Oncolytics Biotech® Inc., First Quarter 2018 Letter to Shareholders

To all of our shareholders,

Oncolytics has made major clinical and corporate progress during 2018. We presented data at a number of medical conferences, underpinning our rationale for a phase 3 registration study of REOLYSIN® (pelareorep) in metastatic breast cancer (mBc) and supporting the inclusion of near-term checkpoint inhibitor (CI) combination studies in our clinical development plan. Studies with pelareorep in combination with CI's would be shorter-term clinical trials broadly evaluating the safety, efficacy and biology of the respective combination and could include a variety of cancers, as well as potentially other classes of anti-cancer agents, including immunomodulatory drugs and CAR-T's.

The board and management team also initiated a plan to relist Oncolytics' shares on the NASDAQ Capital Market, gaining shareholder approval for a potential share consolidation, an important prerequisite to an eventual relisting. We continue to carefully evaluate the timing for this action and plan to execute any potential consolidation and listing, strategically with news flow.

Now let me provide some specific details on our clinical activities and development plans, and in particular, the compelling rationale for wider investigation of pelareorep in combination with checkpoint inhibitors.

Growing Critical Mass of I-O Combination Data

In January, an influential paper in *Science Translational Medicine*, authored by Dr. Adel Samson, et al, at the University of Leeds in London, highlighted reovirus creating an inflamed phenotype. The paper demonstrated evidence that tumor response and patient survival are determined by PD-L1 expression and that preconditioning or priming the tumor's immune microenvironment using targeted, virus-mediated interferon stimulation (pelareorep) would up-regulate tumor PD-L1 protein expression and increase cytotoxic T cell infiltration, improving the efficacy of a subsequent checkpoint blockade. These results are part of the critical mass of data that supports the development of I-O collaborations and were important enough to catch the eye of many key opinion leaders studying I-O therapies and oncolytic virus' and was ultimately covered by international press including Forbes and the BBC.

Later in January, at the 2018 Gastrointestinal Cancers Symposium, sponsored by the American Society of Clinical Oncology (ASCO), a poster presentation highlighted results from our REO 024 study. The phase 1b study, combining pelareorep and KEYTRUDA® in second line pancreatic patients, was designed to evaluate safety and tolerability. The results demonstrated a signal of activity, no increase in immune related toxicity and one significant survival result.

The poster described six efficacy evaluable, second-line, pancreatic cancer patients, including two with stable disease of 126 and 277 days and remarkably, one patient that had a partial response and remained on study for 504 days, through 35 cycles of treatment. The data also demonstrated manageable safety profiles and antitumor activity in previously treated patients with relapsed metastatic pancreatic adenocarcinoma. On-treatment biopsies showed selective reovirus infection and caspase activation in cancer cells and infiltration by CD8 T cells, demonstrating the virus's ability to induce cell death and, importantly, a pro-inflammatory phenotype in treated tumors – turning cold tumors hot. This study is now advancing into phase 2 and we expect to be able to announce details on the expanded study very soon.

Two poster presentations in April at the American Academy of Cancer Research (AACR) 2018 demonstrated additional confirmation of pelareorep's promotion of an inflammatory signature in different cell lines. A study by our very own Dr. Grey Wilkinson demonstrated that pelareorep elicits an interferon-ɣ-proinflammatory gene signature in select cancer cells permissive to viral infection, which could activate and expand T cell and natural killer cell populations at the tumor site. Pelareorep could therefore recruit immune cells and induce an inflamed tumor phenotype in certain tumor types, including hepatocellular carcinoma, as previously demonstrated in other preclinical and clinical studies. These data highlight pelareorep's mechanism of recruiting immune cells and provides further rational for synergies with both CI's and CAR T cell approaches.

A second presentation at AACR by Dr. Sanjay Goel highlighted the synergistic combination of pelareorep and an anti-PD1 agent that increased PD-L1 expression on microsatellite stable colorectal cancer (MSS CRC) cells. In addition, combination therapy made statistically significant improvements in survival compared to controls and pelareorep treated xenografted tumor tissue showed a higher infiltration of T lymphocytes.

