

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> The exact sample size (<i>n</i>) for each experimental group/condition, given as a discrete number and unit of measurement
<input type="checkbox"/>	<input checked="" type="checkbox"/> A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
<input type="checkbox"/>	<input checked="" type="checkbox"/> The statistical test(s) used AND whether they are one- or two-sided <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/> A description of all covariates tested
<input checked="" type="checkbox"/>	<input type="checkbox"/> A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
<input type="checkbox"/>	<input checked="" type="checkbox"/> A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
<input type="checkbox"/>	<input checked="" type="checkbox"/> For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/> For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
<input checked="" type="checkbox"/>	<input type="checkbox"/> For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
<input checked="" type="checkbox"/>	<input type="checkbox"/> Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i>), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	n/a
Data analysis	or serum cytokine analyses: xPONENT version 4.2 or later MILLIPLEX Analyst version 5.1.1.0 or later for calculation of concentrations and statistical analyses All graphics done in GraphPad prism version 9.4.1. Report summaries generated using validated Base SAS® software, version 9.4 or higher, on a PC or server-based platform.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

Patient-related information not presented in this manuscript was collected as part of a clinical trial and is subject to patient confidentiality consideration. Upon

completion of the final clinical study report, summary-level results will be made public and shared in a manner consistent with clinical data-sharing guidelines. The datasets generated and/or analyzed during the current study are not publicly available due to proprietary considerations beyond the data that was disclosed in the manuscript. All data reported are anonymized to respect the privacy of patients who participated in the study, consistent with applicable laws and regulations.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender	Sex was ascertained by the screening investigator. Given the sample size, outcomes were not reported according to sex.
Reporting on race, ethnicity, or other socially relevant groupings	Population demographics are reported in Supplemental Table 1. Given the sample size, outcomes were not reported according to race, ethnicity or other socially relevant groupings.
Population characteristics	Information on age, ECOG performance status, cancer type and treatment history were obtained at screening and are presented in the manuscript in the demographics table.
Recruitment	Participants were recruited by the investigators at participating clinical trial centers. To participate in this study and before any non-routine baseline or screening evaluations, investigators at each site ensured that each patient was fully informed regarding any potential risks and patients signed an informed consent form. Eligibility criteria are detailed in the Methods section of the manuscript and in the clinical protocol. No self-selection or other biases are expected as the inclusion and exclusion criteria detail eligibility for enrollment.
Ethics oversight	<p>The final study protocol and subject informed consent documentation was approved by the Institutional Review Board (IRB)/Independent Ethics committee (IEC) was conducted by 17 Investigators at 15 sites in the United States and any other site level committee deemed appropriate by the 15 institutions listed below. Approval from each applicable committee was received in writing before initiation of the study. Below lists the institutional review boards and ethics committees.</p> <p>Site: Duke University Medical Center Investigator: Christopher Hoimes, MD Institutional review board or ethics committee: Duke University Health System Institutional Review Board, 2200 West Main Street, Suite 900 Erwin Square, Durham, NC 27705</p> <p>Site: The University of Texas MD Anderson Cancer Center Investigator: E. Caterina Dumbrava, MD Institutional review board or ethics committee: The University of Texas MD Anderson Cancer Center, Office of Human Subject Protection 7007 Bertner Avenue, Unit 1637, Houston, TX 77030</p> <p>Site: H. Lee Moffitt Cancer Center and Research Institute Investigator: Monica Chatwal (formerly Dae Won Kim), MD Institutional review board or ethics committee: Advarra IRB, 6940 Columbia Gateway Drive Suite 110, Columbia MD 21046</p> <p>Site: The Sarah Cannon Research Institute Investigator: Johanna Bendell, MD Institutional review board or ethics committee: Western Institutional Review Board, 1019 39th Avenue SE Suite 120, Puyallup, WA 98374</p> <p>Site: Roswell Park Cancer Institute Investigator: Gurkumal Chatta MD Institutional review board or ethics committee: Roswell Park Institute Institutional Review Board, Elm & Carlton Streets, Buffalo, New York 14263</p> <p>Site: Baylor Charles A. Sammons Cancer Center. Investigator: Carlos Becerra Institutional Review Board or ethics committee: Baylor Scott & White Research IRB One Baylor Plaza, Houston, Texas 77030</p> <p>Site: Winship Cancer Institute at Emory University. Investigator: Mehmet Asim Bilen Institutional review board or ethics committee: Western Institutional Review Board (WCG IRB), 1019 39th Avenue SE Suite 120, Puyallup, WA 98374</p> <p>Site: Columbia University Medical Center Investigator: Mark Stein (formerly Gulam Manji), MD Institutional Review Board or ethics committee: CUMC 154 Haven Avenue, 2nd Floor New York, NY 10032</p> <p>Site: University of Chicago Investigator: Walter Stadler, MD Institutional Review Board: Biological Sciences Division/University of Chicago Medical Center IRB Committee C. 5841 S.</p>

