March 3, 2022

Oncolytics Biotech® Reports Fourth Quarter and Full Year 2021 Financial Results and Recent Operational Highlights

Randomized phase 2 metastatic breast cancer trial (BRACELET-1) on track for top-line data in Q4 2022

Clinical breast cancer data indicate pelareorep-induced changes in blood T cell populations may be a predictive biomarker – a key finding for de-risking a phase 3 registrational breast cancer study

Interim safety updates from clinical trials in triple-negative breast and gastrointestinal cancers further demonstrate the favorable safety profile of pelareorep-checkpoint inhibitor combinations

Strong financial position with approximately $41.3 million and cash runway through key milestones and into 2023

Management hosting conference call and webcast today at 5:00 p.m. ET

SAN DIEGO and CALGARY, AB, March 3, 2022 /PRNewswire/ -- Oncolytics Biotech® Inc. (NASDAQ: ONCY) (TSX: ONC) today announced recent operational highlights and financial results for the quarter and year ended December 31, 2021. All dollar amounts are expressed in Canadian currency unless otherwise noted.

"We begin 2022 with a strong foundational dataset and potential value-inflection points expected across our pipeline throughout the year," said Dr. Matt Coffey, President and Chief Executive Officer of Oncolytics Biotech Inc. "Chief among these potential inflection points is the expected fourth quarter top-line data announcement for BRACELET-1, our randomized phase 2 trial in HR+/HER2- metastatic breast cancer. This trial builds upon prior clinical data demonstrating pelareorep's ability to deliver statistically significant survival benefits and synergize with checkpoint inhibition in breast cancer. Importantly, its completion represents

the last major clinical step on our path to a registrational study."

Dr. Coffey continued, "Our efforts to advance towards our 2022 milestones are built upon the progress we made in 2021. Analyses from the AWARE-1 breast cancer trial highlight changes in peripheral blood T cell populations as a potential predictive biomarker that could markedly identify patients most likely to respond to pelareorep. The use of such a biomarker could improve our chances of success in subsequent trials and we are working to further its development as part of BRACELET-1. We are employing a similar strategy in our triple-negative breast and gastrointestinal cancer trials, which are showing positive progress following recent updates confirming the favorable safety profile of pelareorep-checkpoint inhibitor combinations. Looking ahead, we will continue to leverage partnerships with industry leaders and academia to advance pelareorep across a spectrum of indications while remaining primarily focused on completing the steps needed to begin a registrational breast cancer study."

Fourth Quarter and Subsequent Highlights

Breast Cancer Program

AWARE-1 data indicate that changes in peripheral blood T cell populations may be a predictive biomarker of pelareorep therapy

Recently announced analyses from AWARE-1's first two cohorts focused on changes in T cell populations from the peripheral blood and tumors of early-stage HR+/HER2- breast cancer patients following treatment with pelareorep and letrozole without (cohort 1) or with (cohort 2) the PD-L1 inhibitor atezolizumab. These changes were compared to the CelTIL score (a measure of tumor cellularity and inflammation) and tumor-infiltrating CD8+ T cells, two metrics that are associated with favorable clinical outcomes. Collectively, the analyses reinforced pelareorep's immunotherapeutic mechanism of action and its ability to synergize with checkpoint inhibitors such as atezolizumab. They also indicated that changes in peripheral blood T cell populations may predict responses to pelareorep therapy and could potentially serve as a blood-based biomarker to inform the selection of patients in future studies. This has the potential to significantly de-risk a phase 3 registrational trial and supports expansion into indications that have historically not responded to checkpoint blockade therapies.

Reported a positive interim safety update from the phase 2 IRENE trial at the 2021 San Antonio Breast Cancer Symposium

IRENE is an investigator-sponsored, phase 2 trial designed to evaluate the safety and efficacy of pelareorep in combination with Incyte's anti-PD-1 checkpoint inhibitor retifanlimab for second- or third-line treatment of patients with metastatic triple-negative breast cancer (TNBC) who failed prior chemotherapy. Safety data from the trial show that the combination has been well-tolerated, as no safety concerns were noted in any of the five patients enrolled in the trial at the time of reporting (link to PR, link to poster). In addition to evaluating the safety and efficacy of pelareorep plus retifanlimab, IRENE is also designed to assess changes in PD-L1 expression and correlations between treatment outcomes and changes in peripheral blood T cell populations. This could provide a potential biomarker of pelareorep response that may enable the success of future trials by allowing for the early identification of patients most likely to respond to therapy.