Taken together, these findings highlight pelareorep's ability to prime the immune system and enhance the activity of checkpoint blockade and CAR T cell approaches. Importantly, MSS CRC typically does not respond to checkpoint blockade, and comprises approximately 95 percent of colorectal cancer, so viral priming could dramatically expand the use of all CI's by making non-susceptible colorectal cancer tissue treatable by turning cold tumors hot.

Finally, in April, Oncolytics presented a poster highlighting the effectiveness of pelareorep in combination with Keytruda® and/or an anti-CD73 immunotherapy in prostate cancer cell lines, at the 11th International Oncolytic Virus Conference (IOVC). In an animal model, the combination treatment significantly increased survival compared to single agent therapy.

Growing Pipeline of Clinical Activity

This wealth of recently presented combination data points to the need and potential opportunity in evaluating pelareorep in combination with checkpoint inhibitors in larger studies. Our objective for these combinations will be to assess pelareorep's ability to have a meaningful impact on overall survival with these I-O agents. Management is actively pursuing these avenues of investigation with potential pharma partners and, as of now, we expect to have multiple collaborative studies announced through the end of the second quarter and possibly more in the third quarter. These studies would include both solid and heme malignancies where we've already demonstrated activity, as well as a confirmatory study in breast cancer – providing important efficacy, safety and biomarker data – will begin to enroll patients in the third quarter of 2018 and provide significant, value driving data read outs throughout 2019.

I can't stress enough how active and fast growing this area of oncology is today. We believe that immuno-oncology represents the greatest partnership opportunities at the highest valuations, for example the purchase of Viralytics by Merck for almost 400 million dollars and Bristol-Myers Squibb's recent partnering with Nektar valued at over 1.8 billion dollars in up-front payments and investment alone. This direction in I-O's collaborations is quickly becoming part of our strategic partnering plans and we look forward to providing updates on this in the coming months.

Metastatic Breast Program & KOL Call with Dr. Prat

In February, Oncolytics hosted a conference call for investors, featuring Dr. Aleix Prat, Head of Medical Oncology at Hospital Clinic of Barcelona and Executive Committee Member of the Breast International

Group. The call highlighted the unmet medical need to improve the overall survival of women with advanced or recurrent hormone receptor positive, HER2 receptor negative metastatic breast cancer and Dr. Prat expressed his enthusiasm and support for further development of pelareorep. The call also discussed preliminary details of the Oncolytics' planned phase 3 registration study in mBC, which will involve SOLTI and other large cooperative groups in North America and Europe.

Since this call we have continued to make progress in our preparations for our phase 3 registration study and recently received formal agreement from the FDA with our Special Protocol Assessment (SPA).

This agreement with the FDA, outlining the specific clinical pathway forward in metastatic breast cancer, is an important milestone in advancing pelareorep along a path to potential regulatory approval. It's a confirmation from the FDA that our design and protocols will support an application for approval and advances pelareorep to be a phase 3 asset. We continue to work on our manufacturing and supply requirements which are well under way to be completed ahead of the first patient enrolled. Final details of the phase 3 clinical trial will be made available at the launch of the study.

Looking Ahead

I've never been more excited about our future or felt we are in a better position than we are today. Overall, Oncolytics made significant strides in both clinical and business development, as well as corporate progress during the first quarter of 2018, and we intend to sustain that positive momentum for the rest of the year. Throughout 2018, management intends to focus on value creating clinical investigations, the evaluation of business development collaborations, and on the preparation and initiation of a registrational study for pelareorep. A key component of the strategy will be a near-term effort to demonstrate pelareorep's incredible potential with checkpoint inhibitors, a pursuit with potentially significant upside for Oncolytics' stakeholders and the potential to achieve value-creating milestones over the next 12 to 18 months.

I look forward to updating you on our exciting progress throughout the rest of 2018 and beyond.

/s/ Dr. Matt Coffey

President and CEO