Maryland Ave., MC7132, I-625, Chicago, IL 60637

Site: Thomas Jefferson University

Investigator: Usama Gergis, MD

Institutional review board or ethics committee: Western Institutional Review Board, 1019 39th Avenue SE Suite 120, Puyallup, WA 98374

Site: John Theurer Cancer Center at Hackensack University Medical Center

Investigator: Martin Gutierrez, MD

Institutional review board or ethics committee: Western Institutional Review Board, 1019 39th Avenue SE Suite 120, Puyallup, WA 98374

Site: Karmanos Cancer Institute

Investigator: Elisabeth Heath, MD

Institutional review board or ethics committee: Western Institutional Review Board (WCG IRB), 1019 39th Avenue SE Suite 120, Puyallup, WA 98374

Site: University of Nebraska Medical Center

Investigator: Benjamin Teply, MD

Institutional review board or ethics committee: University of Nebraska Medical Center, Office of Regulatory Affairs (ORA) Institutional Review Board (IRB) Academic and Research Services Building 3000, 987830 Nebraska Medical Center, Omaha, NE 68198-7830

Site: Rush University

Investigator: Timothy Kuzel, MD

Institutional review board: Rush University's Office of Research Affairs

Site: Hospital of the University of Pennsylvania

Investigator: Mark O'Hara

Institutional review board or ethics committee: Western Institutional Review Board (WCG IRB), 1019 39th Avenue SE Suite 120, Puyallup, WA 98374

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	Sample sizes in this report were determined by the original clinical trial design and sample availability and consistent with a 3+3 study design.
Data exclusions	Sample sizes in this report were determined by the original clinical trial design and sample availability; no additional exclusions were applied.
Replication	n/a for a human phase 1 clinical trial
Randomization	The clinical trial was single-arm clinical trial.
Blinding	This was an open-label study

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
<input type="checkbox"/>	<input checked="" type="checkbox"/> Antibodies
<input type="checkbox"/>	<input checked="" type="checkbox"/> Eukaryotic cell lines
<input checked="" type="checkbox"/>	<input type="checkbox"/> Palaeontology and archaeology
<input checked="" type="checkbox"/>	<input type="checkbox"/> Animals and other organisms
<input type="checkbox"/>	<input checked="" type="checkbox"/> Clinical data
<input checked="" type="checkbox"/>	<input type="checkbox"/> Dual use research of concern
<input checked="" type="checkbox"/>	<input type="checkbox"/> Plants

Methods

n/a	Involved in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> ChIP-seq
<input checked="" type="checkbox"/>	<input type="checkbox"/> Flow cytometry
<input checked="" type="checkbox"/>	<input type="checkbox"/> MRI-based neuroimaging

Antibodies

Antibodies used

Describe all antibodies used in the study; as applicable, provide supplier name, catalog number, clone name, and lot number.

Validation

Describe the validation of each primary antibody for the species and application, noting any validation statements on the manufacturer's website, relevant citations, antibody profiles in online databases, or data provided in the manuscript.

Eukaryotic cell lines

Policy information about [cell lines and Sex and Gender in Research](#)

Cell line source(s)

HPAC-RFP cells used for assessment of product cytotoxicity were originally derived from ATCC CRL-2119, which is a Human Pancreatic Adenocarcinoma cell line. The original origin of the HPAC line was from the pancreas of a 64-day old white female patient with adenocarcinoma. The base HPAC cell line was transduced using a lentiviral vector sourced from Essen Biosciences to stably express red fluorescent protein (RFP), which was used to count live HPAC cells in an IncuCyte device.

Authentication

Cell line was used as described above.

Mycoplasma contamination

This HPAC-RFP cell line was qualified internally for performance in the cytotoxicity assay, which included testing for mycoplasma contamination (result was negative).

Commonly misidentified lines
(See [ICLAC](#) register)

n/a

Clinical data

Policy information about [clinical studies](#)All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration

NCT02744287

Study protocol

The clinical protocol has been included.

Data collection

Clinical data was collected by Bellicum Pharmaceuticals; sponsor of the clinical trial through an electronic clinical database with data entry provided by each participating site for their enrolled patients. The first subject enrolled November 29, 2016 and the last subject completed the study March 14, 2023.

Outcomes

Commonly used safety and efficacy clinical endpoints for phase 1 oncology clinical trials were selected. Safety and efficacy assessments were performed according to CTCAE grading, PCWG3 criteria and RECIST and analyzed per the SAP.

Plants

Seed stocks

n/a

Novel plant genotypes

n/a

Authentication

n/a