Partner Adlai Nortye advanced to the second dose escalation cohort of theChinese bridging trial evaluating pelareorep-paclitaxel combination treatment in breast cancer

The bridging clinical trial is designed to satisfy Chinese regulatory requirements and thereby accelerate pelareorep's development in China, which comprises the world's second-largest pharmaceutical market. Advancement into the trial's second cohort followed the completion of dosing in the first cohort without any safety issues. The dose being evaluated in the second dose escalation cohort is equivalent to the dose administered in the IND-213 study, which reported a statistically significant near doubling of median survival in HR+/HER2- metastatic breast cancer patients. Results from the bridging trial are expected to allow Adlai Nortye to include data from IND-213 and Oncolytics' ongoing North American metastatic breast cancer trial, BRACELET-1, in future submissions to regulators in China and its territories.

Gastrointestinal Cancers Program

Reported positive interim safety and enrollment updates from phase 1/2 GOBLET trial

The GOBLET trial is being conducted by AIO, a leading academic cooperative medical oncology group based in Germany, and is designed to evaluate the safety and efficacy of pelareorep in combination with Roche's anti-PD-L1 checkpoint inhibitor atezolizumab in patients with advanced or metastatic pancreatic, colorectal, and anal cancers. The study design was featured in a poster at the American Society of Clinical Oncology Gastrointestinal Cancers Symposium (link to PR, link to poster) and included three-patient safety run-ins for two of its four cohorts (first-line advanced pancreatic cancer and third-line metastatic colorectal cancer). The pancreatic cancer cohort's safety run-in is fully enrolled and has been evaluated by the study's Data Safety Monitoring Board (DSMB). The DSMB noted no safety concerns and recommended the study proceed as planned. The safety run-in for the metastatic colorectal cancer cohort is fully enrolled and is awaiting DSMB review.

In addition to evaluating the safety and efficacy of pelareorep-atezolizumab treatment, GOBLET also seeks to assess the potential of CEACAM6 and T cell clonality as predictive biomarkers. An effective predictive biomarker could increase the likelihood of success of future registrational studies by allowing the selection of the most appropriate patients.

The trial builds on previously reported clinical proof-of-concept data for pelareorep-checkpoint inhibitor combination therapy in pancreatic cancer (link to PR, link to poster). It is also supported by prior early clinical data showing that pelareorep-based combination treatments stimulated an adaptive immune response and led to a greater than 90% clinical benefit rate in KRAS-mutated colorectal cancer patients (link to PR, link to study) and a greater than 80% increase in progression-free survival in pancreatic cancer patients with low levels of CEACAM6 expression (link to PR, link to poster).

Corporate Highlights

Promoted Thomas C. Heineman, M.D., Ph.D., to Chief Medical Officer

Dr. Heineman has over two decades of experience successfully leading clinical development programs and previously served as Oncolytics' Global Head of Clinical Development and Operations. Prior to joining Oncolytics, Dr. Heineman was Senior Vice President and Head

of Clinical Development at Denovo Biopharma and Vice President and Head of Clinical Development at both Genocea Biosciences and Halozyme Therapeutics. At Halozyme, Dr. Heineman was also Head of Translational Medicine and oversaw clinical trials in indications such as breast and pancreatic cancer. Dr. Heineman's experience further extends to big pharma and academia as he previously worked as Senior Director, Global Clinical Research and Development at GlaxoSmithKline and as an Associate Professor at the Saint Louis University School of Medicine.

