>President &amp; CEO, Aptose Biosciences, President, CEO &amp; Director of Achillion</td>
</tr>
<tr>
<td>Bernd R. Seizinger, MD, PhD</td>
<td>Former President &amp; CEO of GPC Biotech, VP of Oncology Drug Discovery, BMS</td>
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</tbody>
</table>

- **Extensive knowledge of oncology/immunotherapy** | **Public company experience**
- **Strong business development and commercialization expertise**
# Market and Capital Data

<table>
<thead>
<tr>
<th>Exchanges</th>
<th>OTCQX: ONCYF</th>
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<tbody>
<tr>
<td></td>
<td>TSX: ONC</td>
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<tr>
<td></td>
<td>USD $72.6 M</td>
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<tr>
<td></td>
<td>CDN $93.42 M</td>
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<tr>
<td><strong>Market Cap</strong> (September 21, 2017)</td>
<td></td>
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<tr>
<td></td>
<td>USD $72.6 M</td>
</tr>
<tr>
<td></td>
<td>CDN $93.42 M</td>
</tr>
<tr>
<td><strong>Shares Outstanding</strong> (June 30, 2017)</td>
<td>139,426,222</td>
</tr>
<tr>
<td><strong>Warrants</strong> (June 30, 2017)</td>
<td>16,445,000</td>
</tr>
<tr>
<td><strong>Options</strong> (June 30, 2017)</td>
<td>7,532,827</td>
</tr>
<tr>
<td><strong>Restricted/performance share units</strong> (June 30, 2017)</td>
<td>2,370,388</td>
</tr>
<tr>
<td><strong>Fully Diluted</strong> (June 30, 2017)</td>
<td>165,774,437</td>
</tr>
<tr>
<td><strong>Cash / Cash Equivalents / Short Term Investments</strong> (June 30, 2017)</td>
<td>CDN $16.7 million</td>
</tr>
<tr>
<td></td>
<td>USD $13.5 million*</td>
</tr>
<tr>
<td><strong>Cash runway</strong></td>
<td>End of 2018</td>
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* Based on FX on September 27, 2017
## Milestones

<table>
<thead>
<tr>
<th>Event</th>
<th>Timing</th>
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<tbody>
<tr>
<td>New Leadership Team</td>
<td>☑</td>
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<tr>
<td>Collaboration with Myeloma UK &amp; Celgene</td>
<td>☑</td>
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<tr>
<td>More than doubled 2 year survival in pancreatic cancer</td>
<td>☑</td>
</tr>
<tr>
<td>More than doubled OS in ER+PR+/HER2- mBC patients</td>
<td>☑</td>
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<tr>
<td>Fast Track Designation</td>
<td>☑</td>
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<tr>
<td>Successful End-of-Phase 2 Meeting for mBC</td>
<td>☑</td>
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<tr>
<td>Regulatory milestones (BTD and/or SPA for phase 3 mBC registration study)</td>
<td>Q4/Q1</td>
</tr>
<tr>
<td>Registration Partnership</td>
<td>1H 2018</td>
</tr>
<tr>
<td>NASDAQ</td>
<td>1H 2018</td>
</tr>
<tr>
<td>Initiate phase 3 in metastatic breast cancer</td>
<td>Mid- 2018</td>
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<tr>
<td>Additional pharma research collaborations (IO’s and IMiD’s)</td>
<td>Ongoing</td>
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<tr>
<td>Rapid Recent Progress</td>
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<td>-----------------------</td>
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<tr>
<td><strong>More than doubled Overall Survival in ER+PR+/HER2- patients</strong></td>
<td><strong>155,000+ metastatic breast cancer patients annually</strong></td>
</tr>
<tr>
<td><strong>Granted Fast Track Designation</strong></td>
<td><strong>Unpartnered Ph 3 intravenously delivered IOV exploiting dual-MOA</strong></td>
</tr>
</tbody>
</table>
| **Successful EOP2 meeting with FDA**  
  - One phase 3 study  
  - 400 patients | **Manufacturing at commercial scale with supplies for Ph 3** |

>$ Multi Billion