Financial Highlights

- As of December 31, 2021, the Company reported $41.3 million in cash and cash equivalents.
- Operating expense was $3.8 million for the fourth quarter of 2021 and $13.3 million for the full year 2021, compared to $4.0 million in the fourth quarter of 2020 and $12.5 million for the full year 2020.
- R&D expense was $3.7 million for the fourth quarter of 2021 and $12.9 million for the full year 2021, compared to $4.1 million in the fourth quarter of 2020 and $12.9 million for the full year 2020.
- The net loss for the fourth quarter of 2021 was $7.8 million, compared to a net loss of $9.3 million in the fourth quarter of 2020. The basic and diluted loss per share was $0.14 in the fourth quarter of 2021, compared to a basic and diluted loss per share of $0.21 in the fourth quarter of 2020. The net loss for the full year 2021 was $26.3 million, compared to a net loss of $22.5 million for the full year 2020. The basic and diluted loss per share was $0.49 for the full year 2021, compared to a basic and diluted loss per share of $0.56 for the full year 2020.
- Net cash used in operating activities was $22.4 million for the full year 2021, compared to $22.1 million for the full year 2020.

Anticipated Milestones and Catalysts

- Completion of enrollment in phase 2 BRACELET-1 metastatic breast cancer study: Q1/Q2 2022
- Glioblastoma study update: H1 2022
- Multiple myeloma study data: H1 2022
- GOBLET 3rd-line metastatic colorectal cohort update: H1 2022
- GOBLET pancreatic cohort update: Q3 2022
- Top-line data from phase 2 BRACELET-1 metastatic breast cancer study: Q4 2022

Oncolytics expects to provide updates on the timing of the following milestones:

- Interim safety update from BRACELET-1 metastatic breast cancer study

Webcast and Conference Call
Management will host a conference call for analysts and institutional investors at 5:00 p.m. ET today, March 3, 2022. To access the call, please dial (888) 664-6383 (North America) or (416) 764-8650 (International) and, if needed, provide confirmation number 4650-7590. A live webcast of the call will also be available by clicking here or on the Investor Relations page of Oncolytics' website (LINK) and will be archived for three months. A dial in replay will be available for one week and can be accessed by dialing (888) 390-0541 (North America) or (416) 764-8677 (International) and using replay code: 507-590#.

ONCOLYTICS BIOTECH INC.
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION
(in Canadian dollars, except share amounts)

As at December 31,	2021	2020
Assets		
Current assets		
Cash and cash equivalents	**$ 41,262,044**	$ 31,219,574
Other receivables	**866,055**	89,661
Prepaid expenses	**2,775,800**	2,427,200
Total current assets	**44,903,899**	33,736,435
Property and equipment	**392,041**	236,664
Right-of-use assets	**584,251**	372,468
Total assets	**$ 45,880,191**	$ 34,345,567
Liabilities And Shareholders' Equity		
Current Liabilities		
Accounts payable and accrued liabilities	**$ 1,987,870**	$ 1,805,015
Other liabilities	**352,279**	123,985
Lease liabilities	**293,672**	248,885
Warrant derivative	**56,017**	531,228
Total current liabilities	**2,689,838**	2,709,113
Contract liability	**6,730,287**	6,730,287
Lease liabilities	**361,081**	153,174
Total liabilities	**9,781,206**	9,592,574
Commitments and contingencies		
Shareholders' equity		
Share capital Authorized: unlimited Issued: December 31, 2021 – 55,043,789 December 31, 2020 – 46,166,980	**391,348,183**	356,824,172
Warrants	**3,617,570**	3,617,570
Contributed surplus	**34,161,103**	31,022,356
Accumulated other comprehensive income	**387,738**	400,225
Accumulated deficit	**(393,415,609)**	(367,111,330)
Total shareholders' equity	**36,098,985**	24,752,993
Total liabilities and shareholders' equity	**$ 45,880,191**	$ 34,345,567

ONCOLYTICS BIOTECH INC.
CONSOLIDATED STATEMENTS OF LOSS AND COMPREHENSIVE LOSS
(in Canadian dollars, except share amounts)

For the years ended December 31,	2021	2020	2019
Expenses			
Research and development	**$ 12,920,371**	$ 12,944,510	$ 10,817,997
Operating	**13,314,574**	12,514,496	9,558,641
Loss before the following	**(26,234,945)**	(25,459,006)	(20,376,638)
Change in fair value of warrant derivative	**17,117**	3,491,928	(12,608,808)
Foreign exchange loss	**(135,636)**	(659,173)	(316,719)
Interest income, net	**98,612**	121,194	179,277
Loss before income taxes	**(26,254,852)**	(22,505,057)	(33,122,888)
Income tax expense	**(49,427)**	—	—
Net loss	**(26,304,279)**	(22,505,057)	(33,122,888)
Other comprehensive loss items that may be reclassified to net loss			
Translation adjustment	**(12,487)**	(63,876)	(143,403)
Net comprehensive loss	**$ (26,316,766)**	$ (22,568,933)	$ (33,266,291)
	$	$	$
Basic and diluted loss per common share	**(0.49)**	(0.56)	(1.50)
Weighted average number of shares (basic and diluted)	**53,513,225**	40,338,789	22,137,990

ONCOLYTICS BIOTECH INC.

CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY (DEFICIT)

(in Canadian dollars)

	Share Capital	Warrants	Contributed Surplus	Accumulated Other Comprehensive Income	Accumulated Deficit	Total
	$	$	$	$	$	$
As at December 31, 2018	285,193,061	3,617,570	28,260,613	607,504	(311,483,385)	6,195,363
Net loss and other comprehensive income	—	—	—	(143,403)	(33,122,888)	(33,266,291)
Issued pursuant to incentive share award plan	391,917	—	(391,917)	—	—	—
Issued pursuant to Common Stock Purchase Agreement	5,403,385	—	—	—	—	5,403,385
Issued pursuant to "At the Market" Agreement	8,476,454	—	—	—	—	8,476,454
Issued pursuant to public offering	3,314,429	—	—	—	—	3,314,429
Issued pursuant to warrant derivative exercised	9,152,869	—	—	—	—	9,152,869
Share-based compensation	—	—	1,470,153	—	—	1,470,153
Share issue costs	(854,256)	—	—	—	—	(854,256)
	$	$	$	$	$	$
As at December 31, 2019	311,077,859	3,617,570	29,338,849	464,101	(344,606,273)	(107,894)
Net loss and other comprehensive income	—	—	—	(63,876)	(22,505,057)	(22,568,933)
Issued pursuant to stock option plan	385,022	—	(143,100)	—	—	241,922
Issued pursuant to incentive share award plan	732,367	—	(732,367)	—	—	—
Issued pursuant to "At the Market" Agreement	40,037,786	—	—	—	—	40,037,786
Issued pursuant to warrant derivative exercised	6,332,778	—	—	—	—	6,332,778
Share-based compensation	—	—	2,558,974	—	—	2,558,974
Share issue costs	(1,741,640)	—	—	—	—	(1,741,640)
	$	$	$	$	$	$
As at December 31, 2020	356,824,172	3,617,570	31,022,356	400,225	(367,111,330)	24,752,993
Net loss and other comprehensive income	—	—	—	(12,487)	(26,304,279)	(26,316,766)
Issued pursuant to stock option plan	381,771	—	(143,321)	—	—	238,450
Issued pursuant to incentive share award plan	543,833	—	(543,833)	—	—	—
Issued pursuant to "At the Market" Agreement	34,168,071	—	—	—	—	34,168,071
Issued pursuant to warrant derivative exercised	686,616	—	—	—	—	686,616
Share-based compensation	—	—	3,825,901	—	—	3,825,901
Share issue costs	(1,256,280)	—	—	—	—	(1,256,280)
	$	**$**	**$**	**$**	**$**	**$**
As at December 31, 2021	**391,348,183**	**3,617,570**	**34,161,103**	**387,738**	**(393,415,609)**	**36,098,985**

ONCOLYTICS BIOTECH INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in Canadian dollars)

For the years ended December 31,	**2021**	**2020**	**2019**
Operating Activities			
Net loss for the year	**$ (26,304,279)**	$ (22,505,057)	$ (33,122,888)
Depreciation - property and equipment	**130,243**	88,957	122,982
Depreciation - right-of-use assets	**321,822**	357,230	362,592
Share-based compensation	**3,825,901**	2,558,974	1,470,153
Interest expense on lease liabilities	**91,727**	68,526	94,817
Unrealized foreign exchange loss	**425,681**	645,078	353,189
Change in fair value of warrant derivative	**(17,117)**	(3,491,928)	12,608,808
Net change in non-cash working capital	**(907,987)**	209,779	(1,795,777)
Cash used in operating activities	**(22,434,009)**	(22,068,441)	(19,906,124)
Investing Activities			
Acquisition of property and equipment	**(285,948)**	(29,305)	(10,905)
Cash used in investing activities	**(285,948)**	(29,305)	(10,905)
Financing Activities			
Proceeds from exercise of stock options	**238,450**	241,922	—
Proceeds from exercise of warrants	**230,946**	1,696,460	3,465,867
Proceeds from Common Stock Purchase Agreement	**—**	—	5,360,247
Proceeds from "At the Market" equity distribution agreement	**32,911,791**	38,296,146	8,131,620
Proceeds from public offering	**—**	—	4,505,359
Payment of lease liabilities	**(365,510)**	(460,724)	(447,497)
Cash provided by financing activities	**33,015,677**	39,773,804	21,015,596
Increase in cash	**10,295,720**	17,676,058	1,098,567
Cash and cash equivalents, beginning of year	**31,219,574**	14,148,021	13,699,881
Impact of foreign exchange on cash and cash equivalents	**(253,250)**	(604,505)	(650,427)
Cash and cash equivalents, end of year	**$ 41,262,044**	$ 31,219,574	$ 14,148,021

About Oncolytics Biotech Inc.

Oncolytics is a biotechnology company developing pelareorep, an intravenously delivered immunotherapeutic agent. This compound induces anti-cancer immune responses and promotes an inflamed tumor phenotype -- turning "cold" tumors "hot" -- through innate and adaptive immune responses to treat a variety of cancers.

Pelareorep has demonstrated synergies with immune checkpoint inhibitors and may also be synergistic with other approved oncology treatments. Oncolytics is currently conducting and planning clinical trials evaluating pelareorep in combination with checkpoint inhibitors and targeted therapies in solid and hematological malignancies as it advances towards a registration study in metastatic breast cancer. For further information, please visit: www.oncolyticsbiotech.com.

This press release contains forward-looking statements, within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended and forward-looking information under applicable Canadian securities laws (such forward-looking statements and forward-looking information are collectively referred to herein as "forward-looking statements"). Forward-looking statements contained in this press release include statements regarding Oncolytics' belief as to the potential and benefits of pelareorep as a cancer therapeutic; Oncolytics' expectations as to the purpose, design, outcomes and benefits of its current or pending clinical trials involving pelareorep; our plans and expectations regarding a potential registrational study in breast cancer, including the anticipated timing and impact of the announcement of our top-line data announcement for BRACELET-1, the other steps necessary to position us for the registrational study and various timing matters related thereto; our expectations regarding enrollment in our various studies and the planned timing of further announcements in respect thereto; our intention to continue to leverage

partnerships with industry leaders and academia and the anticipated benefits thereof; our expectations regarding the Adlai Nortye bridging clinical study and the potential benefits therefrom; our upcoming milestones and catalysts and the anticipated timing of release of updates in respect thereof; our cash runway; our plans to advance towards a registration study in metastatic breast cancer; and other statements related to anticipated developments in Oncolytics' business and technologies. In any forward-looking statement in which Oncolytics 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. Such forward-looking statements involve known and unknown risks and uncertainties, which could cause Oncolytics' actual results to differ materially from those in the forward-looking statements. Such risks and uncertainties include, among others, the availability of funds and resources to pursue research and development projects, the efficacy of pelareorep as a cancer treatment, the success and timely completion of clinical studies and trials, Oncolytics' ability to successfully commercialize pelareorep, uncertainties related to the research and development of pharmaceuticals, uncertainties related to the regulatory process and general changes to the economic environment. In particular, we may be impacted by business interruptions resulting from COVID-19 coronavirus, including operating, manufacturing supply chain, clinical trial and project development delays and disruptions, labour shortages, travel and shipping disruption, and shutdowns (including as a result of government regulation and prevention measures). It is unknown whether and how Oncolytics may be affected if the COVID-19 pandemic persists for an extended period of time. We may incur expenses or delays relating to such events outside of our control, which could have a material adverse impact on our business, operating results and financial condition. Investors should consult Oncolytics' quarterly and annual filings with the Canadian and U.S. securities commissions for additional information on risks and uncertainties relating to the forward-looking statements. Investors are cautioned against placing undue reliance on forward-looking statements. The Company does not undertake any obligation to update these forward-looking statements, except as required by applicable laws.

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